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Amitrajeet A. Batabyal
Yoshiro Higano
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Rural–Urban Dichotomies and Spatial Development in Asia

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Books are as useful to a stupid person as a mirror is useful to a blind person.

Kautilya
375BCE–283BCE

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Rochester, New York, USA — Amitrajeet A. Batabyal
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Part I
Introduction

Chapter 1
Introduction to Rural-Urban Dichotomies and Spatial Development in Asia

Amitrajeet A. Batabyal, Yoshiro Higano, and Peter Nijkamp

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Abstract Following this introductory chapter which comprises Part I of the book, there are 11 chapters and each of these chapters—written by an expert or by a team of experts—discusses a particular research question or questions about rural-urban dichotomies and spatial development in Asia. For ease of comprehension, we have

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divided the present volume containing 12 chapters into five parts. Part II of this book focuses on migration and this part consists of two chapters. Part III concentrates on the provision of goods and services and this part of the book consists of three chapters. Part IV focuses on conflict and this part consists of two chapters. The focus of the four chapters that comprise Part V of this book is on reforms and their impacts.

Keywords Middle class · Economic growth · Rural-urban divide · Determinants of middle class

1.1 Preliminaries

In the post-World War II era, beginning with the prominent work of Lewis (1954), one standard way in which development economists such as Gupta (1993), Basu (2000), and others have studied rural-urban dichotomies is in terms of the rural to urban *migration* of labor in so-called dual economy models.[1] In such models, production in one sector of the economy is targeted to the satisfaction of local needs and production in the other sector is targeted to the global export market. Lewis (1954) used the concept of a dual economy as the basis of what might be called his labor supply theory of rural-urban migration. He distinguished between a rural low-income subsistence sector with surplus labor and an expanding urban capitalist sector. Put succinctly, the urban sector absorbs the migrating labor from the rural areas until the rural surplus has been exhausted.

Like development economists, regional scientists have also analyzed rural-urban dichotomies in the post-World War II era.[2] In this regard, Batabyal et al. (2019a) and Batabyal and Yoo (2019) tell us that in the work of many regional scientists, urban regions are frequently dynamic, they display relatively rapid rates of economic growth, they are industrial, and they are often technologically more advanced. In contrast, rural regions are viewed as being not as dynamic, they are often agricultural, they display slow rates of growth, and they are technologically backward. This bipartite characterization has been used by regional scientists to point to rural-urban disparities in metrics such as education (Jordan et al. 2014), health (Hall et al. 2006), and income (Yamamoto 2008).

Schaeffer et al. (2013) have rightly pointed out that until the mid-twentieth century, "rural" could be thought of as being the opposite of "urban." However, with ongoing urbanization, economic and social structures of rural and urban regions have become more similar. Even so, perceptions and attitudes, these researchers

[1] See Ray (1998), Fields (2004), and Gollin (2014) for additional details on dual economy models.

[2] This said, it should be noted that earlier regional scientists such as Christaller (1933) and Losch (1954) have studied rural and urban regions in Europe specifically.

note, often survive long after the conditions that shaped them have changed. In this regard and with particular focus on Asia, researchers such as McGee (1998, 2008), Lerner and Eakin (2011), and Anonymous (2015) have all contended that given the increasing salience of urbanization in driving economic growth and development, it is now time to *rethink* the more traditional ways of conceptualizing rural-urban dichotomies in Asia.

Consistent with the above line of reasoning, the first of this book's two objectives is to bring together in one place, original research that sheds new light on rural-urban dichotomies and spatial development when these dichotomies are viewed *broadly* to include, in addition to migration, topics like the provision of goods and services, conflict, and economic reforms and their impacts.

That said, several researchers such as Mahbubani (2008), Batabyal and Nijkamp (2017), and Batabyal et al. (2019b) have noted that in the last two centuries, as the West (North America and Western Europe) was holding sway on the world stage, Asian nations were mainly bystanders, responding to increasing surges of Western commerce, thought, and power. However, there is now an ongoing shift in the global center of gravity. Specifically, geopolitical and economic power are gradually moving away from the West to Asia and therefore Asia is returning, according to Mahbubani (2008), to the global center stage it occupied for 18 centuries before the rise of the West.[3]

This state of affairs has led to a considerable amount of hand-wringing and soul-searching—see Allison (2017) and Rachman (2017)—in the West. In particular, the rise of Asia has led to some rebalancing in America's foreign policy and specifically to President Obama's pivot to Asia and, more recently, to President Trump's attacks on Huawei and his trade war with China.[4] The geopolitical and economic rise of Asia raise salient questions about how rural-urban dichotomies and spatial development ought now to be viewed in this vast continent. Also, given the present-day significance of Asia, Sen (2001) has rightly remarked that lessons learned about rural-urban dichotomies and spatial economic development in Asia are likely to prove useful for the design and implementation of suitable policies in other continents of the world. This state of affairs provides a rationale for the second of our two objectives and that is to study rural-urban dichotomies and spatial development in *Asia*.

Following this introductory chapter which comprises Part I of the book, there are 11 chapters and each of these chapters—written by an expert or by a team of experts—discusses a particular research question or questions about rural-urban dichotomies and spatial development in Asia. For ease of comprehension, we have divided the present volume containing 12 chapters into five parts. Part II of this book focuses on migration and this part consists of two chapters. Chapter 2 provides a detailed discussion of agritourism, unemployment, and rural-urban migration in an

[3] See Myrdal (1968) for an alternate perspective on Asia and South Asia in particular.

[4] See Batabyal (2018a, b, c) for additional details on this last point.

Asian developing nation such as Cambodia. Chapter 3 sheds light on the extent to which reference-dependent preferences influence migration within Japan.

Part III concentrates on the provision of goods and services and this part of the book consists of three chapters. Chapter 4 looks at the extent to which rural and urban residents are satisfied with the provision of public goods and services in China. Chapter 5 examines the rural versus urban gap in the provision of healthcare and in the accessibility of what the chapter calls cultural services in South Korea. Chapter 6 analyzes the ways in which the provision of education affects rural and urban life by providing a comparative study of Indonesia, Myanmar, and the Philippines.

Part IV focuses on conflict and this part consists of two chapters. Chapter 7 demonstrates the ways in which domestic violence spills over across space in Nepal. Chapter 8 contains a formal analysis of how conflict about the distribution of natural resources can lead to a desire to secede by a minor region when this region is part of a larger nation.

The focus of the four chapters that comprise Part V of this book is on reforms and their impacts. Chapter 9 uses a three-sector, mobile capital version of the prominent Harris-Todaro model[5] to provide a general equilibrium analysis of economic liberalization and structural change in a developing country such as India. Chapter 10 analyzes the extent to which there is convergence in monthly per capita expenditures across states in India and in rural and urban regions in particular. Chapter 11 sheds light on the determinants of the rise of the middle class in India with particular emphasis on the rise in the rural and in the urban areas within this nation. Finally, Chap. 12 studies the difficulties associated with the implementation of community-driven development projects in the presence of circular and cyclical migration of workers to and from the capital city of Dili in Timor-Leste. With this preliminary discussion out of the way, we now proceed to comment on the intellectual contributions of the individual chapters in this book.

1.2 Migration

1.2.1 Agritourism and Welfare

Agritourism is one kind of tourism that seeks to attract visitors to rural and agricultural regions to provide these visitors with distinct educational and recreational experiences.[6] Although one associates this kind of tourism primarily with the developed—Europe and the United States—world, increasingly, this kind of tourism is also becoming popular in Asian nations such as Cambodia, the Philippines, and

[5]See Harris and Todaro (1970) for a full description of this model.

[6]Go to https://nationalaglawcenter.org/overview/agritourism/ for additional details. Accessed on 28 October 2020.

Thailand. What impact will policies that are designed to promote agritourism have on labor markets? This is the central question that is addressed by Chap. 2.

This chapter extends the Copeland and Taylor (1999) model and focuses on a small developing nation in which there are three industries. First, there is the smokestack manufacturing industry which is located in an urban area and this industry gives rise to pollution. Second, there is an environmentally sensitive agricultural industry that is located in a rural area and is adversely affected by the manufacturing industry pollution. Finally, there is an agritourism industry that is located in the rural region and that contributes to environmental protection. The main factors of production in the model are labor, foreign capital, and the environmental stock.

The static analysis conducted in this chapter sheds useful light on the impacts of potential policy changes. To this end, consider the case of an Asian developing nation that would like to enhance domestic economic welfare and reduce the unemployment rate in the urban region. To attain these two objectives, this nation institutes (1) a policy that leads to the outflow of labor from the manufacturing industry, (2) a policy to promote urban employment, and (3) a foreign investment policy that is designed to grow the manufacturing industry.

Comparative statics analysis demonstrates that a policy that results in an outflow of labor from the manufacturing industry will reduce the labor input in this industry and in the agritourism industry. Also, this policy will lead to a rise in the competitive wage rate but the price of the manufacturing good will fall. Finally, this "labor outflow" policy has two additional impacts. First, there is a positive impact on domestic economic welfare, and second, the ratio of unemployed to employed workers in the urban region goes down. It is important to recognize that in the model of this chapter, encouraging the outflow of labor is the *only* way in which a policymaker can ensure that domestic economic welfare rises.

Is it possible to raise domestic economic welfare by focusing policy attention on the agritourism industry exclusively? To answer this question, Chap. 2 analyzes the effects of a policy that (1) improves labor productivity in this industry, (2) involves shifting resources to foster what this chapter calls "agricultural-good-intensive tourism," and (3) introduces environmentally friendly technology.

Once again, comparative statics analysis shows that when the marginal product of labor in the manufacturing industry is sufficiently inelastic to additions of the labor input, promoting agricultural-good-intensive tourism will *attenuate* domestic economic welfare. In contrast, when this same condition is satisfied, the introduction of environmentally friendly technology *raises* domestic economic welfare. Even though Chap. 2 does a good job of analyzing how supply-side forces affect agritourism in a developing nation, this chapter omits a discussion of demand-side factors. The impacts of one kind of demand-side factor are studied in Chap. 3.

1.2.2 Reference-Dependent Preferences

At least since the well-known work of Harris and Todaro (1970), we know that economic factors play a major role in the decision to migrate from one region to another. Even so, Chap. 3 points out that in a developed nation such as Japan, people continue to migrate to urban areas even though economic and population growth have both leveled off for many years. To explain this puzzling state of affairs, Chap. 3 studies internal migration in Japan theoretically and empirically. The primary focus of this study is on what is called "reference-dependency." This is the idea that an individual's utility depends at least in part on his or her comparison with either a reference group of individuals or with this individual's own past state or states.

From an empirical standpoint, Chap. 3 points out that even though there is no absolute poverty in the rural regions of Japan and that this nation's population has been declining, many large Japanese cities are continuing to grow their populations. To explain this seemingly quixotic state of affairs, Chap. 3 begins by noting that within each prefecture in Japan, there is a negative relationship between the Gini coefficient[7] and an individual's subjective level of satisfaction. This finding tells us that if we leave absolute income levels aside, individuals *may* obtain disutility from income disparities within prefectures. This last point is then used to analyze internal migration in Japan with models in which there are (1) two regions, (2) two types of residents who differ in their labor skills, and (3) preferences that are "reference-dependent."

When an individual's utility depends on his or her present consumption and on the difference between present and past consumption, the functional forms describing the dependence of utility on these two kinds of consumption matters for migration decisions. Specifically, if these functional forms are linear then the reference-dependence disappears and an individual's migration decision depends simply on the difference between absolute consumption levels. When one departs from linearity and an individual's utility depends on the *ratio* of present consumption to a power function of past consumption, things are different. The reference-dependency idea now matters and it works like a centrifugal force. In other words, as the power function of past consumption—which is the denominator of the ratio mentioned above—becomes larger, an individual is *less* likely to migrate from the poor to the rich region.

Does the above story change when an individual's utility depends not on his or her past consumption but instead on the consumption of others or a reference group? This question is addressed in Chap. 3 in part by concentrating on the case where the reference point in a particular time period is proportional to the average consumption level of the region's residents in the previous time period. The analysis undertaken shows that this kind of reference-dependency reduces the incentive to migrate to the

[7]Go to https://web.archive.org/web/20140712032137/https://data.undp.org/dataset/Income-Gini-coefficient/36ku-rvrj for more on the Gini coefficient. Accessed on 28 October 2020.

wealthier region. In contrast, when individuals have incomplete information about where the reference point lies, it is possible for the overall population distribution to be affected and this fact provides a potential explanation for the observed overpopulation in some Japanese cities. With this discussion of the two chapters about migration that comprise Part II of this book out of the way, we now turn to the three chapters on goods and services that make up Part III of the book.

1.3 Goods and Services

1.3.1 Provision of Public Goods and Services

Given China's remarkable economic growth in the last four decades, we now know that many of its citizens have been lifted out of poverty. In addition, millions of rural residents have migrated to China's sparkling urban centers such as Beijing and Shanghai. Chapter 4 points out that even though the Chinese government has provided a significant amount of public goods and services, this provision has been skewed toward the nation's urban centers. Therefore, city dwellers have benefited disproportionately and rural residents, including those who have migrated to the big cities, have benefited little. Although this saturnine state of affairs has a lot to with the strict enforcement of China's *hukou* or household registration system, it is still interesting to analyze the extent to which rural and urban *hukou* holders are satisfied by the provision of public goods and services by the Chinese government.

Such an analysis is conducted empirically in Chap. 4. Specifically, this chapter uses the 2015 Chinese General Social Survey (CGSS) to statistically study (1) the differences between rural and urban *hukou* holders in their perception of the provision of public goods, (2) whether an individual's *hukou* status predicts how satisfied (s)he is with the governmental provision of public goods, and (3) how rural and urban *hukou* holders respond to the provision of specific kinds of public goods and services.

When asked how satisfied they were with the current provision of public goods and services along four dimensions, respondents in the 2015 CGSS dataset answered that when looked at in terms of the distribution of resources, they were more satisfied than dissatisfied about the resource's adequacy, convenience, and inclusivity. How much does one's *hukou* status influence how one views the provision of public goods? Additional analysis with the 2015 CGSS dataset reveals that although less than one-half (48.12%) of all urban *respondents* were satisfied with the provision of public goods, more than one-half (51.88%) of *urban hukou holders* were dissatisfied with the same provision of public goods.

Moving on to the rural versus urban dichotomy, Chap. 4 shows that as far as the adequacy of the provided resources and the convenience of accessing public services are concerned, urban *hukou* holders are slightly more satisfied than rural *hukou* holders. In this regard, two additional results are worth emphasizing. First, econometric analysis demonstrates that there is a clear and statistically significant

association between an individual's *hukou* status and this individual's satisfaction with the provision of public goods. Second, controlling for, *inter alia*, gender, marital status, and the highest education level, the chance that a rural hukou holder is satisfied with the provision of public goods and services is 20% *less* than the corresponding chance for an urban *hukou* holder.

A central point that is repeatedly made in Chap. 4 is that the satisfaction an individual feels from the provision of public goods and services depends fundamentally on this individual's hukou status. That said, are these Chap. 4 results about rural-urban dichotomies with regard to the provision of public goods and services specific to China or can one find similar results in other Asian nations? This question is addressed in Chap. 5 which focuses on South Korea.

1.3.2 Healthcare and Access to Cultural Services

The authorities in South Korea have known for some time now that even though this nation has rapidly industrialized and urbanized, relative to urban regions, most rural regions are lagging behind. To ameliorate this state of affairs, in 2004, the Korean government implemented the SAQL Act that is designed to improve the quality of life of people resident in agricultural and fishing villages. In 2011, a so-called "Rural Services Standard" was established as a part of the SAQL Act. The purpose of this standard is to create policy targets for vital services that promote quality of life. In particular, to demonstrate its support for vulnerable groups in society, the Korean government established emergency medical facilities, small libraries, and cultural facilities in rural areas.

Although several observers have commented on the need to improve public services for socially disadvantaged groups of people in rural areas, Chap. 5 points out that there is a paucity of research that comprehensively studies the rural service environment and concentrates on rural attributes, particular regional units, and alternate kinds of services. Given this lacuna in the literature, Chap. 5 recommends the use of what it calls the "Service Accessibility Vulnerability Index" (SAVI) to analyze the accessibility to services across regions from a rural-urban vantage point. A key aspect of the analysis undertaken in this chapter is that it utilizes the *Si-Gun-Gu* or a self-governing local jurisdiction—comparable to counties in the United States—as a spatial unit of analysis. There are 250 *Si-Gun-Gu's* in South Korea and together they cover the entire nation and hence make it possible to make rural versus urban comparisons in a meaningful manner. As such, this chapter contends that the use of the SAVI will assist policymakers in prioritizing the type of services to provide in different regions based on a service supply strategy that is demand driven.

The data used in this chapter come from various sources and the SAVI that is created itself consists of three subindices representing spatial accessibility, social vulnerability, and economic vulnerability. In words, the SAVI measures the level of difficulty in accessing services due to distance, social, and economic factors. Therefore, the larger is the SAVI, the more vulnerable is a study region because of limited

accessibility to services. Put differently, the SAVI is high in study regions where there is a concentration of vulnerable people and/or where the distance to service facilities is great.

The estimation of vulnerability reveals that distant rural areas not only have concentrations of low-income households but that these areas also have higher concentrations of elderly people. As far as medical facilities are concerned, there are significant differences between rural and urban areas. Specifically, although per capita *public* healthcare facilities in rural areas are much higher than in urban areas, urban areas have much higher per capita *private* medical centers. Comparing the SAVI across rural and urban areas, Chap. 5 demonstrates that relative to all other rural and urban areas, major metropolitan cities like Seoul and Pusan have the lowest SAVIs and hence are the *least* vulnerable as far as the availability of healthcare is concerned.

How do local characteristics influence vulnerability in terms of access to services? Results obtained in this chapter show that relative to urban areas, rural areas with small populations and labor supply shortages—stemming from the presence of ageing populations—are likely to suffer most from reduced accessibility to services. In addition, local economic conditions are highly correlated with the magnitude of the SAVI. One question that is left unexplored in Chap. 5 concerns the role that education plays in influencing economic welfare across rural and urban regions in Asia. This salient question is studied expansively in Chap. 6.

1.3.3 Education and Inequality

There is no gainsaying the point that education has a considerable impact on both economic development and welfare. Therefore, it is certainly interesting to study whether the expansion of education in a particular nation has narrowed or widened income inequality. To this end, Chap. 6 uses household surveys from Indonesia, Myanmar, and the Philippines to analyze how the expansion of education has affected the distribution of economic well-being in these three nations. The focus in this chapter is on expenditures and *not* on income because expenditure data are more reliable than data on incomes and because expenditure data track economic welfare more closely than do income data.

The methodology utilized in this chapter to study the effects of the expansion of education is in three steps. First, the chapter analyzes inequality in the number of years of education among households—called educational inequality—by carrying out an inequality decomposition analysis by rural and urban sectors, using the Gini coefficient.[8] Second, it employs the so-called Blinder-Oaxaca decomposition method to study the impact of education on the disparities in rural-urban mean per capita expenditure or expenditure inequality. Finally, using a decomposition method

[8]See footnote 7.

developed by Akita and Miyata (2013), this chapter removes the impact of rural-urban differences in educational endowments on expenditure inequality and then ascertains the particular role that education plays in determining expenditure inequality.

Empirical analysis shows that in Indonesia, even though the mean level of educational attainment has increased in both rural and urban areas, it has increased faster in rural areas. In this regard, the expansion of secondary education has *reduced* educational inequality between rural and urban areas and within rural areas. In Myanmar, because of the expansion in preprimary and primary education relative to secondary education, the mean number of years of education and overall educational inequality have both declined, albeit very slightly. In addition, existing educational disparities in rural versus urban education has contributed to a *rise* in overall educational inequality. Finally, in the Philippines, secondary education has been expanded in rural and in urban areas and this has resulted in a *decline* in rural and urban educational inequality. In turn and unlike the case of Myanmar, the expansion in secondary education has led to a *fall* in overall educational inequality.

A hierarchical decomposition of expenditure inequality by location and education provides interesting insights into each of the three countries being studied. In Indonesia, disparities in expenditure between different educational groups contributed greatly to overall inequality in urban areas but not in rural areas. In addition, the disparity in expenditure between the different educational groups has gone up in rural *and* in urban areas. In Myanmar, if policymakers are to attenuate the overall expenditure inequality then they will first need to concentrate their efforts on reducing the existing inequalities between the different educational groups. Also, it will be important to account for the fact that in urban areas, formal job opportunities are limited for older households, and as a result, many such households are likely to find employment only in the informal sector. Finally and in contrast to the situation in Indonesia and Myanmar, Chap. 6 shows that overall expenditure in the Philippines has declined markedly in the time period being studied. That said, policymakers need to pay close attention to the fact that even though female headed households are only 22% of all urban households, such households with lower education are particularly vulnerable to economic shocks. This completes our discussion of the three chapters that comprise Part III of this book. We now shift gears and proceed to discuss the topic of conflict that is covered in the two chapters that make up Part IV of the book.

1.4 Conflict

1.4.1 Domestic Violence and Spatial Spillovers

Chapter 7 concentrates on one kind of conflict, i.e., domestic violence, a topic of considerable importance that has, to the best of our knowledge, been little studied by regional scientists. The fact that domestic violence can and does have a *spatial*

spillover effect ought to be of considerable interest to regional scientists. The analysis undertaken in Chap. 7 focuses on Nepal and clearly demonstrates that domestic violence has a spatial spillover effect and that this effect matters for the implementation of policies designed to eliminate gender-based violence.

Even though the Nepalese government has taken a number of steps to address the problem of domestic violence, this kind of violence persists in Nepal. What explains this unsavory state of affairs? Chapter 7 argues that this is probably because the observed domestic violence is characterized by a spillover effect in which the occurrence of domestic violence in one household or region affects the incidence of this kind of violence in a neighboring household or region.

To formally test the hypothesis of a domestic violence spillover effect, Chap. 7 uses household data from the 2016 Nepal Demographic and Health Survey (NDHS) along with global positioning system (GPS) data to provide a detailed analysis of the spatial relationship between the opinions of neighboring households and the incidence of domestic violence. This testing is guided by the following straightforward line of reasoning: if adjoining households do affect abusive behavior then *targeting* and *focusing* violence reduction efforts are likely to be a better way of dealing with the underlying problem than spreading these efforts throughout the nation.

In order to study the spatial nature of domestic violence concretely, Chap. 7 uses the 2016 NDHS and then runs a cross-sectional multivariate regression. This empirical strategy is grounded in a conceptual model of partner abuse with gender specific levels of economic empowerment. This kind of spatial analysis permits researchers to examine spatial heterogeneity and to isolate domestic violence *hotspots*. The chapter emphasizes that these twin tasks would *not* be possible in a statistical analysis that uses exogenously given geographical boundaries such as provinces or states.

The analysis itself concentrates on physical violence. All "ever-married women" are asked a number of questions about physical violence perpetrated by their spouses and the resulting responses are grouped into three categories which are (1) less severe violence, (2) severe violence, and (3) sexual violence. After testing for spatial autocorrelation, this chapter finds that whereas the western part of Nepal has hotspots for *all* forms of violence, in central and eastern Nepal, there are hotspots for severe physical and sexual violence. The analysis also shows that the incidence of less severe violence is *lower* when households cluster together geographically and when their neighbors are similar.

What are the policy implications of the above findings? This chapter contends that educating men and women about the economic, legal, and social consequences of domestic violence can help diminish the acceptance and the justifiability of abusive behaviors. Second, the spillover effect of domestic violence eases the spread of efforts to preclude violence across households and this feature, we are told, is likely to be crucial in eventually eliminating this scourge in Nepal. We now proceed to Chap. 8 which discusses another kind of conflict that involves the potential secession of a region from the country of which it is a part.

1.4.2 Separation and Natural Resources

After pointing to conflicts between Asian nations such as China and Vietnam over natural resources, Chap. 8 extends the previous work of Ohno (2018) by adding a political-economy component. This extension permits this chapter to theoretically analyze the question of secession. In the model presented, there is a country that is split up into regions 1 and 2. Region 1 (2) has a larger (smaller) population and hence region 1 (2) is referred to as the major (minor) region. Both regions have agricultural and manufacturing goods sectors. The economy of this nation uses two kinds of labor. Some of this labor is employed in the manufacturing sector and the remainder is employed in the agricultural sector. All households in the model have identical preferences, irrespective of the region they reside in. The utility functions of these households display a love for variety *a la* Dixit and Stiglitz (1977).

As far as production is concerned, labor, the sole input, is used to produce the agricultural good and the market for this good is competitive. In contrast, the market for the manufacturing good is monopolistically competitive. As such, the equilibrium price of this good is given by the markup over the marginal cost of production. A key part of the analysis in this chapter concerns natural resources and this term is used broadly. So, beautiful mountains, attractive coastlines, etc., are all considered to be natural resources, and these resources are *immobile* and they are found only in the minor region 2.

Even though the natural resources are found only in the minor region 2, these resources are owned by a central government that represents the entire nation. In addition, this central government benefits monetarily from the natural resources and it distributes these monetary benefits to households that are made up of peasants and workers. Put differently, the utilities of peasants and workers depend in part on the benefits that are distributed to them. What impact does an increase in population have on the utilities of the households? Analysis shows that a population increase raises (lowers) utility when the effect of this increase on the variety of manufactured goods is larger (smaller) than the effect on income redistribution.

When will the minor region 2 want to secede from the larger nation of which it is a part? To answer this question, Chap. 8 notes that since the natural resources are located entirely in the minor region, this region has some bargaining power when interacting with the central government to determine the terms of secession. Even so, as the chapter points out, from a straightforward benefit-cost perspective, the minor region will secede if the weighted utility of the peasants and the workers in this region after secession is *higher* than the corresponding weighted utility prior to seceding. Because of the analytical complexity of the relevant mathematical expressions, it is not possible to obtain easily interpretable answers to the "Should region 2 stay in the integrated economy or secede from it" question. Therefore, this chapter examines some special cases.

Interestingly, when trade between the seceding region and the larger country is impossible and a specific inequality condition holds, the analysis shows that secession is always desirable *independent* of the bargaining power over natural resources

possessed by the minor region. On the other hand, when there are no restrictions on trade between the seceding region and the larger nation, the bargaining power possessed by the minor region needs to exceed a critical threshold for secession to be a desirable option. This concludes our discussion of the two chapters about conflict that comprise Part IV of this book. We now turn to the four chapters that make up the final Part V of this book.

1.5 Reforms and Their Impacts

1.5.1 Foreign Direct Investment and Structural Change

Chapter 9 begins the proceedings by pointing out that even though multi-sector general equilibrium models have been widely used to study the welfare aspects of foreign direct investment (FDI) in developing nations, a lot less attention has been devoted to studying the interactions between rural farm and nonfarm sectors and the implications of these interactions for per capita gross domestic product (GDP) and urban unemployment. Given this lacuna in the literature, the purpose of this chapter is to use a three-sector general equilibrium model in the spirit of Harris and Todaro (1970) to study the functioning of a small open economy in which there is a non-traded intermediate input, a rural-urban dichotomy, and capital is imperfectly mobile between the nonfarm and the industrial sectors.

The model of a small open economy that is presented in this chapter consists of an urban manufacturing sector and a rural sector. The latter sector is split up into an agricultural export good producing sector (sector X) and a nonfarm sector (sector N) that produces a non-traded intermediate input for the import-competing urban manufacturing sector (sector M). The inputs in sector X are land and labor, in sector N, they are land, labor, and capital, and in sector M, they are labor, capital, and the intermediate input. The import-competing sector M is protected with an *ad valorem* tariff. An institutionally given wage is paid to sector M workers, and the wage in sectors X and N is determined by market forces. Labor is perfectly mobile between the X and the N sectors but, possibly because of unionization, there exists an imperfection in the sector M labor market. The capital stock in the economy under study includes domestic and foreign capital which are perfect substitutes and all the production functions exhibit constant returns to scale with diminishing marginal returns.

How does an inflow of foreign capital affect the working of the small open economy under consideration? Comparative statics analysis demonstrates that this inflow (1) raises the rural wage rate, (2) lowers the return to land, and (3) raises the price of the intermediate input produced by the nonfarm sector. To see, for instance, why the third result above arises, note the following line of reasoning: Because domestic and foreign capital are perfect substitutes, an inflow of foreign capital raises the capital stock. Now, given the expansionary effect of sector M, the demand

for the intermediate input produced by sector N increases. Therefore, the real return to capital falls and this leads to a *rise* in the price of the intermediate input.

Can trade policy, i.e., a reduction in the *ad valorem* tariff, be used to enhance social welfare in our small open economy? Analysis shows that the answer to this question depends on the interactions between the following four effects: (1) the total wage income decreases, (2) rental income from land increases, (3) the return to mobile capital falls, and (4) the cost of providing the tariff protection falls. The combined impact of these four effects tells us that if the initial tariff is sufficiently high then the net effect of the reduction in the distortion costs associated with the tariff can be dominant and this dominance can lead to a *rise* in social welfare.

A central conclusion emanating from the analysis in this chapter is that for a developing nation such as India, trade reform can make the nation very dependent on volatile external economic events and that this dependence can subject the output of the manufacturing sector to increased competition, too quickly. When this happens, employers have an incentive to replace labor with capital, and this, in turn, leads to a lower share of employment in what the chapter calls the "registered sectors" of the economy. What policymakers need to be aware of is that trade policy liberalization can lead to *jobless growth* and hence make it difficult to increase productive employment. We now proceed to Chap. 10 which examines the rural-urban dimension of economic growth-driven convergence in a key expenditure metric in India.

1.5.2 Monthly per Capita Expenditure

Governments in developing countries standardly want the economic growth taking place in their countries to be inclusive in the sense that they would like this growth to positively affect all sections of society. Even so, as Chap. 10 points out, the observed economic growth in India in the last few decades appears to have resulted in regional disparities among the different Indian states. Now, very generally and at the level of nations, the idea of *convergence* is the hypothesis that the per capita incomes of developing nations will tend to grow at faster rates than the per capita incomes of developed nations. Therefore, all nations should eventually converge in terms of their per capita incomes.

This convergence idea can also be studied within a nation to examine how economic growth has affected the various states within a nation. This is what Chap. 10 does for the case of India. Specifically, this chapter analyzes rural-urban differences in the convergence of the monthly per capita expenditure (MPCE) of Indian households using data from the National Sample Survey in the 1993–1994 to 2011–2012 time period. In addition, this chapter also looks at the factors that influence the convergence of the MPCE over time.

Chapter 10 uses a fixed effect model and runs three kinds of regressions. The first kind estimates the determinants of the average state-wise monthly per capita expenditures (AMPCE), the second kind focuses on the state-wise monthly per capita consumption expenditures in rural areas (RMPCE), and the third kind looks at the

state-wise determinants of monthly per capita consumption expenditures in urban areas (UMPCE). The chapter also explores the notion of "club convergence" within India by utilizing the so-called PS test which is a test due to Phillips and Sul (2007).

The empirical analysis in the first part of Chap. 10 demonstrates that the 15 major states of India do *not* follow a single transition path and that the MPCE across these different states exhibits distinct transition paths. This finding suggests the possible existence of club convergence within subgroups of states. When this chapter tests for the existence of this kind of convergence, the results show that with the exception of three states—Gujarat, Kerala, and West Bengal—there *is* evidence for the existence of five different clubs. For instance, one club consists of the states of Haryana and Maharashtra and both these states display the same pattern as far as the behavior of per capita consumption expenditure is concerned.

Looking at rural areas in the different states, the analysis shows that the RMPCE metrics across the 15 major Indian states follow heterogeneous patterns and there is, in fact, no evidence of convergence. This notwithstanding, when subgroups of states are looked at separately, one can find evidence for the existence of four clubs. The existence of these four clubs tells us that within each club, there is a common steady state equilibrium path of the RMPCE metric but that this path *varies* across the four identified clubs.

A similar analysis of urban areas in the different states identifies four clubs. Additional analysis shows that in states such as Kerala and Maharashtra with high rates of urbanization, there is a common transition path of the UMPCE metric. Given this chapter's focus on the trinity of the AMPCE, the RMPCE, and the UMPCE metrics, what can one say about the speed of convergence of these metrics within the different identified clubs? Analysis shows that subject to some caveats, the RMPCE metric converges *faster* than the UMPCE metric. In addition, there also exists a rural-urban difference in terms of the convergence of monthly consumption expenditures. Although this chapter provides useful information about rural-urban differences from the standpoint of monthly per capita expenditures, it does not focus on the extent to which economic growth in India has moved people out of poverty and into the *middle class*. This task is undertaken by Chap. 11.

1.5.3 Middle-Class Formation

It is now well known that the economic reforms introduced by the Indian government in 1991 have put the nation on an elevated growth trajectory.[9] Even so, the benefits of the robust resulting growth have been shared unequally by the Indian population. Therefore, the primary objective of Chap. 11 is to analyze the *differences* in the formation of a middle class in rural and in urban areas in this nation. The

[9]See Srinivasan (2003) for a more detailed account of these reforms.

secondary objective is to understand *disparities* in rural-urban middle-class formation in the nation and in the individual states.

To this end, Chap. 11 uses district household survey data on household asset ownership for the years 1992–1993, 1998–1999, 2005–2006, and 2015–2016 to estimate the middle class in rural and in urban areas at the national and at the state levels. Interestingly, this chapter identifies specific assets that are then used to classify the class category into which a household falls. The four distinct categories are (1) lower middle class, (2) middle middle class, (3) upper middle class, and (4) rich class. So, for instance, in 2015–2016, in order to qualify as a member of the lower middle class, a household would have to own a "pucca" or concrete home and a television, and to qualify as a member of the upper middle class, a household would have to own a "pucca" house, a television, a refrigerator or a motorcycle, and a car or a tractor. Because adequate data are available for the four reference years mentioned above across the various states, Chap. 11 is able to utilize a panel data method to ascertain the determinants of the middle class in India. This notwithstanding, because of issues including the expansion of the number of states in India and missing observations, this chapter ultimately ends up using data for 28 states and union territories as a balanced panel in the econometric estimation.

Analysis demonstrates that at the *national* level, there has been significant growth in the size of the middle class in rural and in urban areas. Specifically, over a time period of 22 years, the size of the middle-class population grew by 31%. This tells us that despite an increase in the absolute size of the population, India added approximately 1.4% to the middle-class population every year during the study period. This positive outcome notwithstanding, the chapter reminds us that in this same study period, we have seen a considerable disparity in the size of the middle class between rural and urban areas. This tells us that the rural-urban *gap* in the size of the middle class has widened over time and that, more generally, rural-urban *inequalities* in development have persisted over many decades.

In addition to looking at the national level, Chap. 11 also looks at middle-class formation at the level of individual *states*. The analysis undertaken shows that even though the size of the middle class in all the states being studied has increased from 1992–1993 to 2015–2016, this increase has been much higher in the *southern* states—such as Kerala—followed by western states—such as Maharashtra. States in the central and eastern regions of India have fared poorly when it comes to expanding the size of the middle class.

Analysis in the final part of Chap. 11 yields two results that are worth emphasizing. First, we learn that states like Uttar Pradesh, Bihar, Madhya Pradesh, and the north-eastern states in which a large proportion of the population is dependent on agriculture have a lower share of human capital and hence these states have experienced *lower* growth of the middle class from 1993–1994 to 2015–2016. Second, the growth of the net state domestic product per capita, income, and human capital are the major factors that have greatly influenced the growth of the size of the middle class in India. From the subcontinent of India, we next proceed to Timor-Leste to study the impacts of a particular development project in the final Chap. 12.

1.5.4 Community-Driven Development

Major population movements during and after Timor-Leste's war against Indonesian occupation in 1975–1999 have converted Dili (the capital) from a small colonial outpost into a thriving cosmopolitan city. Chapter 12 points out that constant circular and cyclical rural-urban migration have invalidated what this chapter calls "standard dichotomies between rural and urban." Even so, Dili retains its colonial era system of administrative boundaries and hierarchies of local leadership and these continue to be relied on by both the state and development agencies to formulate and implement development projects. This chapter tells us that this reliance makes it *more* likely that colonial, class, and traditional hierarchies will be endorsed in contemporary thinking about economic development projects.

To see how some of these challenges play out in practice, Chap. 12 describes the design and implementation of the National *Suku* or village Development Program (PNDS) which was put in place by the government of Timor-Leste in 2012. This decentralized development program was eventually rolled out in all of Timor-Leste's 442 *sukus*. A key feature of the PNDS is that it let communities choose what kind of development project they would like and the team that would carry out the project.

Because the PNDS relied on *suku* and *aldeia* (sub-village) boundaries, this program worked quite well in rural areas in ensuring, *inter alia*, that participants learned useful vocational skills. Even so, the program ran into problems in urban Dili not only because Dili "operates on very different principles" but also because of the explosive growth in this city's population that was driven in part by significant rural-urban migration during the war of independence fought against Indonesia. Because of these issues, Chap. 12 makes two noteworthy points about the implementation of PNDS-type development projects. First, we learn that because of repeated rural-urban migration that is both circular and cyclical, the concept of a "rural-urban divide" is largely meaningless. Second, ensuring the success of PNDS-type projects involves not just design and implementation issues but also a clear comprehension of urban spaces and notions of community.

This chapter reports the results of research commissioned by the Asia Foundation between April and May in 2015 that involved seven focus groups in Dili urban *sukus*. The analysis undertaken shows clearly that because of significant variations in *suku* and *aldeia* size and in demographic and socioeconomic composition, it is *not* a good idea to use purely administrative boundaries either for the planning and the implementation of PNDS in urban Dili or, more generally, for urban governance. Second, we learn that in the urban context of Dili, it is *not* sensible to plan and implement projects on the assumption that large pools of labor will be available and willing to work for a few extra dollars. Finally, looking to the future, successful urban planning and development in Dili will require fresh thinking that recognizes the highly cosmopolitan, fluid, and dynamic nature of Dili's urban spaces and how power dynamics produce and reinforce "contemporary urban boundaries" and "conceptual frameworks."

1.6 Conclusions

Issues concerning rural-urban dichotomies and spatial economic development are of central concern to regions located in many different parts of Asia. After many millennia of uneven growth and development, the Asian continent in general now has great opportunities for broad-based spatial economic growth and development. As noted in Sect. 1.1, the geopolitical and economic rise of Asia give rise to significant questions about existing rural-urban dichotomies and how these dichotomies relate to spatial development in this part of the world. In addition, given the present-day salience of Asia, lessons learned about the connections between different rural-urban dichotomies and the salutary impacts of spatial economic development in Asia are likely to prove useful for the design and implementation of regional development policies in other parts of the world.

Given this state of affairs, our goal in this book is to demonstrate how spatial economic development can be promoted by effectively targeting extant rural-urban dichotomies and, in the process, promoting economic growth and development across space in the different regions of Asia. We have done so by providing analytic accounts of many of the relevant research questions written by experts. These experts have great credibility because of two salient reasons. First, they are active researchers themselves. Second, they are also some of the leading contemporary voices on public policy concerning the nexuses between rural-urban dichotomies and spatial economic development in Asia.

In this introductory chapter, we have attempted to provide a plausible context within which one may view the emergence and the study of the different research questions that are dealt with in this tome. In addition, a perusal of the individual chapters clearly demonstrates the salience and the policy relevance of the research questions that are systematically studied in this volume. Therefore, in the coming years, one may look forward to many interesting and policy relevant developments concerning the nexuses between rural-urban dichotomies and spatial economic development in Asia that are directly or indirectly related to the topics discussed in this book.

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Part II
Migration

Chapter 2
Agritourism, Unemployment, and Urban-Rural Migration

Kenji Kondoh and Hiroshi Kurata

Contents

Abstract This study examines the effects of policy changes and improvements in the agritourism sector in a developing country. We analyze the economy of a developing country, which consists of two regions: an urban area where the manufacturing sector is located and which has a certain level of unemployment à la Harris and Todaro (Am Econ Rev 60(1):126–142, 1970), and a rural area where both the agricultural and agritourism sectors are located. We demonstrate that encouraging labor outflow is reasonable, while the effects of a decrease in the minimum urban wage or the effects of additional foreign capital investment are not clear. We also assert that under certain conditions, an enhancement of the ratio of agricultural goods to touristic services in the agritourism sector will improve domestic welfare and reduce the urban unemployment rate. Furthermore, we conclude that agricultural-good-intensive tourism and environmentally friendly agritourism cause positive effects on welfare and employment.

Keywords Agritourism · Urban-rural migration · Unemployment
JEL Code O13 · O18 · Q56

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2.1 Introduction

Agritourism is a type of tourism that involves the agricultural and tourism industries. In most cases, it consists of rural farms providing an agricultural environment that is open to the public and which attracts visitors for agricultural operations, recreation, entertainment, and/or educational experiences.[1] Generally speaking, agritourism is considered beneficial to producers and communities. Farmers take advantage of the opportunities available to generate additional income and obtain a direct marketing channel to consumers, while the tourism industry benefits from the increase in the number of visitors and in their length of stay. Moreover, agritourism provides local communities with the potential to increase their tax bases and to expand employment opportunities, and at the same time, it offers educational experiences to the public, helps in agricultural land preservation, and allows states to develop business enterprises.

While agritourism is mainly witnessed in the United States and Europe, it is widespread in Asian developing countries such as Thailand, the Philippines, and Cambodia. However, this activity varies in different ways. In the United States, the agritourism sector mainly targets U.S. residents, while in developing countries, it is focused primarily on foreign tourists. For example, Thailand offers foreign visitors several types of one-day agritourism trips, which include visits to fruit farms and farmers' houses, harvesting and cooking experiences, and the opportunity to enjoy traditional foods served by English-speaking local guides.[2]

We need to state that the effects of the spread of agritourism on labor markets in developing countries differ from those experienced in developed countries. Since agritourism contributes towards creating job opportunities in rural areas, it may attract urban workers, which will help reduce the economic decline of rural areas due to the labor shortage caused by the decreasing population in developed countries. In contrast, in developing countries, agritourism promotion mitigates the urban-rural migration caused by an excess supply of labor and may directly reduce the number of unemployed urban workers or those engaged in informal jobs.

We focus on developing countries with agritourism sectors. As developing countries tend to have low wage levels, there is both international labor outflow and urban-rural migration. The remittance from this population plays an important role in the economic development of developing countries[3]; in most cases, governments in developing countries seem to admit such international labor outflow. In

[1]For example, the National Agricultural Law Center (https://nationalaglawcenter.org/) reports that pumpkin picking patches, corn mazes, U-Pick operations, petting and feeding zoos, hay rides, cut-your-own Christmas tree farms, dude ranches, demonstration farms, agricultural museums, living history farms, on-farm farmers' markets, winery tours and wine tasting, rural bed and breakfasts, and garden tours are conducted in the United States.

[2]Responsible Thailand (www.responsiblethailand.co.uk/).

[3]Meyer and Shera (2017) empirically tested the impact of remittances on economic growth by using the data of six high remittances receiving countries, and showed significant relationships between remittance and economic growth in these countries.

2018, the remittance to developing countries amounted to 529 billion USD—about 77% of the global remittance and 0.6% of global gross domestic product.[4] Additionally, there is scarcity of domestic capital in developing countries. Thus, governments in developing countries often formulate policies for foreign direct investment (FDI). Despite considering these policies, prior research seems to have overlooked the agritourism sector. For example, from Harris and Todaro (1970), we see that labor outflow is not beneficial, while FDI is beneficial for the country. Notice that this conclusion was obtained without considering agritourism sectors. The benefits of these policies for developing countries with agritourism sectors are not very straightforward.

The purpose of this study is to examine the effects of different policies in a developing country with an agritourism sector. We investigate the effects of those policies on labor supply, the minimum wage rate, and foreign capital. In addition, we consider the effects of changes in the agritourism industry, focusing on an increase in labor productivity, a shift to agricultural-good-intensive tourism, and more environmentally friendly agritourism.

In this study, we analyze the economy of a developing country, which consists of two regions: an urban area where the manufacturing sector is located and which has a certain level of unemployment à la Harris and Todaro (1970), and a rural area where both the agricultural and agritourism sectors are located. Labor is a necessary input of every sector while foreign capital investment is a specific factor of production for the manufacturing of goods. The agritourism sector is supposed to supply a combined good whose primary components are touristic services (also supplied by labor input) and agricultural goods. The productivity of agricultural goods depends on the stock level of environmental capital, which will be damaged by the manufacturing sector but saved by agritourism.

The main results of our study are as follows. First, labor outflow from the region has positive effects on the domestic residents' welfare and contributes to the reduction of the urban unemployment rate. Second, the effects of a decrease in the minimum wage and of additional FDI are not clear. It implies these policies in developing countries may not be effective in an economy with an agritourism sector. In addition, appropriate policies may foster innovation in the agritourism sector, which will enhance the ratio of agricultural goods to touristic services and improve the welfare of domestic residents while reducing the urban unemployment rate. Furthermore, we conclude that agricultural-good-intensive tourism and environmentally friendly agritourism also cause positive effects on welfare and employment.

Before proceeding, we discuss how this study relates to existing research. Considering the importance of agritourism, research has been carried out that covers several aspects of agritourism, which can be categorized into three major groups. Studies in the first group, which include Galuzzo (2018) and McGehee and Kim (2004), define the properties of agritourism by focusing on the incentives of the

[4]Global Knowledge Partnership on Migration and Development (KNOMAD; ttps://www.knomad.org/); World Bank (https://www.worldbank.org/).

supply side of starting a business. Studies in the second group, including Carpio et al. (2008), Santeramo and Barbieri (2017), and Sidali et al. (2019), investigate the incentives of the demand-side such as tourists' preferences and properties. Finally, the third group of studies, which include Jeczmyk et al. (2015), Maude and van Rest (1985), and Schilling et al. (2012), focus on the economic effects of agritourism, considering several specific aspects such as natural environmental protection and the income growth of the rural population. It is important to note that most of the studies in this group are empirical and include case studies in countries such as the U.S., the U.K., and Italy, while only a few theoretical studies have been carried out.

Considering environmental protection aspects, several theoretical studies have focused on the economic effects of tourism promotion. Following the pioneering study by Copeland (1991), most recent studies, including those of Beladi et al. (2009), Chao and Sgro (2008), Chao et al. (2004, 2008, 2010), Hazari and Hoshmand (2011), and Yanase (2017), used a trade model to investigate the agritourism industry. Furukawa et al. (2019) focused on a rural area of a developed country and studied the effects of the inflow of capital, labor, and tourists from outside the area, while Yabuuchi (2013, 2015) studied the economic effects of tourism promotion in developing countries by applying an extended Harris–Todaro urban-rural migration model. The studies above investigate the combined effects of tourism promotion and environmental protection prompted by a pollution tax, considering production and consumption externalities. We need to state that we are not aware of theoretical studies that focus on the effects of economic policies under the existence of the agritourism sector. This industry contributes to the increase in employment in the agricultural sector, inducing part of the agricultural goods produced to be indirectly consumed by foreign tourists, and thus, leading to a reduction in the number of agricultural goods available for the domestic population. Considering that agritourism may foster environmentally friendly actions such as planting trees or cleaning beaches, this sector contributes to the improvement of the natural environment, which directly determines the productivity of agriculture (Copeland and Taylor 1999). Hence, our study combines the literature on agritourism and environmental protection and contributes to the existing research by providing new insights on policies in developing countries.

The remainder of this study is organized as follows. In Sect. 2.2, we present our model. Section 2.3 is dedicated to analysis, while Sect. 2.4 presents our concluding remarks.

2.2 The Model

We extend the basic model of Copeland and Taylor (1999) and assume a small developing country with three industries: the smokestack manufacturing industry, which is located in an urban area and generates pollution; the environmentally sensitive agricultural industry, located in a rural area and suffering from the pollution; the agritourism industry, which is environmentally friendly and also located in

a rural area. The primary factors of production are labor, foreign capital, and environmental stock. Foreign capital is the specific factor in the production of the manufacturing good while the level of environmental stock regulates the productivity of the agricultural good.[5] We assume that the agritourism industry manages to supply touristic services combining agricultural goods (e.g., local foods) and labor input (e.g., accommodation services). Additionally, as opposed to traditional tourism which could harm natural environment, agritourism contributes environmental protection.[6]

The production functions of the manufacturing, agricultural, and agritourism industries in this country are defined as:

$$M = F(K^*, L_M), \tag{2.1}$$

$$A = \sqrt{E}L_A, \tag{2.2}$$

$$S = \beta\, L_S, \tag{2.3}$$

where E is environmental stock; M, K^*, and L_M are, respectively, the output, foreign capital input, and labor input of the manufacturing industry; A and L_A are the output and labor input of the agricultural industry; S and L_S are the output and labor input of the agritourism services; and β is the parameter that reflects the productivity of the agritourism industry. We assume that the production function of manufactured good is linearly homogeneous.[7]

[5]Here we consider the case of Cambodia, a less developed Asian country where the manufacturing sector is mainly managed by foreign capital owners. Cambodia has generally maintained liberal policies regulating foreign investment, which include incentives to investors as 100% foreign ownership of companies, corporate tax holidays of up to eight years, a 20% corporate tax rate after the incentive period ends, duty-free import of capital goods, and no restrictions on capital repatriation. To facilitate foreign investment, Cambodia has also created special economic zones (SEZs), which provide companies with immediate access to land, infrastructures and other services to facilitate the ease of doing business. According to the World Investment Report 2019 says the Cambodian total stock of FDI stood at USD 23.7 billion in 2018, representing almost 97% of the country's GDP. The main investing countries are China (Chinese FDI alone surpassed all other FDI sources combined), Hong Kong, the US, and the Netherlands. Following the Cambodia Industrial Development Policy 2015–2025, the number of big businesses with more than 100 employees which mainly specialize in manufacturing (e.g. garment) industries represents only 0.6% of total companies although accounting for more than 76% of total gross sales. On the other hand, most of the domestic medium and small businesses with less than 100 employees are specialized in the production of foods, beverages, and tobaccos. Considering this situation we ignore the small share of local capital managed industries and assume a manufacturing sector only managed by foreign investors.

[6]For example, we can imagine a rural tour for the people from developed countries with accommodation, local foods as well as experiences such that planting fruits trees or voluntary beach cleaning activities.

[7]This assumption implies that $M - F_L L_M - F_K K^* = 0$ and $F_{LL} L_M + F_{LK} K^* = 0$.

One unit of agritourism is supplied to foreign tourists as a combination of one unit of service and q unit of agricultural goods. Thus, the total output of agritourism can be expressed as follows:

$$X = S = \beta L_S = q^{-1} A_T = q^{-1}(A - D_A), \tag{2.4}$$

where X denotes the output of agritourism, A_T denotes the total amount of agricultural goods supplied to foreign tourists, and D_A denotes the domestic aggregate demand of agricultural goods.

The production activity in the manufacturing industry causes pollution which harms natural environment. We assume the level of environmental stock is a decreasing function of the amount of pollution emitted by the manufacturing industry. Moreover, we consider the positive effects on natural environment caused by agritouristic activities. Therefore, the net stock of environmental capital is:

$$E = \bar{E} - \lambda_1 M + \lambda_2 X, \tag{2.5}$$

where $\bar{E}$ is the natural stock level of environmental capital before damages; λ_1 and λ_2 are, respectively, parameters which reflect the magnitude of effects on natural environment caused by one unit of manufacturing and agritourism output.

The minimum wage rate of the manufacturing industry located in urban area is $\overline{w}$, which is exogenously determined by the negotiation between employers and labor unions. Similarly to the Harris–Todaro framework, urban workers can obtain $\bar{w}$ by the manufacturing industry if employed, but they did not receive wage if not employed. The possibility of a worker being employed or not in every period depends only on a random probability. On the other hand, as we do not assume fixed wage rates in the agricultural and agritourism industry, the wage rate w in both sectors are equal. In the equilibrium after domestic labor mobility between the two regions, we have:

$$w(L_M + L_U) = \bar{w} L_M, \tag{2.6}$$

or

$$w(1 + \eta) = \bar{w}, \tag{2.7}$$

where L_U denotes the number of unemployed workers, and $\eta \equiv L_U/L_M$ is the ratio of unemployed to employed workers in the urban area.

Regarding the industry structure, we assume perfect competition with free entry both in the manufacturing and agricultural industries. Let π_M and π_A be the total profits of the manufacturing and agricultural industries, respectively, expressed as follows:

$$\pi_M = p_M M - \bar{w} L_M - r^* K^*, \tag{2.8}$$

$$\pi_A = A - w L_A, \tag{2.9}$$

where the agricultural good is the numeraire, p_M denotes the price of the manufactured good, and r^* denotes the rental price of foreign capital. Under the assumption that both goods are produced, profit maximization conditions in the manufacturing and agricultural industries yield:

$$\frac{\partial \pi_M}{\partial L_M} = p_M F_L(K^*, L_M) - \bar{w} = 0, \tag{2.10}$$

$$\frac{\partial \pi_M}{\partial K*} = p_M F_K(K^*, L_M) - r^* = 0, \tag{2.11}$$

$$\frac{\partial \pi_A}{\partial L_A} = \sqrt{E} - w = 0. \tag{2.12}$$

Condition (2.12) shows that w depends on the level of net stock of the environment.[8] The full employment condition is:

$$L_M + L_A + L_S + L_U = L, \tag{2.13}$$

where L is the domestic labor endowment.

We also assume perfect competition with free entry in the agritourism industry. Thus, the price of one unit of agritourism good should be equal with its marginal cost, $\beta^{-1} w + q$.

Remembering that agritourism goods are consumed by foreign visitors on the demand side, we specify the following social utility function of domestic residents:

$$U = (D_M)^{\alpha} (D_A)^{1-\alpha}, \quad 0 < \alpha < 1, \tag{2.14}$$

where D_M and D_A are the domestic residents' aggregate consumption levels of manufactured and agricultural goods, respectively, and α is the parameter which reflects the preferences on the manufactured good. Because each firm obtains zero profit and capital owners are foreign investors, the GDP of this country is equal to the labor income, $w(L_A + L_S) + \overline{w} L_M = wL$. Therefore, the demand for each good is obtained by solving the utility maximization problem, subject to the following budget constraint:

$$D_A + p_M D_M = wL. \tag{2.15}$$

Hence, we have

[8] In this model, labor in service sector receives the competitive wage rate w determined in the agricultural sector, because agricultural farms undertake agritourism.

$$p_M D_M = \alpha w L, \tag{2.16}$$

$$D_A = (1-\alpha) w L. \tag{2.17}$$

We assume that foreign investors do not consume any goods in the visited country and remit all their income to their home country by manufactured good. Also, we need to remember that agritourism goods are consumed by foreign visitors. Thus, we have:

$$D_M = M - p_M^{-1} r^* K^*, \tag{2.18}$$

$$D_A = A - A_T. \tag{2.19}$$

2.3 Comparative Statics

Because of the zero-profit condition and (2.9), A is equal to wL_A, and A_T is equal to $\beta q L_S$. Thus, from (2.17) and (2.19), we have:

$$(1-\alpha) w L = w L_A - \beta q L_S. \tag{2.20}$$

From (2.6), (2.13), and (2.20), we obtain:

$$\alpha w L - (w + \beta q) L_S = \bar{w} L_M. \tag{2.21}$$

Also, from (2.11), (2.16), and (2.18), we have:

$$p_M [F(K^*, L_M) - F_K(K^*, L_M) K^*] = \alpha w L. \tag{2.22}$$

Finally, from (2.5) and (2.12), we can assert:

$$\bar{E} - \lambda_1 F(K^*, L_M) + \lambda_2 \beta L_S = w^2. \tag{2.23}$$

Now we have four endogenous variables, L_M, L_S, w, and p_M will be determined in equilibrium by four equations, (2.10), (2.21), (2.22), and (2.23), given the exogenous variables $\overline{E}, L, \alpha, \beta, q, \overline{w}, K^*, \lambda_1$, and λ_2.

Totally differentiating (2.10), (2.21), (2.22), and (2.23),

$$\begin{bmatrix} -\bar{w} & -(w+\beta q) & \alpha L - L_S & 0 \\ p_M F_{LL} & 0 & 0 & F_L \\ p_M(F_L - F_{LK}K^*) & 0 & -\alpha L & F - F_K K^* \\ -\lambda_1 F_L & \lambda_2 \beta & -2w & 0 \end{bmatrix} \begin{bmatrix} dL_M \\ dL_S \\ dw \\ dp_M \end{bmatrix} =$$

$$\begin{bmatrix} -\alpha w \\ 0 \\ \alpha w \\ 0 \end{bmatrix} dL + \begin{bmatrix} L_M \\ 1 \\ 0 \\ 0 \end{bmatrix} d\bar{w} + \begin{bmatrix} 0 \\ -p_M F_{LK} \\ p_M F_{KK} K^* \\ \lambda_1 F_K \end{bmatrix} dK^* + \begin{bmatrix} qL_S \\ 0 \\ 0 \\ -\lambda_2 L_S \end{bmatrix} d\beta$$

$$+ \begin{bmatrix} \beta L_S \\ 0 \\ 0 \\ 0 \end{bmatrix} dq + \begin{bmatrix} 0 \\ 0 \\ 0 \\ -\beta L_S \end{bmatrix} d\lambda_2. \tag{2.24}$$

Using (2.10), the determinant of the matrix of (2.24) is:

$$\Delta = -\bar{w} F_L \{L_S \lambda_2 \beta + 2w(w + \beta q)\} - \alpha L (w + \beta q) \lambda_1 F_L^2 < 0. \tag{2.25}$$

2.3.1 Policy Changes in Developing Countries

We now discuss the effects of specific policy changes in developing countries. A developing country, such as Cambodia or Myanmar, which intends to enhance domestic economic welfare and reduce the unemployment rate in urban areas introduces the following economic policies: (1) a policy aimed at encouraging labor outflow, which may contribute to reduce the labor supply surplus and the number of urban unemployed workers; (2) a policy to foster urban employment by reducing the urban minimum wage rate, which may have positive effects on the average income of domestic residents; (3) a foreign investment policy to sustain the growth of the manufacturing sector, which may expand production in urban areas. We examine the effects of these policies using comparative statics.

Labor Outflow

First, let us consider a decrease in labor endowment due to emigration. From (2.24), simple calculations yield:

$$\frac{dL_M}{dL} = -\frac{1}{\Delta} F_L \alpha w [L_S \lambda_2 \beta + 2w(w + \beta q)] > 0, \tag{2.26}$$

$$\frac{dL_S}{dL} = -\frac{1}{\Delta} F_L^2 \alpha w L_S \lambda_1 > 0, \tag{2.27}$$

$$\frac{dw}{dL} = \frac{1}{\Delta} \alpha w (w + \beta q) \lambda_1 F_L^2 < 0, \tag{2.28}$$

$$\frac{dp_M}{dL} = \frac{1}{\Delta} p_M F_{LL} \alpha w [L_S \lambda_2 \beta + 2w(w + \beta q)] > 0. \tag{2.29}$$

We can conclude that labor outflow due to migration will reduce the labor input in the manufacturing sector and the level of tourism services. Regarding the effect on the environmental capital stock, we obtain the following relationship from (2.12):

$$\text{sgn } dw = \text{sgn } dE. \tag{2.30}$$

From (2.5) and (2.30), the sign of (2.28) implies that the positive effect of decreasing labor in the manufacturing sector dominates the negative effect of decreasing tourism services on the environment.

Next, we consider the effect on welfare. In this model, as the competing firms in the manufacturing industry obtain zero profit and capital owners are foreigners, national welfare will be equal to the economic welfare of the workers. The expenditure function of a representative worker is defined as:

$$e(p_M, u) = w, \tag{2.31}$$

where u denotes the utility level of a representative worker in the domestic country. Totally differentiating (2.31):

$$\frac{\partial e}{\partial p_M} dp_M + \frac{\partial e}{\partial u} du = dw. \tag{2.32}$$

From Shephard's lemma, we have $\partial e / \partial p_M = m$, where m denotes the per capita consumption of the manufactured good, that is:

$$m = \frac{M - (r^* K^* / p_M)}{L} = \frac{\bar{w} L_M}{p_M L}. \tag{2.33}$$

Then (2.32) yields:

$$\frac{\partial e}{\partial u} \frac{du}{dL} = \frac{dw}{dL} - m \frac{dp_M}{dL} < 0. \tag{2.34}$$

Considering that the sign of (2.34) is negative, labor outflow produces a welfare-enhancing effect for the developing country.

Finally, from (2.7), the effect on ratio of unemployed to employed workers in the urban area unemployment rate, η, can be expressed as:

$$d\eta = -\frac{(1+\eta)}{w}dw + d\bar{w}. \tag{2.35}$$

Thus,

$$\frac{d\eta}{dL} = -\frac{1+\eta}{w}\frac{dw}{dL} > 0. \tag{2.36}$$

As the sign of (2.36) is positive, labor outflow will reduce the ratio of unemployed to employed workers. Thus, we establish the following proposition.

Proposition 1

1. Labor outflow will reduce the labor input to the manufacturing industry as well as the agritourism industry. The competitive wage rate will increase while the price of manufactured good will decrease.
2. Labor outflow will cause positive effects on domestic economic welfare. It will also reduce the ratio of unemployed to employed workers in urban area.

In contrast to the traditional analysis of Harris and Todaro (1970), which concludes that labor outflow produces a negative effect on welfare, we find that exporting workers could be a good policy in terms of environment, employment, and welfare for developing countries.

Decrease in Urban Minimum Wage Rate

Next, let us consider a decrease in the urban minimum wage rate due to the negotiation between the employers and the labor union. From (2.24), simple calculations yield:

$$\frac{dL_M}{d\bar{w}} = \frac{1}{\Delta}F_L L_M\{\lambda_2 + 2w(w+\beta q)\} < 0, \tag{2.37}$$

$$\frac{dL_S}{d\bar{w}} = \frac{1}{\Delta}\lambda_1 F_L^2 L_M L_S < 0, \tag{2.38}$$

$$\frac{dw}{d\bar{w}} = -\frac{1}{\Delta}(w+\beta q)\lambda_1 F_L^2 L_M > 0, \tag{2.39}$$

$$\frac{dp_M}{d\bar{w}} = \frac{1}{\Delta}[-p_M\{2w(w+\beta q) + L_S\lambda_2\beta\}(F_L + F_{LL}L_M) - \alpha L(w+\beta q)\lambda_1 F_L], \tag{2.40}$$

$$\frac{\partial e}{\partial u}\frac{du}{d\bar{w}} = \frac{dw}{d\bar{w}} - m\frac{dp_M}{d\bar{w}}, \tag{2.41}$$

$$\frac{d\eta}{d\bar{w}} = -\frac{1+\eta}{w}\frac{dw}{d\bar{w}} + 1. \tag{2.42}$$

The decreasing urban minimum wage rate will increase labor input in the manufacturing sector and tourism services. It reduces the competitive wage rate and the environmental stock level, which implies that the effect on L_M is dominated by that on L_S. The sign of (2.40), the effect on the price of the manufactured good, is not clear. Furthermore, we make the following assumption:

Assumption 1: F_{LL} is sufficiently small.

Assumption 1 implies that the marginal products of labor in the manufacturing sector are sufficiently inelastic to additional labor input. Then, the sign of Eq. (2.40) will be positive. In contrast, the signs of Eqs. (2.41) and (2.42) are not clear even in this case. Hence, we cannot obtain clear results regarding the effects on economic welfare and unemployment rate.

Proposition 2

1. Decreasing urban minimum wage rate will enhance the employment of urban area and expand the output of agritourism industry while reducing the competitive wage rate and the environmental stock level.
2. Under Assumption 1, decreasing urban minimum wage rate will reduce the relative price of the manufactured good while effects on the ratio of unemployment to employment in urban areas and on the economic welfare of domestic residents are not clear.

In this case, the effect on economic welfare is not clear because of not only decreasing the price of manufactured good but also competitive wage rate. Also, the effect on the urban unemployment rate is not clear. Thus, we need to remark that there is a possibility that decreasing urban minimum wage may not be welcomed by domestic residents.

Increase in Foreign Capital Investment

Next, let us consider an increase in foreign capital investment.[9] From (2.24), simple calculations yield:

$$\frac{dL_M}{dK^*} = \frac{1}{\Delta}\alpha L F_L(w+\beta q)\lambda_1 F_K < 0, \tag{2.43}$$

[9]Here, we assume that for some reasons, the world interest rate, rental price of capital, r^*, decreases. Then, the temporary domestic interest rate, r, is larger than r^*, which will introduce additional foreign capital investment. Increasing capital endowment in the manufacturing sector will reduce the rental price of capital. In our model, satisfying (2.11), $p_M F_K(K^*, L_M) = r$, and increasing K^* reduces r, L_M and p_M, which implies an increase in F_K .

$$\frac{dL_S}{dK^*} = -\frac{1}{\Delta}\lambda_1 F_L^2 F_K L_S p_M > 0, \tag{2.44}$$

$$\frac{dw}{dK^*} = \frac{1}{\Delta}(w+\beta q)\lambda_1 F_K p_M F_L^2 < 0 \tag{2.45}$$

$$\begin{aligned}\frac{dp_M}{dK^*} = \frac{1}{\Delta}\big[&F_{LK}p_M\{L_S\lambda_2\beta + 2w(w+\beta q)\} \\ &+(w+\beta q)\alpha L\lambda_1 p_M\{F_L F_{LK} - F_K F_{LL}\}\big] < 0,\end{aligned} \tag{2.46}$$

$$\frac{\partial e}{\partial u}\frac{du}{dK^*} = \frac{dw}{dK^*} - m\frac{dp_M}{dK^*}, \tag{2.47}$$

$$\frac{d\eta}{dK^*} = -\frac{1+\eta}{w}\frac{dw}{dK^*} > 0. \tag{2.48}$$

An increase in foreign capital investment will reduce labor input in the manufacturing sector but expand it in the service sector. The increase in foreign capital investment reduces the marginal product of capital and expands output in the manufacturing industry. Consequently, it reduces the relative price of manufactured goods, and thus, from (2.10), labor input in the manufacturing industry will decrease. In contrast, labor input in the service industry will increase. In addition, the competitive wage rate and environmental stock level will reduce because of the expanded manufacturing sector. Hence, the urban unemployment ratio will increase. Finally, even under Assumption 1, welfare effects on domestic residents are not clear.

Proposition 3

1. Increasing foreign capital investment will reduce labor input in the manufacturing industry, while expanding it in the tourism service industry.

   It will increase the competitive wage rate, the environmental stock level, and the ratio of unemployment to employment in urban areas.
2. Increasing foreign capital investment will increase the relative price of the manufactured good. The effect on the economic welfare of domestic residents is not clear.

Compared to the case of decreasing urban minimum wage, we need to highlight that a policy aimed at increasing foreign capital investment will probably not be welcomed by domestic residents, as it would inevitably produce an increase in the urban unemployment ratio.

In summary, considering the current widespread agritourism sector, we find that encouraging labor outflow is the only available policy for the government of a developing country to improve welfare, while policies to reduce minimum urban wage rate and encourage foreign investment in the urban manufacturing sector may cause negative effects on the economy.

2.3.2 Improvement of the Agritourism Sector

Next, let us discuss the technical improvements in the agritourism sector that may contribute to enhance economic welfare, reduce urban unemployment, and increase labor productivity in the tourism sector. These improvements include: (1) improvement in labor productivity in the agritourism sector; (2) shift to agricultural-good-intensive tourism, and (3) introduction of environmentally friendly technology.

Increase in Labor Productivity of Tourism

Let us consider an increase in labor productivity of agritourism sector, namely an increase in β. This technological improvement implies the same amount of tourism good could now be produced by less labor input than before. From (2.24), simple calculations yield:

$$\frac{dL_M}{d\beta} = -\frac{1}{\Delta} F_L \lambda_2 L_S \alpha L w > 0, \tag{2.49}$$

$$\frac{dL_S}{d\beta} = -\frac{1}{\Delta} F_L L_S \{\bar{w} p_M (2wq + \lambda_2 L_S) + \alpha L q \lambda_1 F_L\} < 0, \tag{2.50}$$

$$\frac{dw}{d\beta} = -\frac{1}{\Delta} w \lambda_2 L_S p_M F_L^2 > 0, \tag{2.51}$$

$$\frac{dp_M}{d\beta} = \frac{1}{\Delta} p_M F_{LL} \alpha L w \lambda_2 L_S > 0, \tag{2.52}$$

$$\frac{\partial e}{\partial u}\frac{du}{d\beta} = \frac{dw}{d\beta} - m\frac{dp_M}{d\beta}, \tag{2.53}$$

$$\frac{d\eta}{d\beta} = -\frac{1+\eta}{w}\frac{dw}{d\beta} < 0. \tag{2.54}$$

Equations (2.49) and (2.50) imply that a technological improvement in labor productivity of tourism sector will reduce the labor input of the tourism sector and enhance the labor input of the manufacturing sector. As a result, the competitive wage rate and the level of environmental stock will increase, and the urban unemployment ratio will decrease. Furthermore, under Assumption 1, the positive first term of RHS in (2.53) dominates the negative second term leading to the conclusion that there is a positive effect on domestic welfare. Hence, we establish the following proposition.

Proposition 4

1. An increase in labor productivity of tourism will enhance the labor input in the manufacturing sector while it will reduce the labor input in the tourism sector. In this circumstance, the price of the manufactured good, the competitive wage rate,

and the natural environmental stock will increase while the ratio of unemployed to employed workers in urban areas will decrease.
2. Under Assumption 1, an increase in labor productivity of tourism will produce a positive effect on domestic welfare.

The above proposition asserts that a technological improvement which allows to save labor input in agritourism sector will cause positive effects on the economy of the developing country.

Shift to Agricultural-good-intensive Tourism

Next, let us consider a shift to more agricultural-good-intensive agritourism. For example, an additional experience like apple harvesting will contribute to enrich other agritourism services such as accommodation with local food. This reform will make it possible to consume more of the agricultural good in one unit of tourism good, and in our model, it translates in an increase in q. From (2.24), simple calculations yield:

$$\frac{dL_M}{dq} = \frac{1}{\Delta}\beta^2 L_S F_L \alpha L \lambda_2 < 0, \tag{2.55}$$

$$\frac{dL_S}{dq} = \frac{\beta L_S}{\Delta}\{2wp_M F_L^2 + \alpha L \lambda_1 F_L^2\} < 0, \tag{2.56}$$

$$\frac{dw}{dq} = \frac{1}{\Delta}\beta^2 \lambda_2 L_S p_M F_L^2 < 0, \tag{2.57}$$

$$\frac{dp_M}{dq} = -\frac{1}{\Delta}\lambda_2 \beta^2 L_S p_M F_{LL} < 0, \tag{2.58}$$

$$\frac{\partial e}{\partial u}\frac{du}{dq} = \frac{dw}{dq} - m\frac{dp_M}{dq}, \tag{2.59}$$

$$\frac{d\eta}{dq} = -\frac{1+\eta}{w}\frac{dw}{dq} > 0. \tag{2.60}$$

Equations (2.55) and (2.56) imply that a shift to a more agricultural-good-intensive agritourism will reduce the labor input of both manufacturing and tourism industries. The competitive wage rate and the level of environmental stock will decrease, and the urban unemployment ratio will increase. Furthermore, if Assumption 1 is satisfied, the negative first term of RHS in (2.59) dominates the positive second term, leading to the conclusion that the effect on domestic welfare could be negative. Hence, we establish the following proposition.

Proposition 5

1. Shifting to a more agricultural-good-intensive agritourism industry will reduce the labor input to both manufacturing and agritourism industry. The price of the

manufactured good, the competitive wage rate, and the natural environmental stock will decrease while the urban unemployment ratio will increase.
2. Under Assumption 1, shifting to a more agricultural-good-intensive agritourism industry will have a negative effect on domestic welfare.

Therefore, under certain conditions, an increase in per capita consumption of agricultural good by foreign tourists in the agritourism industry might reduce the economic welfare as well as the level of natural environment and the urban unemployment ratio. This result comes from the direct effect of a reduction in domestic consumption of the agricultural good generated by an increase in the foreign tourists' consumption.

Environmentally Friendly Agritourism

Finally, let us consider the situation in which the agritourism industry becomes more environmentally friendly, for example, introducing sustainable activities as planting trees. Such a reform will enhance the positive effect of agritourism on natural environment. In our model, it means that λ_2 would increase. From (2.24), simple calculations yield:

$$\frac{dL_M}{d\lambda_2} = -\frac{1}{\Delta} F_L \alpha L(w + \beta q)\beta L_S > 0, \tag{2.61}$$

$$\frac{dL_S}{d\lambda_2} = \frac{-\beta L_S}{\Delta} \beta \bar{w} F_L L_S^2 < 0, \tag{2.62}$$

$$\frac{dw}{d\lambda_2} = -\frac{\beta L_S}{\Delta} \bar{w}(w + \beta q) F_L > 0, \tag{2.63}$$

$$\frac{dp_M}{dq} = \frac{\beta L_S}{\Delta}(w + \beta q)\alpha L p_M F_{LL} > 0, \tag{2.64}$$

$$\frac{\partial e}{\partial u}\frac{du}{d\lambda_2} = \frac{dw}{d\lambda_2} - m\frac{dp_M}{d\lambda_2}, \tag{2.65}$$

$$\frac{d\eta}{d\lambda_2} = -\frac{1+\eta}{w}\frac{dw}{d\lambda_2} < 0. \tag{2.66}$$

Equations (2.61) and (2.62) imply that shifting to a more environmentally friendly agritourism will enhance the labor input of the manufacturing industry while reducing the labor input of the agricultural industry. The competitive wage rate and the level of environmental stock will increase, and the urban unemployment ratio will decrease. Furthermore, if Assumption 1 is satisfied, the positive first term of RHS in (2.65) dominates the negative second term and thus we can conclude the effect on domestic welfare could also be positive. Hence, we establish the following proposition.

Proposition 6

1. Shifting to a more environmentally friendly agritourism will reduce its labor input, while that of the manufacturing industry will increase. The price of manufactured good, the competitive wage rate, and the natural environmental stock will grow while the urban unemployment ratio will decrease.
2. Under Assumption 1, shifting to a more environmentally friendly agritourism will enhance the domestic welfare.

Therefore, under certain conditions, a more environmentally friendly agritourism causes positive effects on welfare as well as the level of natural environment. In equilibrium, labor reallocates from the tourism sector to manufacturing leading to a reduction of urban unemployment ratio.

In summary, considering the rapid wide spreading of the agritourism sector, we find that, under certain conditions, improving this industry in terms of technology may cause positive effects on domestic welfare.

2.4 Concluding Remarks

We have considered how policies in developing countries and improvements in the agritourism sector may affect the economy. We demonstrated that encouraging labor outflow is reasonable for a developing country since it has a positive effect on domestic welfare and the urban unemployment rate. In contrast, the effects of an additional inflow of foreign capital and the adjustment of the fixed minimum wage on welfare in urban areas are not clear. Increasing labor productivity in the agritourism sector by shifting to service-intensive agritourism or introducing more environmentally friendly activities will be beneficial to the economy under certain conditions (i.e., a sufficiently large labor supply and a relatively inflexible competitive wage rate).

There are still aspects that need to be considered since our study only focuses on the supply side of agritourism in a developing economy. In future studies, we should analyze the demand-side of the agritourism sector in greater detail, and consider the case of a developed country to compare the results with those obtained in this study.

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Chapter 3
Overpopulation and Reference-Dependent Preferences: Does Internal Migration in Japan Actually Satisfy People?

Kiyoshi Yonemoto

Contents

Abstract The study in this chapter characterizes Japanese internal migrations theoretically as well as empirically, taking into account the reference dependency of the preferences of the people. Internal migrations in a developed country can be caused not only by income disparities in absolute terms but also by some

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psychological elements (e.g., comparison to the consumption levels in the past or the others'). The study outlines Japanese internal migrations using actual data, introduces several types of theoretical reference-dependent models, presents the results of simplified empirical tests, and argues their policy implications.

Keywords Internal migration · Urban-rural disparity · Reference-dependent preference

3.1 Introduction

Since the seminal work of Harris and Todaro (1970), many studies have theoretically or empirically analyzed the rural-urban migrations from economic viewpoints[1]; most of them have focused on the overpopulation and unemployment issues in the urban areas in developing countries (e.g., in tropical Africa). However, the continuous concentration of population to large urban areas is observed even in other countries. In Japan, although both economic and population growths have leveled off for decades, the urbanization trend is still significant.

As Stark and Taylor (1989) argue in their research on international migration, people's behavior is affected not only by the income level but also by the position relative to others. Particularly in developed countries, their motivation is not always the traditional impetus such as escape from absolute poverty or feudalism; more (psychologically) complex considerations such as aspiration, desire for recognition, or relative position may play a larger role. In this chapter, the effect of reference-dependency on migration is explored empirically using Japanese data as well as theoretically with microeconomic models; it considers the cases in which a consumer's utility is characterized by the comparison to the others or his/her state in the past, represented by the "reference points."

Such characterization is also the first step toward understanding the welfare of the residents and migrants of the new generation. Easterlin and Plagnol (2008) emphasize the role of relative income variables in determining life satisfaction by studying German residents after the reunification. Graham and Markowitz (2011) and Olgiati et al. (2013) investigate the "frustrated achievers" among migrants, who report low satisfaction despite their high objective achievements in terms of income. Similar analyses are conducted by Bartram (2011), which compared immigrants in the U.S. with natives, Switek (2012), with Swedish data, and Stillman et al. (2015), with New Zealander data, and indicated the significance of "relative" concepts and the possibility of "mistakes" in people's premigration decisions.

As for the misconception of the migrants, Knight and Gunatilaka (2010) compare more straightforwardly the levels of subjective well-being before and after migration and find the people's expectations are biased. The reasons for "wrong" information

[1] Among the recent ones are Issah et al. (2005) and Naito (2012).

or cognitive bias on the consequence of migration are argued by Mahler (1995) and Schkade and Kahneman (1998).

While noting those studies, the effect of reference-dependency on migration is explored in this chapter. Section 3.2 outlines the past and current situations of internal migrations in Japan. Section 3.3 proposes several models and considers the effect theoretically. In Sect. 3.4, empirical results are presented. Section 3.5 concludes and indicates future perspectives.

3.2 Internal Migrations in Japan

3.2.1 Historical Context

Major internal migrations in modern Japan began in the late nineteenth century as regional borders were opened by the new government. A large number of migrants journeyed into the cities, and the rate was particularly high during the period of rapid economic growth after WWII, reflecting the strong labor demand of the industries. As Fig. 3.1 indicates, the net inflow hit its maximum around 1960 and then declined sharply as a result of a change in domestic economic structure and the oil crisis.[2] However, it rose again in the 1980s during the economic boom, and since the late 1990s, some amount of immigration has continued. The inflows for 2020–2045 have been estimated to be 300,000–600,000 for each interval (5 years); despite economic growth, improvement in the nationwide transportation system, and regional developments, the inflow is unlikely to cease.

Figure 3.2 illustrates the (actual and estimated) change in the population by municipality type (large cities, medium-sized cities, and small cities, towns, and villages).[3] The overall movement simply exhibits single-peaked change (growth and decline in total population) but the composition of the three types in the twentieth century is different from the one in the latter half (including the estimated part); in the first half, the increased total population has been absorbed by large and medium-sized cities while the decline occurs mostly in the small cities, towns, and villages, mostly keeping the populations of the larger cities. That is, large Japanese cities are

[2]Sources: Japanese Population Census (by Ministry of Internal Affairs and Communications) for the historical part and Population Projection for Japan (by National Institute of Population and Social Security Research) for the estimated part. "Tokyo area" in this figure refers to Tokyo, Kanagawa, Chiba, and Saitama prefectures.

[3]Sources: Japanese Population Census and Population Projection for Japan for the historical and estimated parts, respectively. For the first part, the populations of absorbed municipalities are counted as those of the existing municipalities (as of 2015). "Large cities" refers to the 23 wards of Tokyo and 20 major cities designated by government ordinance. "Medium-sized cities" correspond to "core cities" and "(former) special cities" as of 2015. The populations of the municipalities of Okinawa are excluded from the entire figure as they had been under U.S. administration until 1972 and there are some statistical discontinuities.

Fig. 3.1 Immigration to Tokyo area (actual/estimated)

still growing (or at least are not significantly declining) despite the country's rapid population decline and absence of absolute poverty in rural areas like in developing countries.

Certainly, one possible cause of this phenomenon is the enlargement of regional disparity, as Tachibanaki and Urakawa (2012) argue it has actually occurred, particularly in the 2000s.[4] However, this study also considers another cause: the psychological factor. In addition to the simple difference in income levels, their relative position compared to others or the consumer's own past may matter.

3.2.2 Imperfect Relationship Between Income and Happiness

Since the introduction of the "hedonic treadmill" theory by Brickman and Campbell (1971) and the related empirical economic study by Easterlin (1974), developments in the economics of human behavior, happiness, or migration have indicated that the relationship between the absolute income level and human happiness is not so strong. Hagerty (2000), Diener and Seligman (2004), and Helliwell and Barrington-Leigh (2010) also illustrate the imperfect relationship between them using interregional data.

For Japanese cases, Yamane et al. (2008), Sasaki (2008), Ando (2014), and Suzuki and Tanabe (2016) derive similar conclusions from their extensive studies. Ohtake et al. (2010) and Tachibanaki and Urakawa (2012) generally summarize the associated topics and results. The following is a simple example: Fig. 3.3 indicates the relationship between the Gini coefficient *within* each prefecture and the stated level of satisfaction.[5] The estimated coefficient is significant at 5%. That is, the

[4]Note that Tachibanaki and Urakawa (2012) and Morikawa (2013) also point out, when the price levels are taken into account, the disparity is not so clear as the one inferred from the nominal values.

[5]Source: The income data are from National Survey of Family Income and Expenditure, Ministry of Internal Affairs and Communications (MIAC), Japan, 1999. Those of the level of satisfaction are

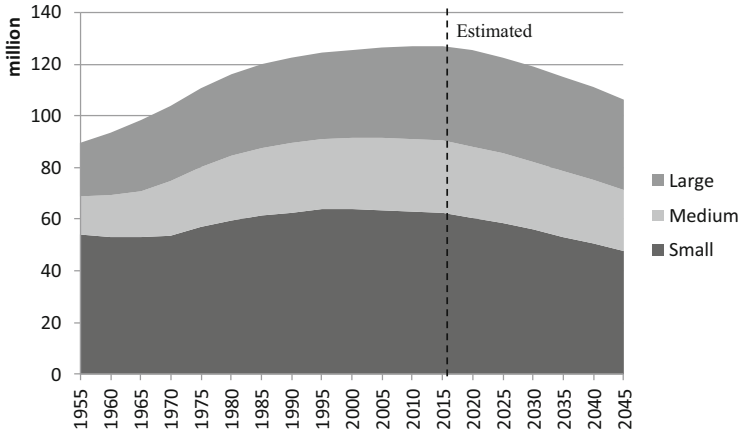

Fig. 3.2 Changes in population by city types, Japan (actual/estimated)

absolute income levels *aside*, people may receive disutility from the disparity within each region.

3.3 The Models and Theoretical Analyses

3.3.1 Characterizing Migrations with Reference-Dependent Models

This chapter proposes several reference-dependent models by extending Yonemoto (2014, 2018) and conducts theoretical analyses by deriving the corresponding results.

The interdependency of people's levels of happiness has been argued even in the early works such as A. Smith (1759). As Mui (1995) summarizes, since Veblen (1934) and Duesenberry (1949), various economic researches have been conducted assuming explicitly that the utility depends on some relative conditions or variables such as Galbraith (1958), which argues that poverty is relative (in his Chap. 23) and Sen (1966), which introduces "sympathy" into his formulation. Stigler and Becker (1977) theoretically analyze the roles of addiction, custom, tradition, advertising, fashions, and fads using a general utility function.

The comparison to the others is often studied in the context of "envy." Foley (1967) has introduced the idea of envy in describing the "equitable" public competitive equilibrium. Hochman and Rodgers (1969), Scott (1972), and Brennan (1973)

based on the National Survey of Lifestyle Preferences, Cabinet Office of Japan, summarized by Suzuki and Tanabe (2016) calculating the average of 1978–2008 values. Because of the data availability and stability, the base year of this figure is 1999, which is relatively "earlier."

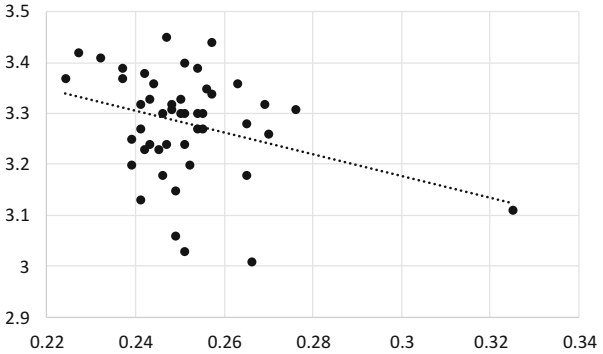

Fig. 3.3 Gini coefficient and subjective level of satisfaction

have explicitly put the states of others into the utility function. Kolm (1972) and Varian (1974) theoretically investigated it by extending the preference theory.

Some studies have also considered the cases in which the reference point is determined by the consumer's behavior in the past. Kahneman and Thaler (1991) state, "comparisons to others and especially to one's past determine the standard of satisfaction with income." The models of habit formation, such as Pollak (1970) and the ones summarized by Becker (1996), have been used to characterize human behavior based on this idea. Recently, based on the experiment of Loewenstein (1987), Wakai (2008) develops theoretical models which characterize "utility smoothing." Rozen (2010) also illustrates "intrinsic habit" with an infinite-horizon setting.[6]

3.3.2 The Basic Setting

All the theoretical models used in this section are of two-region (discrete-choice) with a reference-dependent preference. This subsection illustrates the structure of the economy, the behaviors of consumers, and the locational equilibrium.

Economy and Consumer/Resident

Consider an economy in which there are two regions $i = 1, 2$, and two types of residents (consumers) $k = h, l$, who differ in their labor skills. The number of residents of type k in region i in period t is denoted by N_{kit} so that the population of region i is $N_{it} = N_{hit} + N_{lit}$ while the total number of each type is $N_k = N_{k1t} + N_{k2t}$,

[6]Experimental studies on habit formation include Loewenstein (1987), which is about famous comparisons among sequential combinations of "Eat at Home," "Fancy French" and "Fancy Lobster," and Hsee and Abelson (1991), which is about hypothetical changes in salary.

which is assumed not to change over time (for simplicity). Following from McFadden (1973), suppose that the people's locational choice is of discrete-choice type[7]:

$$u_{knijt} = v_{kijt} + \varepsilon_{knijt} \tag{3.1}$$

where v_{kijt} is the observable (and common) part of the utility of type k resides in i and moves to (or stays in) j in period t, and ε_{knijt} is the unobservable part (of nth resident) and follows some distribution. In the case, the distribution is Gumbel, it is well known that the probability of choosing region 1 is:

$$\begin{aligned} P^*_{ki1t} &= \frac{\exp\ v_{ki1t}}{\exp v_{ki1t} + \exp v_{ki2t}} \\ &= \frac{1}{1 + \exp\left(v_{ki2t} - v_{ki1t}\right)} \end{aligned} \tag{3.2}$$

Note that P^*_{ki1t} has the same sign as $v_{ki1t} - v_{ki2t}$. Instead of assuming that the population distribution is instantaneously adjusted according to (3.2), consider the case in which fraction μ of the potential migrants can successfully move:

$$P_{kijt} - P_{kij(t-1)} = \mu\left(P^*_{kijt} - P_{kij(t-1)}\right) \text{ for } i \neq j \tag{3.3}$$

Then, N_{kjt} is actually determined by:

$$\begin{aligned} N_{kjt} &= \left[P^*_{kjjt} + (1-\mu)P^*_{kjit}\right]N_{kj(t-1)} + \mu P^*_{kijt}N_{ki(t-1)} \\ &= N_{kj(t-1)} + \mu\left(P^*_{kijt}N_{ki(t-1)} - P^*_{kjit}N_{kj(t-1)}\right) \text{ for } i \neq j \end{aligned} \tag{3.4}$$

Also, taking into account Clark and Oswald (1998) and Dufwenberg et al. (2011), suppose that the first term of (3.1) is reference-dependent:

$$v_{kijt} = v\left(c_{kjt}, \overline{c}_{kijt}\right) \tag{3.5}$$

where c_{kjt} is the consumption of type k in region j in period t, and $\overline{c}_{kijt}$ is the "reference point" (e.g., the past consumption, defined later in detail). Also, suppose that $c_{hjt} > c_{ljt}$ for $j = 1, 2$, $c_{k1t} > c_{k2t}$ for $k = h, l$, and $c_{kjt} \geq c_{kj(t-1)}$ for $k = h, l$ and $j = 1, 2$.[8] Furthermore, in the following subsections, several functional forms are considered and the results are derived.

[7]This assumption is made, like in many studies on population distribution, in order to avoid a corner solution (i.e., zero population in either region) even when the difference in income is small.

[8]The consumption or income level can be determined endogenously in a general equilibrium framework such as in Yonemoto (2014, 2018). The corresponding extension is briefly outlined at the end of Sect. 3.3.3. while most of the essential results do not change.

3.3.3 Past Consumption Level as the Reference Point

Difference from the Past Consumption Level

First, following from Pollak (1970), consider the following specification of habit-formation type:

$$v_{kijt} = v_1\left(c_{kjt}\right) + v_2\left(c_{kjt} - c_{ki(t-1)}\right) \tag{3.6}$$

That is, v is a function of the "change" in consumption as well as its absolute level. If both v_1 and v_2 are linear,

$$\begin{aligned} v_{kijt} &= (1-\beta)c_{kjt} + \beta\left(c_{kjt} - c_{ki(t-1)}\right) \\ &= c_{kjt} - \beta c_{ki(t-1)}. \end{aligned} \tag{3.7}$$

Note that (3.7) coincides with an ordinary reference-independent utility function when $\beta = 0$ and becomes simply a function of the "change" in consumption when $\beta = 1$. The difference in v_{kijt} between the two regions is:

$$v_{ki1t} - v_{ki2t} = c_{k1t} - c_{k2t} \tag{3.8}$$

In this kind of linear case, the effect of the reference-dependency disappears. Like traditional cases, the migration behavior only depends on the difference in the absolute consumption levels.

Ratio to the Past Consumption Level

Alternatively, assume that v is a function of the ratio of the consumption level to (a power function of) the one in the last period:

$$v_{kijt} = \frac{c_{kjt}}{\left(c_{ki(t-1)}\right)^{\gamma}} \tag{3.9}$$

Again, $\gamma = 0$ corresponds to the case in which v degenerates into reference-independent expresson while $\gamma = 1$ refers to a simple fraction. The difference in v_{kijt} is:

$$v_{ki1t} - v_{ki2t} = \frac{c_{k1t} - c_{k2t}}{\left(c_{ki(t-1)}\right)^{\gamma}} \tag{3.10}$$

which now depends on γ. Differentiating with respect to γ:

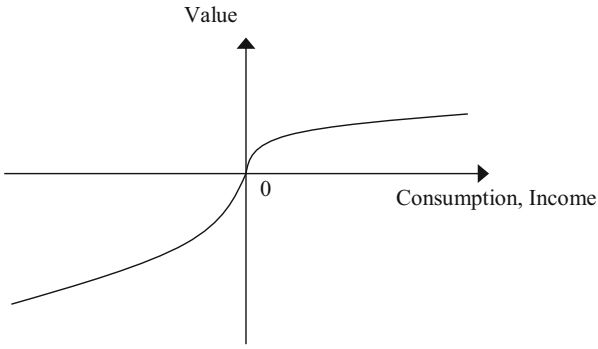

Fig. 3.4 Typical value function of prospect theory

$$\frac{\partial\left(v_{hi1t}-v_{hi2t}\right)}{\partial\gamma}=-\left(c_{k1t}-c_{k2t}\right)\left(c_{ki(t-1)}\right)^{-\gamma}\ln c_{ki(t-1)} \tag{3.11}$$

which is negative for $c_{ki(t\ -\ 1)}>1$. By (3.10) and (3.11), the reference-dependency works as a centrifugal force: as the denominator becomes larger and the consumers gets insensitive to the absolute difference, they are not to be attracted by the richer region as much as before.

Kahneman-Tversky Type Function

Returning to the "difference" specification, now consider a nonlinear case. When the "reference point" matters, the basic prospect theory developed by Kahneman and Tversky (1979) and their successor suggests a utility (value) function such as the one depicted in Fig. 3.4. It is typically concave in the positive part of the domain but convex, and the slope is larger in the negative part. Noting that shape, specify v as follows[9]:

$$v_{kijt}=(1-\beta)c_{kjt}+\beta\ \mathrm{g}\left(c_{kjt}-c_{ki(t-1)}\right)$$

$$\mathrm{g}\left(c_{kit}-c_{ki(t-1)}\right)=\begin{cases}\left(c_{kjt}-c_{ki(t-1)}+1\right)^{\sigma}-1 \text{ for } c_{kit}-c_{ki(t-1)}\geq 0\\ -\gamma\left(c_{ki(t-1)}-c_{kjt}+1\right)^{\sigma}+\gamma \text{ for } c_{kit}-c_{ki(t-1)}<0.\end{cases}$$

$$0<\sigma\leq 1,\gamma>1 \tag{3.12}$$

Differentiating with respect to β, the effect of reference-dependency is:

[9] "1" is added for technical reasons: then, the power function is always positively related to the power.

$$\frac{\partial\left(v_{ki1t}-v_{ki2t}\right)}{\partial\beta}=c_{k2t}-c_{k1t}+\mathrm{g}\left(c_{k1t}-c_{ki(t-1)}\right)-\mathrm{g}\left(c_{k2t}-c_{ki(t-1)}\right) \tag{3.13}$$

Because $c_{kjt}\geq c_{kj(t\ -\ 1)}$, the positive part of g is used for $i=2$. Then, the cross-partial derivative is:

$$\begin{aligned}\frac{\partial^2\left(v_{k21t}-v_{k22t}\right)}{\partial\beta\partial\sigma}&=\left(c_{k1t}-c_{k2(t-1)}+1\right)^{\sigma}\ln\left(c_{k1t}-c_{k2(t-1)}+1\right)\\&\quad-\left(c_{k2t}-c_{k2(t-1)}+1\right)^{\sigma}\ln\left(c_{k2t}-c_{k2(t-1)}+1\right)>0\end{aligned} \tag{3.14}$$

For $i=1$, similar argument holds if $c_{k2t}\geq c_{k1(t\ -\ 1)}$:

$$\begin{aligned}\frac{\partial^2\left(v_{k11t}-v_{k12t}\right)}{\partial\beta\partial\sigma}&=\left(c_{k1t}-c_{k1(t-1)}+1\right)^{\sigma}\ln\left(c_{k1t}-c_{k2(t-1)}+1\right)\\-\left(c_{k2t}-c_{k1(t-1)}+1\right)^{\sigma}&\ln\left(c_{k2t}-c_{k2(t-1)}+1\right)>0\ \text{for}\ c_{k2t}\geq c_{k1(t-1)}.\end{aligned} \tag{3.15}$$

If $c_{k2t}<c_{k1(t\ -\ 1)}$, the negative part of g is used for the fourth term in (3.13). As a result, instead of (3.15), the following is obtained:

$$\begin{aligned}\frac{\partial^2\left(v_{k11t}-v_{\mathrm{k12}t}\right)}{\partial\beta\partial\sigma}&=\left(c_{k1t}-c_{k1(t-1)}+1\right)^{\sigma}\ln\left(c_{k1t}-c_{k1(t-1)}+1\right)\\+\gamma\left(c_{k1(t-1)}-c_{k2t}+1\right)^{\sigma}&\ln\left(c_{k1(t-1)}-c_{k2t}+1\right)>0\ \text{for}\ c_{k2t}<c_{k1(t-1)}.\end{aligned} \tag{3.16}$$

Since (3.14) to (3.16) are all positive, when $\sigma<1$, (3.13) is negative for $i=1$, 2. The reference-dependency works as a centrifugal force: because an individual with Kahneman-Tversky utility is insensitive to higher levels of richness or poverty, the difference between the two regions is not counted as much as the linear case.

Next, differentiating (3.13) with respect to reference point $c_{ki(t\ -\ 1)}$, the following is obtained:

$$\frac{\partial\left(v_{ki1t}-v_{ki2t}\right)}{\partial c_{ki(t-1)}}=\beta\left[\frac{\partial\mathrm{g}\left(c_{k1t}-c_{ki(t-1)}\right)}{\partial c_{ki(t-1)}}-\frac{\partial\mathrm{g}\left(c_{k2t}-c_{ki(t-1)}\right)}{\partial c_{ki(t-1)}}\right] \tag{3.17}$$

For $i=2$ and for $i=1$ with $c_{k2t}\geq c_{k1(t\ -\ 1)}$, (3.17) is positive. That is, higher consumption level in the previous period promotes migration because people are "bored" as a result of habit formation and become sensitive to even a small difference between the two regions. For $i=1$ with $c_{k2t}<c_{k1(t\ -\ 1)}$,

$$\frac{\partial\left(v_{k11t}-v_{k12t}\right)}{\partial c_{k1(t-1)}}=\beta\left[-\sigma\left(c_{k1t}-c_{k1(t-1)}+1\right)^{\sigma-1}+\gamma\sigma\left(c_{k1(t-1)}-c_{k2t}+1\right)^{\sigma-1}\right] \text{ for } c_{k2t} < c_{k1(t-1)} \tag{3.18}$$

which can be negative for small c_{k2t}, the convex part of g can still work as a centrifugal force because people are insensitive to relative poverty.

General Equilibrium

It has been so far assumed that c s are given exogenously according to the residents' types. However, like in Yonemoto (2014, 2018), the consumption or income (wage) levels can be determined in the market. In that case, the behavior of the firms (production) should be modeled, and the wages, prices of the goods, and the employment become all endogenous.[10] The "equilibrium" is characterized by the corresponding system of equations. Because the space is limited, this section presents the essence of the effect of reference-dependency, with partially exogenous framework.

Note that the effect of migration on productivity (e.g., agglomeration economy) can be analyzed when the production functions are modeled. Also, one can consider two or more goods whose consumption levels are determined by peoples' optimization, taking into account the prices and their income levels, and analyze more complex type of dependency.

3.3.4 Difference from the (Past) Regional Average

In this subsection, instead of assuming one's utility depends on his/her past consumption level, it depends on the others'. Suppose that the reference point is proportional to the average consumption level of the residents in the corresponding region in period $t-1$[11]:

$$v_{kijt}=v_1\left(c_{kjt}\right)+v_2\left(c_{kjt}-\overline{c}_{jt}\right)$$

[10] Alternatively, any partial equilibrium analyses such as Yonemoto (2021), which extends the original setting of Harris and Todaro (1970), are also possible.

[11] The average in period t can be also used as the reference point. But, in that case, because it depends on the population distribution, the entire system must be solved for N s such as in Yonemoto (2014, 2018). In this subsection, for simplicity, the reference points are assumed to be determined before the people make decisions.

$$\bar{c}_{jt} \equiv \frac{N_{hj(t-1)}c_{hj(t-1)} + N_{lj(t-1)}c_{lj(t-1)}}{N_{\ j(t-1)}} \tag{3.19}$$

which is analogous to Duesenberry (1949) and Clark and Oswald (1998). If both v_1 and v_2 are linear, (3.19) is rewritten as:

$$\begin{aligned} v_{kijt} &= (1-\beta)c_{kjt} + \beta\left(c_{kjt} - \bar{c}_{jt}\right) \\ &= c_{kjt} - \beta\bar{c}_{jt} \end{aligned} \tag{3.20}$$

The effect of reference-dependency on the difference in v_{kijt} is:

$$\frac{\partial\left(v_{ki1t} - v_{ki2t}\right)}{\partial\beta} = \bar{c}_{2t} - \bar{c}_{1t} < 0 \tag{3.21}$$

That is, reference-dependency reduces the migration to the richer area. Because the utility is relative, higher absolute income is less attractive than in ordinary cases.

Kahneman-Tversky Type Function

Kahneman-Tversky case is, in analogy with (3.12):

$$\begin{aligned} v_{kijt} &= (1-\beta)c_{kjt} + \beta\, \mathrm{g}\left(c_{kjt} - \bar{c}_{jt}\right) \\ \mathrm{g}\left(c_{kjt} - \bar{c}_{jt}\right) &= \begin{cases} \left(c_{kjt} - \bar{c}_{jt} + 1\right)^{\sigma} - 1 \text{ for } c_{kjt} - \bar{c}_{jt} \geq 0 \\ -\gamma\left(\bar{c}_{jt} - c_{kjt} + 1\right)^{\sigma} + \gamma \text{ for } c_{kjt} - \bar{c}_{jt} < 0 \end{cases} \\ 0 &< \sigma \leq 1, \gamma > 1 \end{aligned} \tag{3.22}$$

The derivative of the difference with respect to β is:

$$\frac{\partial\left(v_{ki1t} - v_{ki2t}\right)}{\partial\beta} = c_{k2t} - c_{k1t} + \mathrm{g}(c_{k1t} - \bar{c}_{1t}) - \mathrm{g}(c_{k2t} - \bar{c}_{2t}) \tag{3.23}$$

As long as $c_{ljt} < \bar{c}_{jt} < c_{hjt}$ (i.e., the average does not change significantly), the cross-partial derivative for $k = h$ is:

$$\begin{aligned} \frac{\partial^2\left(v_{hi1t} - v_{hi2t}\right)}{\partial\beta\partial\sigma} &= \left(c_{h1t} - \bar{c}_{1t} + 1\right)^{\sigma} \ln\left(c_{h1t} - \bar{c}_{1t} + 1\right) \\ &\quad -\left(c_{h2t} - \bar{c}_{2t} + 1\right)^{\sigma} \ln\left(c_{h2t} - \bar{c}_{2t} + 1\right) \end{aligned} \tag{3.24}$$

The sign of (3.24) depends on $c_{hjt} - \bar{c}_{jt}$, deviation from the reference point. If it is larger in region 1 (e.g., the disparity is larger in the rich region), (3.24) is positive so

that for $\sigma < 1$, (3.23) is negative and even smaller than (3.21). Kahneman-Tversky setting reduces migration of the high-skilled as they are insensitive to larger deviation. For $k = l$:

$$\frac{\partial^2(v_{li1t} - v_{li2t})}{\partial\beta\partial\sigma} = -\gamma(\overline{c}_{1t} - c_{l1t} + 1)^{\sigma} \ln(\overline{c}_{1t} - c_{l1t} + 1) + \gamma(\overline{c}_{2t} - c_{l2t} + 1)^{\sigma} \ln(\overline{c}_{2t} - c_{l2t} + 1) < 0. \tag{3.25}$$

If $\overline{c}_{jt} - c_{ljt}$ is larger in region 1, the insensitivity takes more low-skilled people to the rich region.

Incomplete Information

So far, it has been assumed that the people are aware of the situation after they migrate. However, as has been argued in the previous section, some people do not correctly expect their well-being after moving into another region. Suppose that, while a consumer can correctly observe the income level of his/her type in the other region, he/she has incomplete information on the reference point there. As a result, he/she also refers to the one in the current location in expecting their utility:

$$\begin{aligned} v^e_{kijt} &= (1-\beta)c_{kjt} + \beta\left(c_{kjt} - \overline{c}^e_{jt}\right) \\ &= c_{kjt} - \beta\overline{c}^e_{jt} \text{ for } i \neq j \\ \overline{c}^e_{jt} &= \varepsilon\overline{c}_{jt} + (1-\varepsilon)\overline{c}_{it} \end{aligned} \tag{3.26}$$

where $\overline{c}^e_{jt}$ and v^e_{kijt} are the expected reference point and the utility level in region j from the viewpoint of a consumer currently living in i, respectively. ε represents the "degree of correct expectation" on the reference point. Note that the following holds for $i = 1, 2$:

$$v_{k11t} - v^e_{k12t} = v^e_{k21t} - v_{k22t} = c_{k1t} - c_{k2t} - \varepsilon\beta(\overline{c}_{1t} - \overline{c}_{2t}) \tag{3.27}$$

In this specification, the difference from the viewpoint of region 1 coincides with that of region 2. Differentiating with respect to ε, we get:

$$\frac{\partial(19)}{\partial\varepsilon} = -\beta(\overline{c}_{1t} - \overline{c}_{2t}) < 0 \tag{3.28}$$

That is, the "overpopulation" is worsened as the incompleteness increases, lowering ε. Note that, once "trapped" in the larger region, by (3.27), the people cannot get out from it. They are stuck in an environment in which the income is higher but their level of satisfaction is not as much high (because of higher ex-post

reference point there); a policy that take them (back) to region 2 improves their welfare.

3.4 Empirical Studies

3.4.1 Backgrounds

Yonemoto (2015, 2017) has shown, using Japanese inter-prefectural data for 1955–2014, migrations (a posteriori) depend not only on the differences in current income levels but also on their summations, or the changes in some cases. This section is an extension of those studies using newly obtained data and taking the spatial autocorrelation into account.

Preceding studies on migration and its (economic) causes are summarized in detail by Greenwood (1985, 1997). Researches related to the present chapter include Walsh (1974), which compares static expectations with extrapolative ones, and Gabriel and Levy (1988), which tests three types of adaptive expectation models.

As for the studies on Japanese domestic migrations, following from Kono (1963), Mera (1977) conducts a regression analysis using 1952–1974 data; Tabuchi (1985) takes into account dynamic factors. Ito (2006) investigates the long-term migrations in 1955–1990; Ota and Ohkusa (1996) use a model which determines wage and migration simultaneously.

The theory of spatial autocorrelation has been primarily developed since the seminal work of Anselin (1988). The modeling and analyses of this study are mostly based on Arbia (2014) and Tsutsumi and Seya (2014).

3.4.2 Models Used in the Estimations

The basic models used in this section are summarized as follows.

Location Choice

Characterize (the logistic transformation of) the probability of a resident (consumer) moving from location i to j in period t as follows[12]:

[12]It can be confirmed that (3.24) approximates (3.3) when μ is small.

$$\ln\left(\frac{p_{ijt}}{1-p_{ijt}}\right)=\alpha+\sum_m \beta_m\left(x_{mjt}-x_{mit}\right) \tag{3.29}$$

where x_{mit} denotes the m^{th} explanatory variable representing the state (e.g., income) of location i. In particular, $m = 0$ (i.e., $_{0it}$) indicates the variable related to the consumer's income level. α is a constant, but later, when fixed effects are taken into account, regional dummies are introduced instead.

Specifying the Income Part

Based on the specifications in the last section, the following expressions are used in the estimations:

1. Habit Formation

$$x_{0it}=\eta_0\Delta y_{it}+\eta_1 y_{it} \tag{3.30}$$

where y_{it} is the income level in period t and $\Delta y_{it}\equiv y_{it}-y_{i(t-1)}$ is the change in income.[13]

2. Disparity

$$x_{0it}=\eta_0 \mathrm{GINI}_{it}+\eta_1 y_{it} \tag{3.31}$$

where GINI_{it} is the Gini coefficient of region i in period t.[14]

Rewrite (3.29) as:

$$\widehat{p}_{ijt}=\alpha+\sum_m \beta_m \widetilde{x}_{mjt}$$

$$\widehat{p}_{ijt}\equiv \ln\left(\frac{p_{ijt}}{1-p_{ijt}}\right), \widetilde{x}_{mjt}\equiv x_{mjt}-x_{mit} \tag{3.32}$$

The corresponding econometric model without fixed effects or spatial autocorrelation is:

[13]Note that, if the effect of savings is ignored, the consumption level is approximated by that of income.

[14]Because only aggregate data are available and (3.20) cannot be estimated for each k, the degree of disparity is introduced here. In general, high disparity induces relatively large number of "poor" people so that a rise in disparity in the destination region is expected to reduce the number of migrants when people are aware of reference-dependency.

$$\widehat{p}_{ijt} = \alpha + \sum_m \beta_m \widetilde{x}_{mjt} + \varepsilon_{ijt} \tag{3.33}$$

The one with fixed effects is:

$$\widehat{p}_{ijt} = \alpha_{ij} + \sum_m \beta_m \widetilde{x}_{mjt} + \varepsilon_{ijt} \tag{3.34}$$

As for spatial autocorrelation, this study considers a spatial error model (SEM) of spatial autoregressive type.[15]

$$\boldsymbol{\varepsilon} = \lambda \mathbf{W}\boldsymbol{\varepsilon} + \mathbf{e} \tag{3.35}$$

where $\boldsymbol{\varepsilon}$ and $\mathbf{e}$ indicate the error vectors ($ijt \times 1$) and $\mathbf{W}$ is the spatial weight matrix.

This study assigns "1" to the migration in which the destinations are physically neighboring (including the cases in which they are connected by bridges or tunnels) and then row-normalized.

3.4.3 The Data

Most of the data are the ones used in Yonemoto (2015, 2017), which has investigated the migrations in the 1950–1970s.[16] Excluding the data on Okinawa prefecture, which had been under U.S. administration from 1945 to 1972, the data on the migrations among 46 prefectures are used. Since the census and other surveys are carried out every 5 years, three periods, 1960, 1965, and 1970, are targeted in the analysis of this time.[17]

Migrations

This study's migration data are prefectural and based on the "Report on Internal Migration in Japan," which has been published by the Statistics Bureau of Ministry of Internal Affairs and Communications (MIC) or its preceding organizations in

[15]Because this study deals with regional differences in independent variables, there are some difficulties in interpreting a spatial lag model (SLG), another major specification.

[16]Because Yonemoto (2015, 2017) has also tested the effects of (ex-post) lifetime income for more than 40 years, the study period is limited to the 1970s and before.

[17]Those periods are chosen because (1) the author has already collected enough data and (2) they include the periods in which the most outstanding economic growth occurred so that before/after comparisons are possible. In the future, the author will extend the study to include detailed data on the 1980s and after.

Japan since 1954. This study treats migrations in both directions as different observations. Therefore, each cross-sectional set of data includes 46×45 elements.

The MIC data are on the migrations of the people who have Japanese nationality. To calculate the rate of emigration, the number of emigrants must be divided by the population. For the (old) periods in which the data on the populations of Japanese nationality are not available, they are approximated by the total (resident) populations on the Census or Population Estimates.

Income (Wage)

Income data are from the "Monthly Labour Survey" (monthly average cash earnings of regular employees; of firms with 30 employees or more) by the Employment, Wage and Labour Welfare Statistics Office of Ministry of Health, Labour and Welfare (MHLW), and they are simply multiplied by 12 to approximate the annual figures and deflated by the price indices described below.[18]

Distance

"Distance between Prefectural Offices" by Geospatial Information Authority is used. Note that the distances are constant over time (thus, they are not used in the "fixed effects" model).

Commuting Time

"Average commuting time" on the Housing Survey by Prime Minister's Office, 1968, is used. The figures for other periods are not released so that the variable is constant over time.

Lowest Temperature

The lowest temperature in 1961–1965, on "Climate Statistics" by the Japan Meteorological Agency, at each meteorological observatory located in the prefectural capital is used (constant over time).

[18]The multiplier can be different if bonuses or taxes are taken into account. However, the significance of the estimated coefficient is not affected.

College Student Rate

For each prefecture, the number of college students on the "School Basic Survey" by the Ministry of Education is divided by the total population. Because the migration data are released every 5 years, there is obviously a lag between the change in the number of students and the migration counts. The data for 1958, 1963, and 1968 are used to characterize the movement 2 years later.

Employment (Rate) of Primary and Secondary Industries

Employment data on the "Census of Establishment" by the General Affairs Agency is used.

Marriage Rate

The number of "Married" on the Census data is divided by the population aged 15 or over.

Youth Rate

"Population aged 15 or over" on the Census data is divided by the total population.

Unemployment Rate

"(Total) unemployment" on the Census data is divided by the "labor force."

Housing Rent

"Rent per tatami unit (rented houses used exclusively for living)" on the Housing Survey is used. Because the surveys were conducted in 1958, 1963, and 1968, those are used to represent 1960, 1965, and 1970 values, respectively.

3.4.4 Estimation Results and Discussions

Habit Formation

Table 3.1 indicates the results of the estimations using specification 1 in Sect. 3.4.2. In the case of a simple OLS (Estimation 1), the coefficient for Δy is significant to

Table 3.1 Income and its change

	Estimation 1		Estimation 2		Estimation 3	
Type	OLS		Fixed effects		Spatial error fixed effects	
	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value
Constant	−8.55	−429.5***	−8.55	−1662.1***		
Δyt	-2.52×10^{-7}	−1.566+	1.82×10^{-7}	2.05**	1.42×10^{-7}	2.69***
yt	1.37×10^{-6}	16.70***	-2.31×10^{-7}	−2.89***	-2.76×10^{-7}	−5.16***
Adjusted R^2	0.067		0.938			

Throughout this section, the asterisks indicate: ***significant at 1% level, ** 5%, * 10%, and + 15%

some extent (at 15% level) but the sign is negative and looks "wrong." However, when fixed effects are taken into account, it turns out to be positive and significant at 10% level (Estimation 2). Moreover, when spatial error model is used, the coefficient for Δy is significant at 5% level (Estimation 3).[19] Note that this empirical finding, the "change" in income seems to be more correlated to the migration flow than its absolute level, does not directly indicate all the specifications of this chapter are correct. For example, the same relationship might be found when people take into account the expected future level of income, which is approximately the integral of the "changes," or the "change" reflects any shifts in the labor-market conditions such as an increase in labor demand, which also raises employment.[20] However, certainly, this kind of finding of anomalies will advance the research of this field.

Table 3.2 presents the cases in which more control variables are included. The results are similar to those of Table 3.1. With fixed effects, the sign of Δy turns out to be positive and significant (Estimation 5). With spatial error, some sociological variables also seem to explanatory powers (Estimation 6) while Δy is still positive and somewhat significant in some cases (e.g., Estimation 7).

Estimations in Table 3.3 correspond to the "disparity" specification, in which the Gini coefficient is included instead of the "change." In OLS estimations, the coefficient for the Gini is insignificant when the full samples of 1960–1970 are used (Estimation 8) while it is negative and significant at 10% when 1965–1970 samples are used; it might be indicating the change in people's preference from the "absolute" type to the "relative" during the period of economic growth. While the significance of the coefficient for the Gini does not disappear with fixed effects (Estimation 10), it fades away in the spatial error model (Estimation 11). This might be because, as many preceding studies have shown, people's expectation on their situation after migration is not perfect.

3.5 Conclusion and Future Perspectives

It is inferred from the analyses of the previous subsections that a consumer's utility may depend on some reference point, such as the situation of the others or his/her own past. Also, it is possible that people do not recognize the corresponding effect correctly in their decision-making before migration. Then, the population distribution is also affected, and, in particular, overpopulation in larger cities is likely to occur if people have incomplete information.

In the case of overpopulation, the overall (post-migration) welfare of the people, as well as environmental sustainability, is improved by government intervention. However, simply putting constraints on agglomeration economies, which tends to

[19]Moran's I statistics for the models of this study are, in most cases, highly significantly different from zero (for example, 0.0989 for Estimation 1).

[20]Yonemoto (2015, 2017) have tested the significance of the integral of the "changes."

Table 3.2 Income, its change, and other socio-economic variables

	Estimation 4		Estimation 5		Estimation 6		Estimation 7	
Type	OLS		Fixed effects		Spatial error fixed effects		Spatial error fixed effects	
	Coefficients	*t*-value	Coefficients	*t*-value	Coefficients	*t*-value	Coefficients	*t*-value
Constant	−7.31	−236.3***	−8.55	−1664.7***				
Δyt	-3.93×10^{-7}	−2.24**	1.63×10^{-7}	1.80*	5.49×10^{-8}	1.02	8.40×10^{-8}	1.57+
yt	6.74×10^{-7}	6.61***	-1.87×10^{-7}	−2.09**	-8.52×10^{-8}	−1.40	-1.42×10^{-7}	−2.46**
Commuting time	4.34×10^{-4}	0.185						
Lowest temp	-1.61×10^{-2}	−3.67***						
Distance	-2.57×10^{-3}	−47.6***						
College student	-4.69×10^{-3}	−1.98**						
Primary indust	4.27×10^{-2}	1.91*	-3.45×10^{-2}	−2.63***				
Secondary indust	1.33×10^{-2}	4.27***	5.46×10^{-3}	2.08**	4.74×10^{-3}	2.78***	6.66×10^{-3}	4.19***
Marriage	2.21×10^{-6}	0.865			-8.29×10^{-7}	−1.45+		
Unemployment	-1.69×10^{-2}	−0.462						
Youth	-7.45×10^{-2}	6.81***			1.50×10^{-2}	3.00***		
Rent	-3.98×10^{-4}	7.55***	-1.02×10^{-4}	−2.57**	-1.12×10^{-4}	−4.09***	-1.21×10^{-4}	−4.45***
Adjusted R^2	0.348		0.938					

Table 3.3 Income and Gini coefficient

	Estimation 8		Estimation 9		Estimation 10		Estimation 11	
Periods	1960–1970				1965–1970			
Type	OLS		OLS		Fixed effects		Spatial error	
	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value	Coefficient	*t*-value
Constant	−8.55	−429.4***	−8.42	−351.7***	−8.42	−429.4***		
Gini	−0.357	−0.417	−2.76	−2.41**	−0.576	−1.59+	−2.58	−1.24
yt	1.28×10^{-6}	20.9***	1.24×10^{-6}	18.3***	7.65×10^{-8}	2.19**	-8.70×10^{-9}	−0.358
Adjusted R^2	0.066		0.078		0.970			

Table 3.4 Number of industries whose largest concentration are in each group

	All industries	Manufacturing
Large cities	425.5	100
Medium-sized cities	36.5	25
Small cities, towns, and villages	78	53
Total	540	178

make a large city even larger and increases regional disparity but may also increase overall production, is neither realistic nor efficient in general. Alternatively, if one can find industries that can be located in places other than large cities without losing much efficiency, attracting those industries to those places might be one solution.

For example, logistics or some manufacturing industries tend to avoid congestion or high land cost while some service industries do not. Table 3.4 counts the number of industries that have their largest concentration (in terms of the number of enterprises) in each region.[21] Although more than half of the industries have the highest concentration in large cities, some do not. That is, some industries do not particularly prefer locating in the most populated cities but tend to locate in other places.

Another solution might be more direct; if overpopulation is caused by peoples' misconception, just let them know it. By informing the rural residents about the economic conditions (including housing rents and employment situation) in large cities, the problem of information incompleteness might be eased by letting them recognize it. Also, by promoting a life in rural areas or non-large cities where nominal income may be smaller, but residents are more "satisfied," the population distribution can be adjusted.

Note that, by "correcting" the overpopulation, the entire system is to be more environmentally sustainable. If people's preference depends on any relative variables, raising absolute values may end up with the "hedonic treadmill," more resource-consuming economy without improving the overall welfare. Awareness of the relativity increases sustainability as well as people's welfare.

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[21] Source: 2012 Economic Census for Business Activity, by Ministry of Internal Affairs and Communications. The three municipality groups are as defined in Sect. 3.1.

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Part III
Goods and Services

Chapter 4
Rural-Urban Satisfaction Towards China's Public Goods and Services Provision

Yang Li Allen and Wenming Zhang

Contents

Abstract China's unprecedented rate of development over the past 40 years has created a rapidly unequal society. This divide is starkest when comparing rural and urban spaces. The Chinese government's development strategy has largely centered on spending substantial resources on urbanization. Therefore, the quantity and quality of providing public goods and services has been skewed toward urban areas, even though the rural counterpart still hosts two-thirds of China's population. Strict hukou (household registration) enforcement has kept rural residents legally away from public goods, services, and social welfares in attractive urban center. However, even as urban dwellers are often more affluent, they also demand more from the government. This chapter seeks to explore the difference between rural and

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urban hukou holders on their perceptions of public goods provision. By utilizing the 2015 Chinese General Social Survey (CGSS), we applied binomial logistic regression to test whether hukou status predicts people's satisfaction toward public goods and services provision ($N = 10{,}195$). Rural hukou holders have 20% lower odds of being satisfied with general public goods and services provision than urban hukou holders when controlling for demographic and socioeconomic indicators ($p < 0.05$). When the other control variables are set to their means, the probability of urban hukou holders being satisfied is roughly 50%, while rural counterpart is 45%. In the analysis of nine specific types of public goods and services, rural dwellers were more satisfied in terms of healthcare, housing, and social control, but less satisfied with public infrastructures. Hukou yielded no statistical significance in public education, public employment services, social security, temporary subsidies, and public culture and physics. These results show that public goods provision is a complex relationship in China, which does not distribute neatly across the rural-urban divide.

Keywords Chinese governance · Rural-urban comparison · Public goods provision · Binomial logistic regression

4.1 Introduction

China's unprecedented rate of development over the past 40 years has created a rapidly unequal society. This divide is starkest when comparing rural and urban spaces. The Chinese government has poured substantial resources into its metropolitan cities. Therefore, the quantity and quality of providing public goods and services are skewed toward urban spaces, even though the rural counterpart still hosts two-thirds of China's population. Urbanization and industrialization have brought millions of Chinese rural residents to the city areas. Due to the dual system of public goods and services, the entitlements are limited to local residents. Strick hukou (household registration) enforcement has kept rural residents away from the hosting cities' public goods, public services, and social welfares. Public goods, in this chapter, refers to the non-excludable and non-rivalrous goods and services provided by the government. This notion is exchangeable to denote pure public goods, such as infrastructures and education, and impure public goods like various social welfare, pensions, and governmental assistance.

Scholars have long highlighted this stark urban and rural public goods divide in the case of China, and they are naturally curious about the situation and consequences. Researchers have reached some agreement on the hukou system, causing a huge social disparity between the urban and rural regions. They have proven China's rural-urban disparities via various analytical perspectives of history, institution, political economy, etc. Some studies touched upon the rural-urban comparison, such as subjective well-being (Zhang et al. 2020), happiness (Knight and Gunatilaka 2010), social welfare (Cai 2011), and education (Allen 2017). Other scholars

embedded this rural-urban division into their works, such as Frazier (2010), by acknowledging the unequal development of social welfare and revealed the unevenness through the case of pension reform. Saich (2008) studied China's provision of public goods via a wide range of welfare reforms. When examining public goods provision in China, most scholars focused on either urban or rural areas. Some scholars have emphasized urban public goods provision in China (Solinger 1995; Dickson et al. 2016), while others have solely focused on rural counterparts. (Tsai 2002, 2007a, b; Chen and Huhe 2013; Luo et al. 2007, 2010; Huhe et al. 2015; Xia 2011). Scholars also have centered the rural and urban divide on the situations of rural migrants residing in cities (Feng et al. 2002; Wu 2004; Zhou and Ronald 2017). However, there is a dearth of research comparing rural-urban satisfaction with public goods provision in China. To build upon the existing literature on this topic, we examined the rural-urban satisfaction toward public goods and services provision.

This chapter explores the difference between rural and urban hukou holders on their perceptions of public goods provision. The popular perception is referred to as satisfaction (dependent variable) in this study. We treated hukou status, rural or urban, as the primary independent variable of interest. It is because the hukou system persists to function as the main instructional yardstick on the allowance of governmental subsidies, welfare, and employment opportunities (Cheng and Selden 1994; Cai 2011). More specifically, we asked three guiding questions: (1) what are the general differences among rural and urban hukou holders on various perceptions of public goods provision? (2) Does hukou status predict satisfaction? And (3) How do rural and urban hukou holders respond to specific types of public goods and services?

The 2015 Chinese General Social Survey (CGSS) was the dataset used in this study. We first explored the descriptive statistics of the variables in this study. Next, we applied binomial logistic regression to test whether hukou status predicts people's satisfaction toward public goods and services provision. Our findings show that rural hukou holders have 20% lower odds of being satisfied with general public goods and services provision than urban hukou holders when controlling for socioeconomics and demographics ($p < 0.05$). When the background variables are set to their means, the probability of urban hukou holders being satisfied is roughly 50%, while the rural counterpart is 44%. In the analysis of nine specific types of public goods and services, rural dwellers were more satisfied with healthcare, housing, and social control, but less satisfied with public infrastructures than their urban counterparts. Hukou yielded no statistical significance in public education, public employment services, social security, temporary subsidies, as well as public culture and physics. These results show that public goods provision is a complex relationship in China, which does not distribute neatly across the rural-urban divide.

Our findings echoed the current literature, as rural hukou holders tend to be less satisfied with public goods provision. It indicated the disparity and inequality of public goods provision among rural and urban areas. The following section of this chapter traces the evolution of China's household registration system and its consequences to public goods and services provision. In Sect. 4.3, we will present the dataset, coding procedures of quantitative indicators, and the statistical method

applied in this project. This chapter ends with analytical findings and a discussion built from their implications.

4.2 Household Registration (Hukou) System as a Rural-Urban Divide

During the past several decades, China has experienced dramatic social changes and rapid economic growth. According to data released by the National Bureau of Statistics of China (NBS) in 2015, the GDP per capita has jumped from 381 RMB in 1978 to 41,908 RMB in 2013, which is a 110 times growth in 35 years (these figures were found on the Bureau's website: www.stats.gov.cn). This economic growth has brought prosperity to China, but it also has shifted sociopolitical conditions from the heavily controlled communist rule to a more liberal style with certain degrees of freedom. It has become much easier for rural residents to move to different regions, especially urban areas, through the government's slow relinquish of its former heavily controlled household registration system.

The hukou system was a critical institutional expression of socialist urban bias established in China in the 1950s (Cheng and Selden 1994; Lin 2006). A hardline socialist style government ruled China during that period. Lin (2006) explained that a socialist state is theoretically the vehicle for society to acquire equality classlessness and, ultimately, self-management without bureaucracy. Despite the government's goal to create an egalitarian society, the social political strain has divided the society into two classes, the urban and rural (Cheng and Selden 1994). Thus, in reality, China in Mao's period was established through an urban-rural division and later enabled the old forms of class inequalities to be reinstated in the marketplace. The hukou system was the main cause since it kept the rural residents separated from the urban populations. Although, it has also been argued that the system has prevented a potential destabilizing mass migration from the rural areas to the cities (Chan and Buckingham 2008). This situation lasted until the early stages of the economic reform in the 1980s, when internal migration policy was relaxed, although some of the same biases remained.

In the period before 1978, both the urban and rural residents were socially inclusive. The urban areas in China utilized a universal lifelong employment policy, which guaranteed that the normal working population was enlisted through government's job assignment into different working units (danwei) (Frazier 2002; Bray 2005). At the same time, danwei, referred to as "labor management institutions" by Frazier (2002), would provide a comprehensive welfare package. During the pre-economic reform era, more than 80% of the urban labor force was organized and covered in the danwei system. These danwei included state-owned enterprises, state agencies, government departments, and public sector organizations. Hence, the danwei system operated as a mini-welfare system, which provided three essentials—an iron rice bowl (job tenure), a big rice pot (equal wage), and a welfare package,

such as daycare, kindergarten and school, medical care, assistance, senior citizens' insurance, and funeral services, to their members and even their family members (Frazier 2002). A similar, but highly uneven and fragmented, welfare package was provided to the rural areas as well, through a rural commune system. In the rural areas, farmers were granted collective ownership of the land and were organized into communes. The communes distributed daily necessities to the working farmers in the group.

After 1978, with the economic reforms, the Chinese government retreated its welfare support, as the leadership thought that potential social problems would be solved with the maturity of the economic market. Policymakers in China abandoned universal basic welfare and focused on "development as priority," mostly pursuing economic growth (Wang 2008, p. 20). During the late 1970s to the early 1980s, the state-owned enterprises (SOEs) were long considered to be the stable centerpieces of the state-controlled economy, due to the state-owned banks' support for depository savings, and they also provided investment funding for SOEs as the outside budgeting for the state. However, the security and benefits that were granted to employees by the SOEs had been decreasing over time. The labor forces outside the urban formal employment system stirred the early development of the labor market in urban China (Seeborg et al. 2000). Thus, to spur and enhance the urban service section development, since 1983, the governmental loosened migration control and allowed rural migrants to move in cities. Some of the migrants engaged in manual works, and some set up small urban business, for instance, barbershops and restaurants. Some became to be the "contract workers," hired by the SOEs. These contract workers were with no social protection and limited tenure (Gu 1992; Seeborg et al. 2000; Cai 2013).

For the rural areas, the commune system was completely abolished in the late 1980s. The rural areas experienced a short prosperous period with an increase in annual income (Oi 1993). However, rural income has now mostly stagnated, and the disparity between urban and rural income has widened (Cai 2011). Also, due to the loss of collective rights, which were granted in the commune, the peasants had to absorb the heavy burden of costs for schools, medical care, and other fees. This burden aggravated the situation in rural areas; and peasants were forced to seek works in other places. Consequently, the rural migrants flooded into cites illegally, without the rights of residency, which formed an immense labor reserve known as the "floating population" (Solinger 1999; Goodkind and West 2002).

The relaxation of controlling hukou system has facilitated a growing number of migrants leaving their registered rural regions to the urban cities. Since the early 1990s, the number of migrants, without a local household registration status, has increased, which has a significant impact on fundamental social and demographical conditions in Chinese society. After examining the 2000 and 2010 population census data, Liang et al. (2014) pointed out that the floating population jumped from 79 million in 2000 to 221 million in 2010 (p. 697). They further explained that the floating population in 2010 accounted for approximately 17% of the total Chinese population (Liang et al. 2014). Murphy (2002) believed that the massive population mobilization would have huge effects on China's economic, social, and political

developments in the future. Although the geographic mobilization and employment hunting are relatively easier than before for the migrants, the social consequences of hukou status continue affecting almost all of the flowing populations in China. Many rural migrants move to urban regions to fulfill the increasing domestic demand for cheap labor, especially coastal regions, where the export-oriented economy is amalgamated into the global capitalist environment (Pun 2016). These cheaper laborers provided by migrants are not only exploited in China's numerous factories but also abused in China's urbanization process. Miller (2012), in his work *China's Urban Billion*, showed that China's rapid urbanization in the past several decades is based on the exploitation of the cheap labor.

Due to the hukou status, Chinese domestic migrants are treated differently from the citizens who own local household registration in desired urban areas (Cheng and Selden 1994; Solinger 1999). As previously mentioned, some functions of the hukou system, such as resource allocations and subsidization for local urban dwellers, have decreased due to the governmental goal of improving market forces. Therefore, social benefits and welfare packages have either reduced significantly or totally dissolved. Nevertheless, Wang (2010) showed that urban dwellers in major cities, who held local hukou status, were still entitled significant state subsidies, including housing, healthcare, employment, and especially education. He stated that a Beijing hukou holder, one of the most desired registration, can be admitted to universities with relatively lower scores on the National College Entrance Examination (*Gaokao*). The nation's most desirable higher education institutions are clustered within the affluent metropolises, too (Allen 2017).

4.2.1 Resilience of the Hukou System

The household registration system has operated as an institutional tool for social exclusion, by means of preserving a large amount of cheap labor to serve and assist for China's economic development. There is no denying that migrants have been excluded from destiny (host) areas, based on their rural registration. Because of the deficiency of holding rural hukou status, migrants are usually barred from enjoying equal economic opportunities. They also lack political rights, in terms of their limited entitlement to social security and welfare services (Cai 2013). Chinese intellectuals, such as Liang (2001) and Liang and Ma (2004), pointed out that government control has been fading, on population migration and labor mobility. Because internal migration has been relaxed and localized, population mobility, in general, has increased; particularly, the number of rural laborers moving to the urban regions has augmented exponentially. Liang et al. (2014) showed that the flowing population reached 170,614,000 in 2010, which is more than 10% of China's total population (p. 699). However, neither the government principles of internal migration nor the regulations and enforcement mechanisms of domestic population migration have fundamentally changed. While the hukou system is still present, the severity and degrees of scope have been lessened.

Since the 1990s, many Chinese intellectuals or academics have critically assessed China's hukou system, based on its institutional exclusion. They especially criticized the implications of the hukou system, including the rural-urban division, regional disparities, and even social discrimination. (Wang 2005; Montgomery 2012). Although, several academics, such as Mallee (1995), Wang (2004), and Chan and Buckingham (2008), have noticed that the hukou system has evolved and modernized since China implemented its Open Door policy. In 2019, the National Development and Reform Commission (NDRC) released the Urbanization Plan that set to relax hukou restrictions in small- to medium-sized cities (Chu 2020). However, despite these tweaks, the hukou system has remained mostly intact, especially in the most desirable and affluent areas. This shows incredible institutional resilience and social-political continuity of the system.

The hukou system still persists as a function of allowances in governmental subsidies, welfare, and employment opportunities, which implies that local permanent urban residents would be the priority group of people. Migrants in cities only have access to short-termed, unfavorable, dirty, and low-status jobs. Thus, employees with rural hukou status are labeled as "peasant workers" or "second class," indicating an underclass status. Migrants in cities are not only facing discriminations on job situation but also excluded from most government services (Chan 1994; Yang and Guo 1996; Solinger 1999; Wang et al. 2002; Wu et al. 2009). This brings heavy financial burdens to the migrants who are living in cities without a local hukou status. They usually have to pay more on visiting hospitals or sending their off springs to local public schools. What is more, in order to reside legally in cities, every migrant needs to collect several documents, such as certificates of identity, temporary residency, and employment approval, required by many city governments. Thus, they have to bear extra costs on collecting those documents and for covering institutional services.

The huge number of population migration and large geographic mobility from rural to urban areas since 1978 do not shake the legitimacy of the hukou system; instead, they visualize the prevailing social inequality and social injustice. Miller (2012) believed that the hukou system constructed an exploitative model of urbanization, so he warned that this system had made social stratification worse and that migrants are socially excluded. Accordingly, he called for a hukou reform in China; otherwise, he wrote, "without hukou reform, China's cities will soon be home for several hundred million second-class citizens" (Miller 2012, p. 4). Still, the hukou system has caused a huge social disparity between the urban and rural regions.

The sympathies for rural migrants not only emerged among scholars but also from the ordinary Chinese. By carefully tracing the evolution of China's welfare regime, Frazier (2011) used pension as his research subject. The author pointed out that pension is the most uneven and prevalent welfare program in China. He argued that such welfare is still fragmented due to the delegated administrative accountabilities. By scrutinizing public responses toward old-age pension and Social Insurance Law, Frazier (2010) noticed an emerging popular sense of calling for a national and unified pension system based on citizenship. Frazier's (2010) evidence came from a 2004 Beijing Area Study survey, which included a specific section on popular

attitudes toward pensions. In addition, he also included a similar survey conducted in the Shanghai area. Although Frazier (2010, 2011) drew his conclusions only through urban attitudes, neither of the survey respondents consisted of rural residents nor migrants. His research still shed light on future research involving public opinions and welfare provision.

4.3 Research Question and Method

Inspired by the existing literature, we hope to examine the rural-urban attitudes toward public goods provision. We used hukou status as the measurements for comparing rural and urban contents, as the hukou system persists to function as the leading instructional benchmark on the allowance of governmental subsidies, welfare, and employment opportunities. More specifically, we asked three guiding questions: (1) what are the general differences among rural and urban hukou holders on various perceptions of public goods provision? (2) Does hukou status predict satisfaction? And (3) How do rural and urban hukou holders respond to specific types of public goods and services?

To answer these questions, this chapter utilized the 2015 Chinese General Social Survey (CGSS) for our data, a national representative sample of public opinions in China. CGSS was developed in a collaborative project between Hong Kong University of Science and Technology and Renmin University of China, along with other Chinese academic institutions involved in fieldwork. The first CGSS was conducted in 2003, and it was carried out almost every year. CGSS covered both urban and rural households, aiming to observe the altering relationship between social structure and quality of life nationwide. The newest public CGSS was conducted in 2015, and its data was openly shared on the official website of the Chinese National Survey Data Archive (the data can be found at cnsda.ruc.edu.cn). CGSS 2015 covered 478 rural villages and urban communities, scattering in 28 provinces, cities, and autonomous regions across mainland China. There are 10,968 valid questionnaires collected in CGSS 2015; the whole social survey consists of six modules. All respondents had to answer two major modules, the core module and the 10-year review module. The former captures the social demographic characteristics and general information, the later evaluates personal economic and social attitudes. Only a small proportion of the respondents were asked to answer the rest of the modules. The measures for this project are mainly derived from the major two modules, required by every respondent.

4.3.1 *Dependent Variable: People's Satisfaction with Public Goods and Services Provision*

The CGSS 2015 provides a nationally representative sample of China regarding social, health, and general well-being. For this project, we only used certain suitable parts of this dataset. The dependent variable, overall satisfaction, represents people's satisfaction with public goods provision. This composite was constructed by four separate but related questions. Respondents were asked *how satisfied they were with current public goods and service provision, taking all aspects into consideration?* This question is evaluated in four major elements, (1) adequacy of resources, (2) equilibrium of resources distribution, (3) convenience of accessing public services, and (4) inclusiveness of public services. The respondents answered these sets of questions through six choices: very unsatisfied, not satisfied, hard to say, satisfied, very satisfied, and cannot answer (see Table 4.1). For this analysis, we deleted respondents who chose not to answer these questions.

As displayed on Table 4.1, people's attitudes were divided when expressing their satisfaction in terms of the equilibrium of resource distribution. But there is more satisfaction than dissatisfaction with the resource's adequacy, convenience, and inclusiveness. Based on these sets of questionnaires, we created a composite variable, indicating people's overall satisfaction. First, we gave each response a value, 1 for very unsatisfied to 5 for very satisfied, respectively. We then calculated the sum of the overall satisfaction for each respondent by adding up their four evaluations. There were 10,313 valid units created, with a minimum of 4 and a maximum of 20. The mean of the overall satisfaction variable was 12.37, and the standard deviation was 3.22. We divided the overall satisfaction variable by 4 to get the average overall satisfaction value, which was a mean of 3.09. Finally, we constructed a dummy variable for overall satisfaction that will be used as the outcome variable in the binary logistic model, with 0 representing the unsatisfied attitude and 1 indicating satisfied standpoint, by comparing the mean of average overall satisfaction. If the average overall satisfaction was below the sample average score, then it was coded as 0 and vice versa. In total, there were 10,313 valid units coded for overall satisfaction, containing 5532 unsatisfied respondents and 4781 satisfied respondents.

Table 4.1 Overall satisfaction with public goods and services provision

	Very unsatisfied	Not satisfied	Hard to say	Satisfied	Very satisfied	Total
Adequacy of resources	212	2739	2875	4225	262	10,313
Equilibrium of resource distribution	384	3335	3043	3343	208	10,313
Convenience of accessing to public services	293	2736	2749	4201	334	10,313
Inclusiveness of public services	332	2718	3164	3817	282	10,313

Source: Statistical analysis of Chinese General Social Survey 2015

4.3.2 Independent Variable: Hukou Status

The abovementioned discussion reveals that hukou status has played an important role in distinguishing Chinese citizens. No matter how long people have left their hometowns, they are always tied to where their hukou was registered (Cheng and Selden 1994; Chan and Buckingham 2008). Thus, hukou status simply indicates a cleavage among people from urban or rural areas, and it represents the clear distinction between rural and urban residents. Therefore, we set hukou as the independent variable of interest, which is dummy coded with 0 representing urban hukou status and 1 indicating rural hukou status. In CGSS 2015, there are eight categories for current hukou registration statuses (Variable 18). We kept the agricultural household registration as the original. We created an urban hukou status, by combining four categories: nonagricultural hukou, blueprint hukou (rural people who received temporary urban household registration), and two types of urban residential household registration (previously agricultural and nonagricultural hukou status). Three categories were omitted, which include military hukou status, people without hukou, and others. There were 10,296 valid respondents, including 4545 urban hukou holders (44.14%) and 5751 rural holder registers (55.86%).

4.3.3 Control Variables: Social Demographic Predictors

With the intention to observe whether rural-urban distinction would affect Chinese satisfaction at public goods provision, we have set up the two primary variables: hukou status and people's general satisfaction. The following section lists a range of background characteristics that were included in our test. These background indicators, such as demographic, socioeconomic, and geographic traits, are all drawn from the core module of the CGSS 2015 (see Table 4.2).

In our statistical analysis below, we employed six demographics and socioeconomic characteristics of respondents that may have some association with the content of public goods provision. First, gender (male = 0; female = 1) is the only immutable demographic variable included in our model. Second, the other control variables reveal the general socioeconomic backgrounds of respondents. Marital status has been coded as 0 if the respondents were not married and 1 for married. Education level has been divided into six categories, which were coded as (0) no formal education experience, (1) below high school, (3) high school degree, (4) associate degree, (5) college degree, and (6) graduate degree. Chinese Communist Party (CCP) membership has also been included in our model, with 0 indicating as a CCP member and 1 indicating as a non-CCP member. All of these abovementioned demographic and socioeconomic variables are objective. Meanwhile, the income level is a subjective measurement. It is based on respondents' subjective opinions when comparing one's financial situation to others. Income level was grouped into three types: below average, average, and above average. Third, we

Table 4.2 Definitions, metrics, and descriptive statistics for variables in the study

Variable	Definition and metrics	Frequency (%)
Dependent variable		
Overall satisfaction	*Are you satisfied with public goods and services provision?* Unsatisfied = 0 Satisfied = 1	53.64 46.36
Independent variable		
Hukou type	Urban = 0 Rural = 1	44.14 55.86
Control variables		
Gender	Female = 0 Male = 1	52.64 47.36
Marital status	Not married = 0 Married = 1	22.27 77.73
Chinese communist party member	Yes = 0 No = 1	15.65 84.35
Educational level	No formal education Below high school High school degree Associate degree College degree Graduate degree	13.63 51.02 18.46 7.53 8.34 1.02
Income level	Below average Average Above average	37.80 53.88 8.32
Region	Eastern Central Northeast Western	35.86 26.33 13.08 24.73

Source: Statistical analysis of Chinese General Social Survey 2015

assumed that people's satisfaction with public goods provision might be affected not only by their demographic and socioeconomic characteristics but also by the geographic location where they are from. As China's coastal areas are more affluent than inner land and developed much faster and stably than the northeast region. In order to capture the different developmental scale of each location, we classified our respondents in terms of the economic division of China by provinces into Eastern, Central, Northwest, and Western regions as defined by China's State Council.

4.4 Statistical Results

The result of analyses of urban-rural comparison in terms of Chinese satisfaction with public goods provision is reported below. First, the general differences among rural and urban hukou holders on various public goods provision perceptions are revealed by descriptive statistics (see Table 4.3). Table 4.3 summarizes the percentage of respondents satisfied with public goods and services provision and those who are not satisfied. By applying a similar coding pattern of the overall satisfaction variable, we dummy coded four aspects of local public goods and services provision: adequacy, equilibrium, convenience, and inclusiveness. The overall satisfaction, along with these four measurements, is given percentages to sum "unsatisfied" and "satisfied" judgment. Generally, more than half of urban hukou holders (51.88%) were not satisfied with public goods provision, compared to 48.12% urban respondents who were satisfied.

Meanwhile, there were 55.09% of rural hukou holders that were less satisfied, and 44.91% of them expressed satisfaction toward public goods provision. Among urban and rural residents, there were slightly more dissatisfied respondents (53.67%) than those who are satisfied (46.33%). In terms of the four evaluative measurements, both urban (63.94%) and rural (63.88%) respondents acknowledged the most satisfaction toward equilibrium of resource distribution. On the contrary, they were least contented with the inclusiveness of public services, with 42% of urban respondents and 37.91% of rural citizens. Regarding the adequacy of resources and convenience of accessing public services, both urban and rural respondents showed similar patterns, with roughly more unsatisfied than satisfied percentages. In short, the comparative evidence suggests that urban hukou holders are slightly more satisfied than those who have a rural hukou status, though the total dissatisfaction among urban and rural respondents is somewhat overweight.

Second, in order to seek the answer to whether hukou status predicts contented outcome, we applied binomial logistic regression to test the relationship. Binomial logistic regression, with its binary outcome, offers more flexibility than other linear regressions due to less severe assumptions (Urdan 2016). The null hypothesis states that *there is no relationship between urban-rural hukou status and people's satisfaction with public goods and services provision*. We used two models in this exploration. Model 1 examines the relationship between two major variables of interest: hukou status and people's satisfaction. Model 2 does the same while adding demographic and socioeconomic characteristics. The results of these two binominal regressions are displayed in Table 4.4. Both of the overall p-values in Model 1 and Model 2 are less than 0.05. Thus, the null hypothesis is rejected. We concluded that there is an association between hukou status and respondents' satisfaction with public goods provision, and it is statistically significant.

Model 1 looks at the relationship between hukou status and people's satisfaction shown in odds ratios. Compared to urban Chinese citizens, rural residents are 0.88 times the odds of urban counterparts to express their satisfaction with public goods provision ($p < 0.001$). When adding other background indicators, the result reveals

Table 4.3 The difference among urban-rural holders' perception (in percentage)

	Adequacy		Equilibrium		Convenience		Inclusiveness		Overall satisfaction	
	Unsatisfied	Satisfied	Unsatisfied	Satisfied	Unsatisfied	Satisfied	Unsatisfied	Satisfied	Unsatisfied	Satisfied
Urban	54.24	45.76	36.06	63.94	53.51	46.49	58.00	42.00	51.88	48.12
Rural	58.32	41.68	36.12	63.88	58.08	41.92	62.09	37.91	55.09	44.91
Total	56.52	43.48	36.09	63.91	56.06	43.94	60.29	39.71	53.67	46.33

Source: Statistical analysis of Chinese General Social Survey 2015

Table 4.4 Binomial logistic regression of the effect of hukou status and socioeconomic characteristics on satisfaction

	Model 1	Model 2
Hukou status (rural)	0.88***	0.8***
Demographics and socioeconomics		
Gender (male)		1.03
Marital (married)		1.13**
Edu level		
Below high school		0.85**
High school		0.71***
Associate degree		0.63***
College degree		0.63***
Grad school		0.38***
CCP member (not a member)		0.84**
Income level		
Average		1.41***
Above average		1.61***
Region		
Central		0.96
Northeast		0.83**
West		1.13*
Constant	0.92**	1.03
Pseudo R^2	0.0008***	0.01***
N	10,195	10,195

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
Note: the coefficients are displayed in odds ratios

a similar story. According to logistical regression from Model 2, rural hukou holders are 0.8 times the odds of their urban counterparts to be satisfied with the overall condition of providing public goods, when holding the demographic and socioeconomic variables constant. In other words, when controlling six other social-economic factors, we found that hukou does affect peoples' satisfaction. Rural hukou holders have odds of being satisfied with public goods and services provision 20% lower than the odds for urban hukou holders ($p < 0.001$) when controlling for gender, marital status, highest education level, CCP affiliation, income level, and geolocation. When every control variable is set to its mean, 49.38% of urban hukou holders tend to be satisfied with local public goods provision. Meanwhile, 44.86% of rural hukou holders expressed their satisfaction (see Fig. 4.1).

In terms of the control variables, the statistical evidence shows that gender does not affect respondents' satisfaction. In addition, geolocation is partially associated with people's attitudes, as central residents are statistically insignificant while the other two regions are. The odds of northeaster respondents being satisfied are 17% lower than the odds for those who are from the eastern area, when controlling for all the variables in the model. Meanwhile, the West residents have odds of holding positive attitudes are 1.13 times the odds for eastern Chinese ($p < 0.05$). People who are married have odds of being satisfied 1.13 times the odds for people who are not married in the model. Chinese citizens who are non-CCP members have odds of

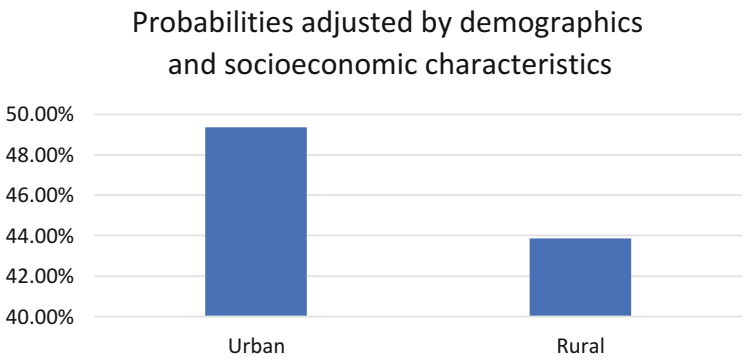

Fig. 4.1 Estimated adjusted probabilities of satisfaction among urban-rural Chinese. Source: Results from statistical analysis of CGSS 2015

being satisfied with public goods provision 16% less than the odds for those who are entitled to CCP membership. The pattern of association for income level indicates that the wealthier, the more satisfied. Compared to those with below average income level, the odds for average income-makers and high-income residents are 41% and 61% higher in terms of contentment, respectively. However, the education level is a negative predictor, the more educated, the less satisfied. All of the indicators are statistically significant at the 95% confidence level.

Finally, we replicated the same model to look at the relationship between hukou status and respondents' satisfaction with nine types of public goods and services. We found that hukou status is statistically significant on the subjects of healthcare, housing, social control, and public infrastructures ($p < 0.05$). (see Table 4.5) When controlling all other indicators constant, rural Chinese have odds of being satisfied with healthcare, housing, and social control 14%, 15%, and 13%, respectively, higher than the odds for urban citizens. Regarding public infrastructures, the odds of satisfaction for rural Chinese are 0.86 times the odds of urban counterparts. There was no association between hukou status and respondents' satisfaction in terms of public education, public employment services, social security, temporary subsidies, as well as public culture and physics. (see Table 4.6) It is understandable, as most of these public goods and services are targeted to urban Chinese. Rural citizens are not entitled to those social welfares and services.

4.5 Discussion

Hukou distinguishes people from their entitlements of social benefits and welfare packages as well as enjoyment of public goods, via a rural-urban dichotomous perspective (Cheng and Selden 1994; Wang 2005; Frazier 2010, 2011; Montgomery 2012). According to previous studies on the hukou system, there is a general understanding that rural migrants are largely excluded from the urban sectors, such

Table 4.5 Binomial logistic regression of the effect of hukou status and socioeconomic characteristics on four types of public goods provision

	Health care	Housing	Social control	Public infrastructures
Hukou status (rural)	1.14**	1.15**	1.13*	0.86**
Demographics and socioeconomics				
Gender (male)	0.98	1.07	1.07	0.99
Marital (married)	0.93	1.01	0.93	1.003
Edu level				
Below high school	0.88	0.72***	0.8**	0.83**
High school	0.69***	0.54***	0.65***	0.71***
Associate degree	0.65***	0.51***	0.59***	0.61***
College degree	0.55***	0.44***	0.64***	0.59***
Grad school	0.37***	0.25***	0.55**	0.44***
CCP member (not a member)	0.85**	0.8***	0.84**	0.88*
Income level				
Average	1.44***	1.62***	1.39***	1.35***
Above average	1.71***	1.94***	1.59***	1.45***
Region				
Central	1.57***	1.52***	1.32***	0.997
Northeast	0.66***	0.92	0.73***	0.57***
West	1.47***	1.29***	1.09	0.904
Constant	1.7***	1.44***	2.02***	1.25*
Pseudo R^2	0.0304 ***	0.03***	0.0164***	0.0129***
N	10,002	9746	9690	9414

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

as the labor market and public services (Chan 1994; Cheng and Selden 1994; Yang and Guo 1996; Solinger 1999; Seeborg et al. 2000; Wang et al. 2002; Wu et al. 2009; Cai 2011, 2013). Besides, due to the rural status, migrants are socially excluded from the urban world. The central government has called for a deep reform on the hukou system for several decades, but there was little change in it. However, it was not until July 24, 2014, that the State Council announced to abolish the agriculture and non-agriculture household registration. Meanwhile, the State Council declared a uniform and straightforward resident registration. The goal of removing urban and rural hukou is to simplify institutional functions on collecting and controlling population data and providing relevant needs for residents, such as on education, healthcare, employment, social security, housing, and other properties (China's State Council 2014). Theoretically and ideally, removing the distinction between urban and rural residents could help reduce the unequal public goods provision among rural and urban Chinese citizens. To cater to all citizens, Chinese government should design and construct a national-wide, equal, and unified institution to make sure everyone is entitled for public goods and services.

This research has some major limitations, which could be addressed in future research. The ratio of population is slightly skewed toward urban. The conclusion is drawn from the CGSS 2015, which consists of 4545 urban hukou citizens and 5751

Table 4.6 Binomial logistic regression of the effect of hukou status and socioeconomic characteristics on five types of public goods provision

	Public education	Public employment services	Social security	Temporary subsidies	Public culture and physics
Hukou status (rural)	1.05	0.98	0.97	0.98	0.98
Demographics and socioeconomics					
Gender (male)	0.95	1.1*	1.12*	1.07	0.97
Marital (married)	0.996	0.96	0.94	0.92	0.89*
Edu level					
Below high school	0.98	0.69***	0.73***	0.84*	0.82**
High school	0.75***	0.56***	0.59***	0.701***	0.67***
Associate degree	0.65***	0.53***	0.55***	0.58***	0.62***
College degree	0.63***	0.49***	0.49***	0.61***	0.67***
Grad school	0.25***	0.34***	0.30***	0.375***	0.45***
CCP member (not a member)	0.81***	0.85**	0.81***	0.84**	0.76***
Income level					
Average	1.27**	1.45***	1.58***	1.57***	1.4***
Above average	1.31***	1.89***	1.83***	1.71***	1.57***
Region					
Central	1.28***	1.18**	1.34***	1.28***	0.99
Northeast	0.72***	0.66***	0.68***	0.71***	0.66***
West	1.17**	1.08	1.25***	1.15*	0.94
Constant	1.31**	1.84 ***	2.08***	1.89***	2.996***
Pseudo R^2	0.016 ***	0.019 ***	0.023***	0.0185***	0.0123***
N	10,026	9621	9606	9533	9428

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

rural holder holders (44.14% versus 56%). According to the 2010 Chinese national census, there are 384.3 million urban hukou holders, which accounts for 29.14% of the whole population, meanwhile, the population of rural counterparts is 934.7 million, consisting of 70.86% of the whole population. Apparently, rural hukou holders are underrepresented in the data, thus it may lead to a slightly biased conclusion, favoring the urban population. Future research should explore this divide with updated CGSS waves, which could also account for new changes to the hukou system.

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Chapter 5
Urban-Rural Gap of Healthcare and Cultural Service Accessibility in South Korea

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Contents

Abstract After the legislation of "Special Act on Improvement in Quality of Life for Residents in Agricultural and Fishing Villages," the South Korean government has been implementing various supporting plans, including programs regarding healthcare, general welfare, culture, and education, to improve the quality of life in rural areas. Moreover, to enhance the support towards vulnerable social groups, the government has been developing demand-driven rural policies, such as "outreach services" and the "advance payments program." Defining service-deprived regions is the most essential for efficient implementation of the policies. However, such efforts have failed to reflect reality because most researches rely on county-level data and

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measure vulnerability based on mere physical distance factors. Thus, this chapter proposes Service Accessibility Vulnerability Index (SAVI) by analyzing the distribution of medical, cultural, and welfare facilities and population through GIS (Geographic Information System). The analysis results are calculated in 1 km or 100 m increments but are used in combination for the convenience of analysis. The result showed that vulnerable regions differ by types of service facilities, but metropolitan cities such as Seoul showed superior service accessibility compared to other provinces. Moreover, within a sub-provincial region, there is a difference in accessibility between small cities and rural areas. Along with previous researches, this chapter provides a new approach to calculate service accessibility of specific regions. With today's evolving geotechnical technologies and more geographically disaggregated data, more comprehensive, accurate, and advanced approaches can be developed based on the method proposed in this chapter.

Keywords Quality of life · Vulnerable social groups · Healthcare service · Cultural service · Territorial units · GIS (Geographic Information System) · SAVI (Service Accessibility Vulnerability Index)

5.1 Introduction

It is well known that the rapid industrialization and urbanization of Korea are unprecedented in world history. These changes greatly affect the family and village structures of rural communities, that is, the shrinking and aging rural population (KREI 2015). In particular, Korea has continued to implement market liberalization policies since the inception of central government-driven economic development policies to break into overseas markets by a number of FTA (free trade agreement) with foreign partner countries. And hence, its market opening in agricultural products has increased quickly. Korea introduced the "*Special Act on Improvement in Quality of Life for Residents in Agricultural and Fishing Villages (SAQL)*" to improve rural economy and to support farmers who were expected to suffer from this agricultural market opening such as Korea-Chile FTA, Korea's first free trade deal.

Since SAQL was enacted in 2004, the Korean government has enforced various supporting policy programs for lagging regions to improve the quality of life in rural areas. Rooted in this act, the "five-year rural quality of life master plan" has been developed, and currently, the fourth five-year master plan for the year 2019–2023 is being implemented. Also, the rural services standard was established in 2011 as part of the act, suggesting policy targets for essential services for better living. Currently, the rural services standard includes 17 items in seven categories such as health and welfare, education, settlement, economic activity and jobs, culture and leisure, environment and landscape, and safety. In the master plan, health and cultural services have been considered with the most importance. Moreover, to intensify

support towards vulnerable social groups, the government has been establishing emergency medical facilities in rural areas, managing "Agricultural Safety Medical Center" in partnership with several university hospital systems, and implementing the "Advance Payments Program." Additionally, "small library" and "cultural facilities" have been built in remote regions for enhancing the cultural environment in rural areas.

Although the Korean government has enforced many policy programs for making rural as a better place for living and working, most rural residents think that the target of the rural service standard is not achieved yet. In particular, the level of satisfaction on public services targeting vulnerable social groups such as "outreach services," "public medical treatment," and "emergency medical treatment" is still relatively lower than the rural services standard set as policy goals. Only 5 among 17 items are reported to achieve the targets of the rural services standard during the third term of master plan for Improving Quality of Life (KREI 2019). Thus, the need to improve public services for the socially disadvantaged group in rural areas has been consistently brought up in Korea (Sim et al. 2014).

Many studies are discussing service accessibility in rural areas. Korea Rural Economic Institute (KREI) has developed the "Regional Development Index (RDI)" and been trying to define service disadvantaged regions in rural areas. However, RDI could not produce the complete list of specific areas where the service is deprived due to the limited data. Moon et al. (2013) tried to define health service-deprived areas (Moon et al. 2013), but they just focused on secondary healthcare institutions that are capable of surgical operations. And they failed to consider important factors except the distance variable to define heath service deficiency for each region. Therefore, we need a more comprehensive discussion for a rural service environment that focuses on rural characteristics, specific regional units, various types of services, etc.

This chapter suggests Service Accessibility Vulnerability Index (SAVI) by analyzing the spatial distribution of population and public service facilities such as medical, cultural, and welfare facilities. Based on this index, this study compares the service accessibility across regions from urban and rural comparison perspectives. Our results will help policymakers prioritize the type of services by regions based on demand-driven service supply strategy.

There are several studies regarding the quality of life in rural Korea that pose comprehensive discussions (Song et al. 2008, 2012, 2014; Sim et al. 2014; Park 2014). And other studies about the quality of life take regional characteristics and various other factors into account to discuss the quality of life in rural areas and discussed mostly the neglected minority groups of the society such as the elderly, the disabled, and adolescents (Yoon and Yoon 2003; Noh and Son 2010; Son et al. 2010).

This study attempts to identify service accessibility vulnerable regions—in terms of healthcare and cultural service—while encompassing social and financial aspects of rural areas. Unlike previous studies, this study employs the Si-Gun-Gu (self-governing local jurisdiction in Korea, (comparable to counties in the United States) as a spatial unit of analysis that collectively covers the entire country for comparison

among 250 Si-Gun-Gu and more importantly between urban and rural in an aggregated manner.

There exists also huge literature to analyze service accessibility in Korea. Some of them tried to define the service vulnerable regions that lack the accessibility to public and private services mainly focusing on healthcare services essential to the residents in rural areas (Moon et al. 2013; Lee and Im 2015). Recently many studies tried to develop public service accessibility measures to provide policymakers better understanding to develop tailor-made policy programs for each region (Kim 2007; Lee and Hwang 2015). Kim (2007) measured the accessibility to cultural facilities (522 different complexes that serve as cultural activity centers) to examine the fairness of the spatial distribution of cultural facilities inside Seoul. Lee and Hwang (2015) estimated the accessibility of medical services by calculating the number of doctors per population, and then examined its nationwide effects on public health by using a fixed effect panel model. Also, Yi and Kim (2015) developed the accessibility estimates for medical and public transportation services through survey data and analyzed its effects on the subjective health status of the elderly population using a logit model.

This study firstly specifies the street address of various service facilities into the XY coordinates and distributes the coordinates on the map. Then it develops Service Accessibility Vulnerability Index (SAVI) by using the data on the elderly and underprivileged minority groups that reflects social and economic factors to measure service vulnerability by region. The result from this study can help quality of life policymakers design tailor-made plans for the service-deprived people in rural areas.

This chapter proceeds as follows. Section 5.2 presents the data and methodology, and Sect. 5.3 provides the results about service vulnerable regions in South Korea. Section 5.4 contains a correlation coefficient analysis between SAVI and several key regional indicators followed by a summary and conclusion in Sect. 5.5.

5.2 Data and Methodology

5.2.1 Data

The data used in this study comes from various sources. Our data sources include the Health Insurance Review and Assessment Service of Korea (HIRA), the Ministry of Culture, Sports, and Tourism of Korea, the Korea Association of Social Welfare Centers, the Korean Film Commission (KOFIC), and the Census from the Statistics Korea.

First of all, this study includes the demand for service and distance variables to capture the accessibility to service and identify the service-deprived regions. Specifically, the elderly population, financially vulnerable population, and physical distance (network distance) between residential areas and health or cultural service facilities are included. The elderly population is defined to be the ones who are over 65 years old, and the financially vulnerable population to be the lowest 20% based

on household income distribution.[1] Also, we included the street address information of health service facilities provided by the Health Insurance Review and Assessment Service of Korea (HIRA). This chapter categorized the health service facilities based on both the service providers and the type of services, i.e., public/private facilities and primary/secondary services.

Cultural and public welfare facilities are categorized into public service facilities—libraries, cultural centers, social welfare centers—and private service facilities—museums, art galleries, theaters (movie theaters and concert halls). The street addresses of these facilities ware collected from the Ministry of Culture, Sports, and Tourism of Korea, the Korea Association of Social Welfare Centers, and the Korean Film Commission (KOFIC).

5.2.2 Methodology

The Service Accessibility Vulnerability Index (SAVI) developed in this study consists of three subindices representing spatial accessibility, social vulnerability, and economic vulnerability. First, we include the distance to the nearest service facilities to consider spatial accessibility. Second, social vulnerability can be captured by the share of a socially vulnerable population, and hence this study uses the share of elderly people over 65 in a study region. Finally, we use the share of the population that belongs to the lowest 20% household income group to capture the economic or financial vulnerability. All subindices of SAVI are measured at a 1 km grid level. The proposed Service Accessibility Vulnerability Index (SAVI) is defined in Eq. (5.1) following an index developed for measuring health service deficiency (i.e., Health Service Deficiency Index, HSDI) by Lee and Im (2015). Here, $d_{ij,\ \min}$ stands for the network distance between the center of region i in which the vulnerable one lives and the nearest service facility j, while WR_i represents the share of the socially vulnerable population over 65 years old in region i, and POP_i means for the share of the economically vulnerable population with household income less than 20th percentile. Threshold values for d, WR, and POP in the denominators are the maximum value of each variable among 250 Si-Gun-Gu (comparable to U.S. counties) observations.

[1] National Geographic Information Institute of Korea (NGII) and Biz-GIS was the source of the data of age-specific distribution of population and distribution of income. They provide the GIS data for 100 m grid, and this study aggregated the data into 1 km grid to perform the nationwide analysis.

$$\mathrm{SAVI}(i) = \frac{\left[\left\{\sin\left(\frac{\pi}{2} \times \frac{d_{ij,\min}}{d_{\text{threshold}}}\right)\right\}^2 + \frac{\left\{\sin\left(\frac{\pi}{2} \times \frac{\mathrm{WR}_i}{\mathrm{WR}_{\text{threshold}}}\right)\right\}^2 + \left\{\sin\left(\frac{\pi}{2} \times \frac{\mathrm{POP}_i}{\mathrm{POP}_{\text{threshold}}}\right)\right\}^2}{2}\right]}{2} \tag{5.1}$$

where, $d_{ij,\ min}$ = network distance between the center of region i and nearest service facility j; $d_{\text{threshold}}$ = maximum network distance between the center of region i and nearest service; facility j among 250 si-gun-gu regions; WR_i = share of the socially vulnerable population over 65 years old in region i; $\mathrm{WR}_{\text{threshold}}$ = maximum share of the socially vulnerable population over 65 years; among 250 si-gun-gu regions; POP_i = share of the economically vulnerable population with household income less than 20th percentile in region i; $\mathrm{POP}_{\text{threshold}}$ = maximum share of the economically vulnerable population with household income less than 20th percentile among 250 si-gun-gu regions.

SAVI measures the level of difficulty in accessing the services due to distance, social, and economic factors. And hence, the bigger the SAVI is the more vulnerable a study region is with limited service accessibility. That is, SAVI is high in the study region where the vulnerable population is concentrated and/or the distance to service facilities is large.

5.3 Vulnerability Estimation Results

5.3.1 Distribution of Socially or Economically Vulnerable Population

The distribution of the socially and economically vulnerable population is shown in Table 5.1, and maps in Figs. 5.1 and 5.2 depicted the vulnerable population at a 1 km grid, respectively. The regional reference map of Korea can be found in the appendix. Fig. 5.1 shows the distribution of the elderly population (65 years or older) and darker colors represent the higher concentration of the elderly. As shown in Table 5.1, the elderly population is mainly concentrated in nonmetro regions: Southwest (Jeollanam-do and Jeollabuk-do), East-central (Gyeongsangbuk-do), and Northeast (Gangwon-do). On the map in Fig. 5.1, these four nonmetro regions (or provinces) show the concentration of red and dark dots. Figure 5.2 shows the geographic distribution of the population based on the household income percentile. The 1 km grids with household income over 50th percentile (mid- to high-income) are highlighted in light yellow and these are mostly concentrated in major metropolitan cities like Seoul, while the 1 km grids with low-income percentile (less than 20th percentile) highlighted in darker blue colors are mainly found in nonmetro regions in Southwest (Jeollanam-do and Jeollabuk-do) and East-central (Gyeongsangbuk-do) provinces. These regions with the concentration of

Table 5.1 Distribution of population, the elderly, and household income in South Korea

Metropolitan/province		Population (thousand)	Share of the elderly (65 years or older, in %)	Avg. household income percentile class (1–10)
Urban: Metropolitan cities (7)	Seoul	10,276	12.6	4.6
	Busan	3582	14.7	3.0
	Daegu	2518	12.8	2.8
	Incheon	2943	10.7	2.9
	Gwangju	1488	11.4	2.7
	Daejeon	1551	10.9	2.9
	Ulsan	1171	8.8	2.8
Rural: Nonmetro provincial regions (10)	Gyeonggi-do	12,655	10.5	2.4
	Gangwon-do	1528	17.0	2.1
	Chungcheongbuk-do	1582	14.8	2.0
	Chungcheongnam-do	2088	16.2	2.1
	Jeollabuk-do	1860	17.9	1.9
	Jeollanam-do	1895	20.6	1.8
	Gyeongsangbuk-do	2672	17.8	1.8
	Gyeongsangnam-do	3376	13.8	2.0
	Jeju-do	615	13.8	2.1
	Sejong-si	205	10.7	2.0

low-income households are mainly distant rural areas and also show the higher concentration of the elderly population in Fig. 5.1. In summary, nonmetro (rural) areas of these provinces are the hotspots with the low-income elderly population, while the population in metropolitan cities (urban areas) are younger with higher income levels.

5.3.2 Vulnerability in Accessing Healthcare Services

Geographic Distribution of Healthcare Services in Korea

According to the street address data of public and private medical facilities provided by the Health Insurance Review and Assessment Service of Korea, there are 3478 public medical facilities and 61,035 primary private medical facilities that are capable of treating common diseases throughout the nation. Additionally, 1796 secondary or higher medical facilities do exist across Korea that can manage diseases with professional medical care and are capable of surgical operations. Thus, there are

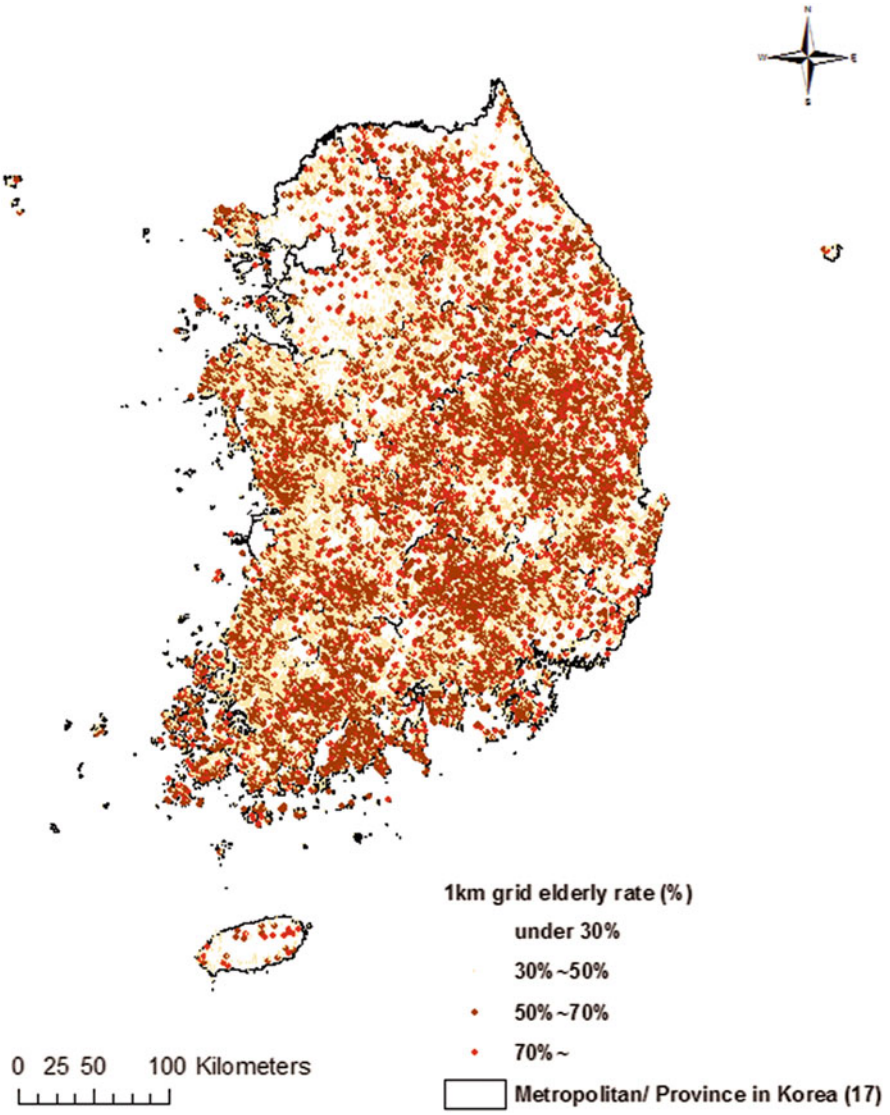


Fig. 5.1 Distribution of the elderly population (65 years or older)

in total of 64,513 primary medical facilities and 1796 secondary or higher medical facilities in Korea (Table 5.2).[2]

[2]In the process of geocoding into X-Y coordinate system, authors found 328 missing values. Therefore, this paper used the data of 66,309 health care service facilities, instead of total 64,786 facilities in South Korea.

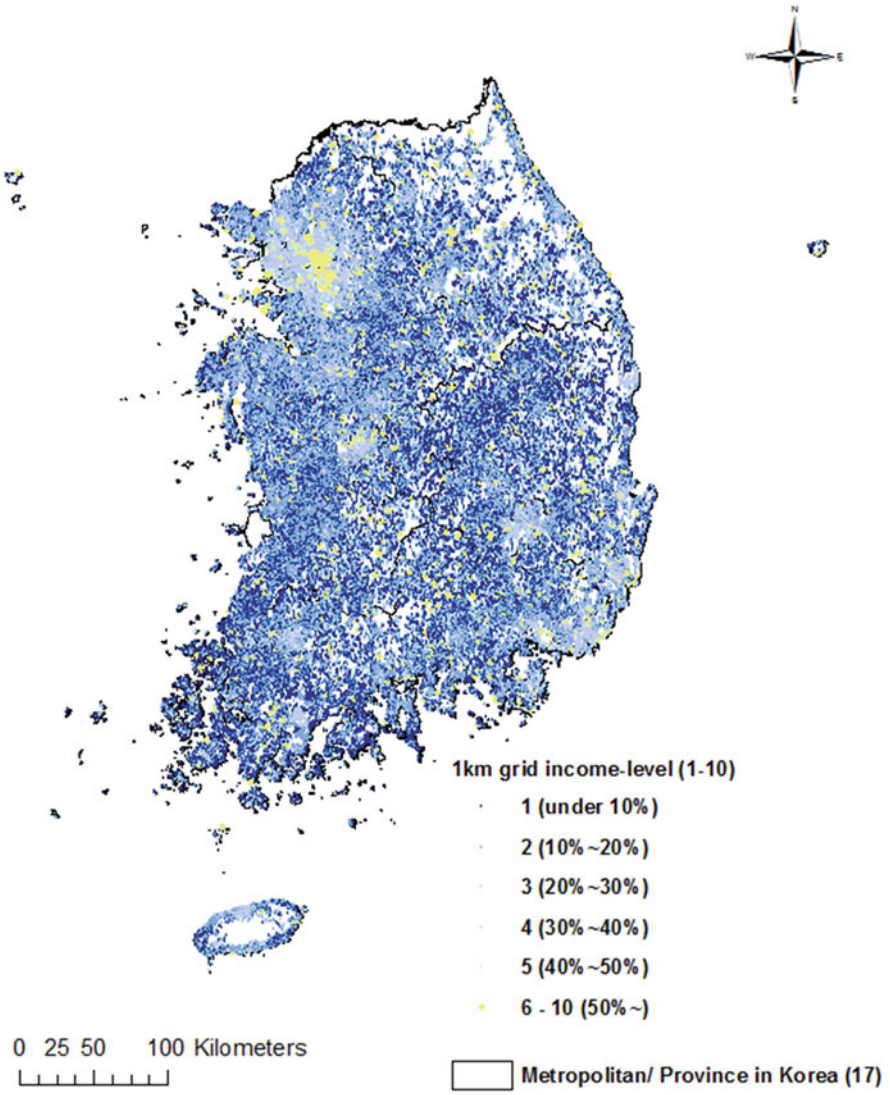


Fig. 5.2 Distribution of population classified with household income percentile

Urban-Rural Comparisons: Number of Medical Facilities and Distance to Services

As shown in Table 5.3, metropolitan cities have relatively fewer public healthcare centers but more private hospitals compared to less populated nonmetro regions (provinces). There are significant differences between metropolitan cities (urban areas) and nonmetro provinces (rural areas) in per capita medical facilities. While

Table 5.2 Distribution of healthcare service facilities in South Korea

Metropolitan/province		Public healthcare centers	Private medical centers (primary care)	Private medical centers (secondary care)	Total healthcare service facilities
Urban: Metropolitan cities (7)	Seoul	29	16,335	183	16,547
	Busan	33	4572	218	4823
	Daegu	26	3379	86	3491
	Incheon	62	2948	91	3101
	Gwangju	17	1889	80	1986
	Daejeon	21	2073	66	2160
	Ulsan	24	1256	52	1332
Rural: Nonmetro provincial regions (10)	Gyeonggi-do	332	12,972	344	13,648
	Gangwon-do	245	1459	44	1748
	Chungcheongbuk-do	268	1623	57	1948
	Chungcheongnam-do	398	2063	87	2548
	Jeollabuk-do	408	2179	95	2682
	Jeollanam-do	561	1743	95	2399
	Gyeongsangbuk-do	555	2511	136	3202
	Gyeongsangnam-do	415	3143	141	3699
	Jeju-do	63	682	14	759
	Sejong-si	21	208	7	236
Nation		3478	61,035	1796	66,309

per capita public healthcare facilities in rural areas is much higher than that in urban areas, urban areas have much higher per capita private medical centers compared to rural areas. However, private medical centers reveal mixed stories based on the type of services. In urban areas, primary care medical centers comprise about 95% of total private medical centers (roughly 5% for secondary care medical centers), and there are 1380 private primary care centers per 100,000 residents compared to only 1000 in private primary care centers per 100,000 rural residents. In contrast, in rural areas, a lower share was found for primary care medical centers at roughly 84% of total private medical centers (about 16% for secondary care medical centers). As a result, per 100,000 population private secondary care medical centers in rural areas is slightly higher at 35 compared to 33 in urban areas. In total, medical facilities per 100,000 residents in urban areas is 23% higher than that in rural areas, mainly due to the concentration of private primary care medical centers in metropolitan cities of Korea. The uneven distribution of medical facilities among metropolitan cities is also evident. In particular, Seoul has an overwhelming advantage in the number of medical facilities per 100,000 population, due to the dominance of private primary

Table 5.3 Healthcare service facilities per 100,000 population and avg. distance to facilities

Metropolitan/province		The number of healthcare service facilities (per 100,000 population)				Average distance to healthcare service facilities (km)		
		Public health care centers	Private medical centers (primary care)	Private medical centers (secondary care)	Total health care service facilities	Public health care centers	Private medical centers (primary care)	Private medical centers (secondary care)
Urban: Metropolitan cities (7)	Seoul	0.28	158.96	1.78	161.03	2.142	0.661	3.031
	Busan	0.92	127.64	6.09	134.65	2.203	3.486	5.442
	Daegu	1.03	134.19	3.42	138.64	3.091	3.741	5.876
	Incheon	2.11	100.17	3.09	105.37	2.098	4.893	16.709
	Gwangju	1.14	126.95	5.38	133.47	2.481	3.368	5.353
	Daejeon	1.35	133.66	4.26	139.26	2.192	3.158	5.758
	Ulsan	2.05	107.26	4.44	113.75	2.967	4.423	7.664
Rural: Nonmetro provincial regions (10)	Gyeonggi-do	2.62	102.50	2.72	107.85	2.354	5.383	9.541
	Gangwon-do	16.03	95.48	2.88	114.40	3.162	13.859	29.455
	Chungcheongbuk-do	16.94	102.59	3.60	123.14	2.199	10.211	16.360
	Chungcheongnam-do	19.06	98.80	4.17	122.03	2.018	8.416	14.448
	Jeollabuk-do	21.94	117.15	5.11	144.19	1.961	10.086	25.296
	Jeollanam-do	29.60	91.98	5.01	126.60	2.203	8.602	20.589
	Gyeongsangbuk-do	20.77	93.97	5.09	119.84	2.502	11.761	22.477
	Gyeongsangnam-do	12.29	93.10	4.18	109.57	2.246	9.992	24.055
	Jeju-do	10.24	110.89	2.28	123.41	2.578	5.927	16.639
	Sejong-si	10.24	101.46	3.41	115.12	1.975	5.891	11.290
Nation		6.69	117.36	3.45	127.50	2.375	6.698	14.117

medical service (159 medical centers per 100,000 residents in Seoul). On the other hand, though Incheon is the fastest-growing metropolitan city among metropolitan cities with a population of over one million, it lacks overall medical facilities, making it the lowest metropolitan city in the number of medical facilities per 100,000 population. This is mainly due to the much lower number of private primary medical centers, 100 per 100,000 residents in Incheon, approximately 37% lower than Seoul.

The differences in distance between facilities between urban and rural areas of Korea are much more evident. Overall, the average distance to a medical facility in urban areas is 2.32 km, while that in rural areas is 3.3 times longer at 7.68 km. This mainly attributes to the limited accessibility (much longer average distance) to private medical centers in rural areas. For instance, the average distance to private primary care centers in rural areas is 7.95 km compared to 2.23 km in urban areas, while the average distance to private secondary care centers in rural areas is 17.54 km compared to 6.41 km in urban areas. Among the 17 regions of Korea, residents of Seoul have the shortest average travel distance to private primary medical services, only 661 m (or 0.66 km), and 3.0 km to the private secondary medical service facilities. However, on average, residents in Gangwon-do travel 13.9 km to private primary medical service facilities and 29.5 km to the secondary medical service facilities. Due to the limited supply of public transit and expressway systems in rural areas, the actual distance considering both time and physical distances can be longer.

Figures 5.3, 5.4, and 5.5 show the spatial distributions of public and private healthcare centers throughout the nation. As shown in the figures, the public healthcare centers are relatively equally distributed, but primary/secondary private hospitals are concentrated mostly in metropolitan cities such as Seoul and Incheon, and Gyeonggi-do province and these regions comprise Seoul Metropolitan Area (SMA).

Comparison of SAVI Between Urban and Rural Areas

With the aim to estimate SAVI based on the types of available medical services, this chapter recategorized the medical services into "primary care service" and "secondary care service" including both public and private, respectively.

Figure 5.6 shows the distribution of SAVI values in overall healthcare service. The dark brown si-gun-gu regions are the ones with the top 10% SAVI values, which represent the most vulnerable regions with limited access to healthcare services. In the same figure, major metropolitan cities such as Seoul, Busan, Daegu, and Daejeon, and Gyeonggi-do province are classified as the least vulnerable with the low SAVI (shared in white). The SAVI of urban areas in the major metro regions is lower than that of rural areas in nonmetro provinces.

Figures 5.7 and 5.8 show the distribution of SAVI value for primary and secondary healthcare services, respectively. The distribution of SAVI for primary healthcare services in Fig. 5.7 is almost identical to the overall healthcare service

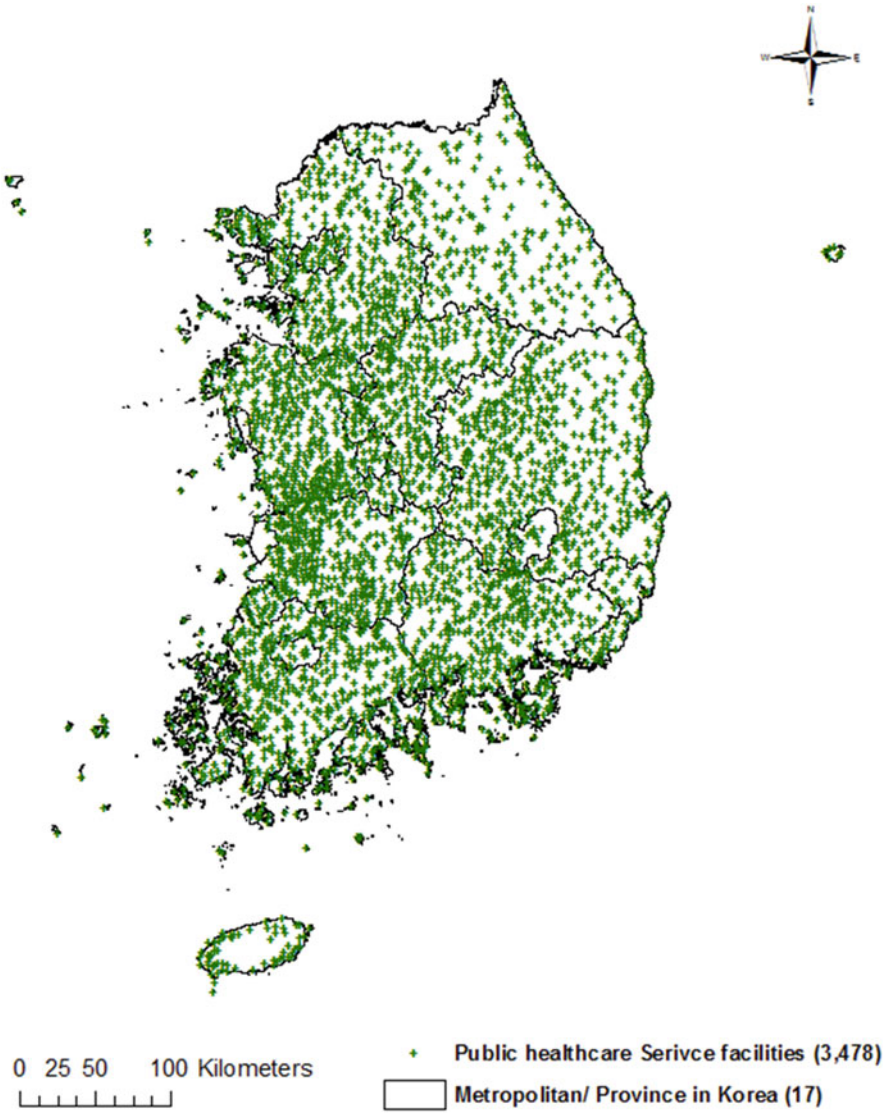


Fig. 5.3 Distribution of public healthcare facilities in South Korea

SAVI distribution presented in Fig. 5.6. This means that the distance from the primary medical service facilities is a dominant factor for overall healthcare services vulnerability because the spatial distribution of primary medical service facilities is much denser than secondary healthcare services. Therefore, healthcare service vulnerability appears to mainly depend on the type of healthcare available services in the region, i.e., primary or secondary.

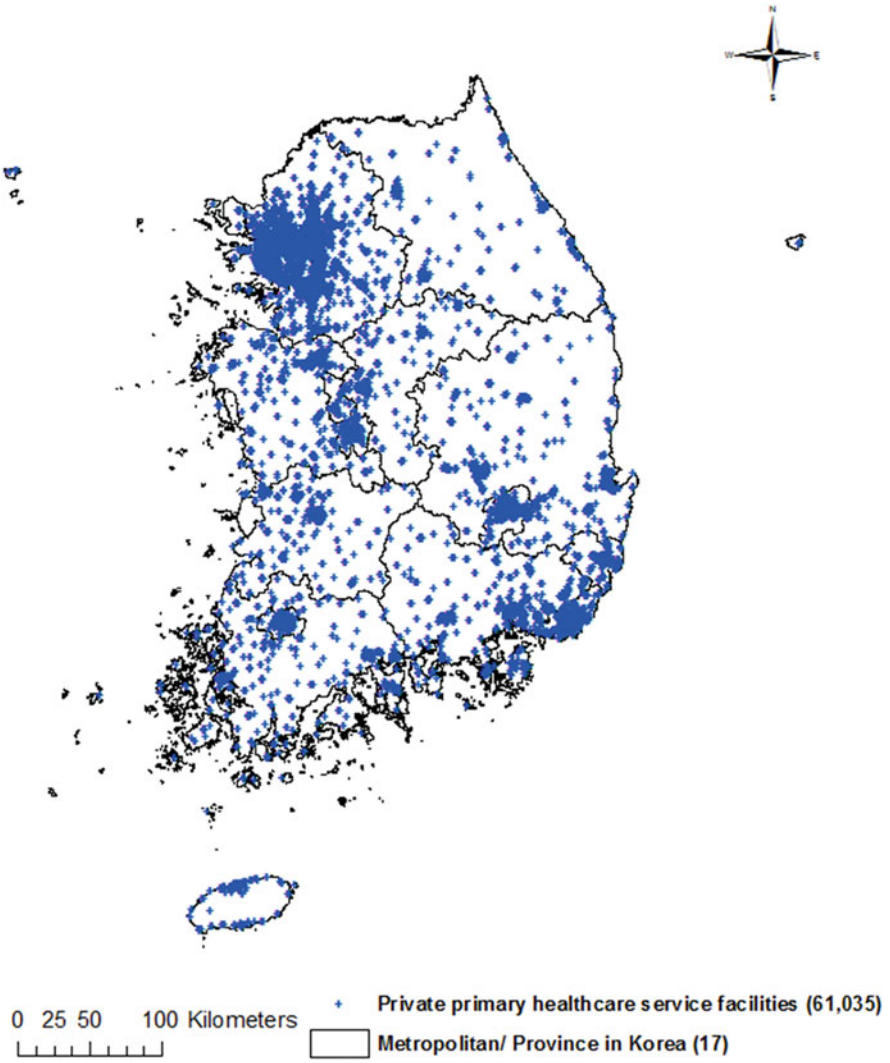


Fig. 5.4 Distribution of private primary healthcare facilities in South Korea

Table 5.4 shows healthcare service SAVI of metropolitan cities (urban) and nonmetro province (rural) regions. The SAVI of metro cities such as Seoul, Busan, and Daejeon was much lower than those of other nonmetro provinces like Gyeongsangbuk-do, which means that metro regions have much better accessibility to healthcare service than nonmetro regions. The SAVI value of Gyeongsangbuk-do, the lowest among 17 regions, is about five times higher than that of Seoul. In the case of secondary medical services, the accessibility gap (or regional inequality in service accessibility) is much bigger than the gap in accessibility to primary healthcare

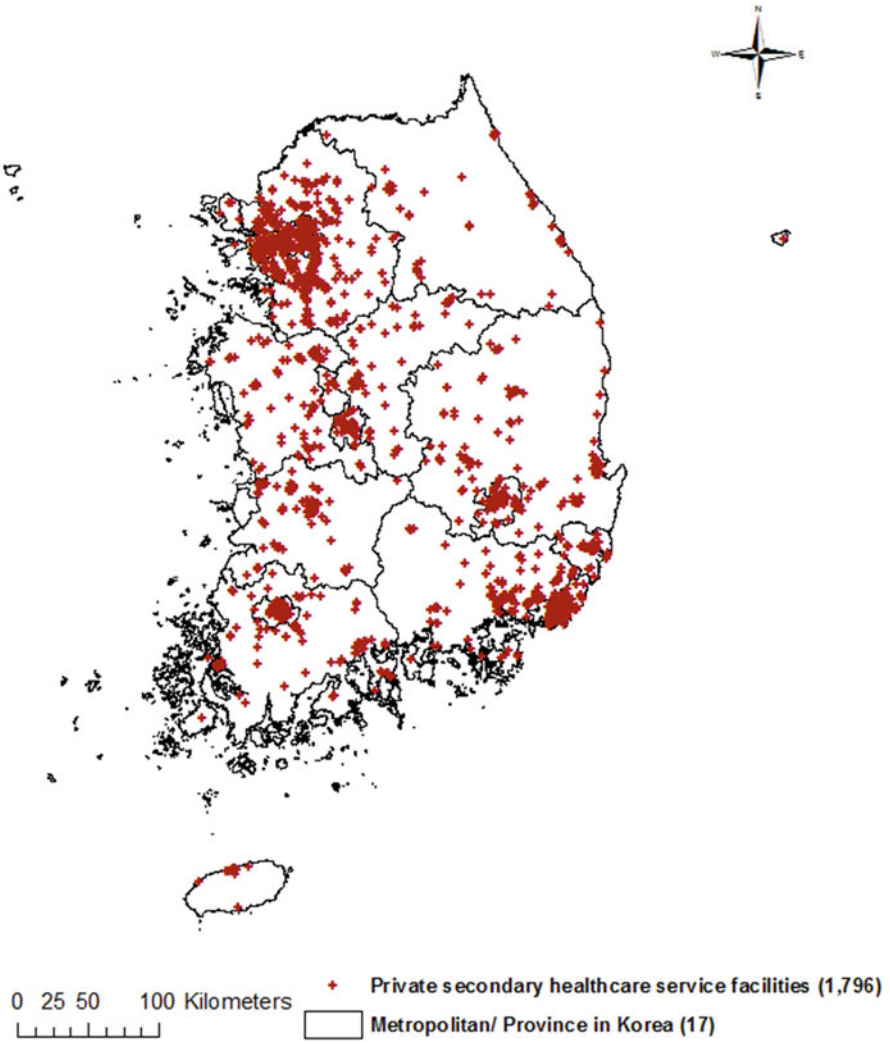


Fig. 5.5 Distribution of private secondary healthcare facilities in South Korea

services. Among nonmetro regions, Gyeonggi-do and Jeju-do show high accessibility to secondary medical services. Gyeonggi-do has the advantage of being next to the City of Seoul and a part of Seoul Metropolitan Area (SMA), and Jeju-do seems to benefit from the development of international tourism including health tourism.

Table 5.5 lists the top 10 SAVI regions for medical services among 250 self-governing jurisdictions (i.e., si-gun-gu, equivalent to a county in the U.S.) in Korea.[3]

[3]Usually, self-governing local jurisdiction with population over 100,000 is designated as 'si' that is recognized as city, while other locals with population less than 100,000 are designated as 'gun'.

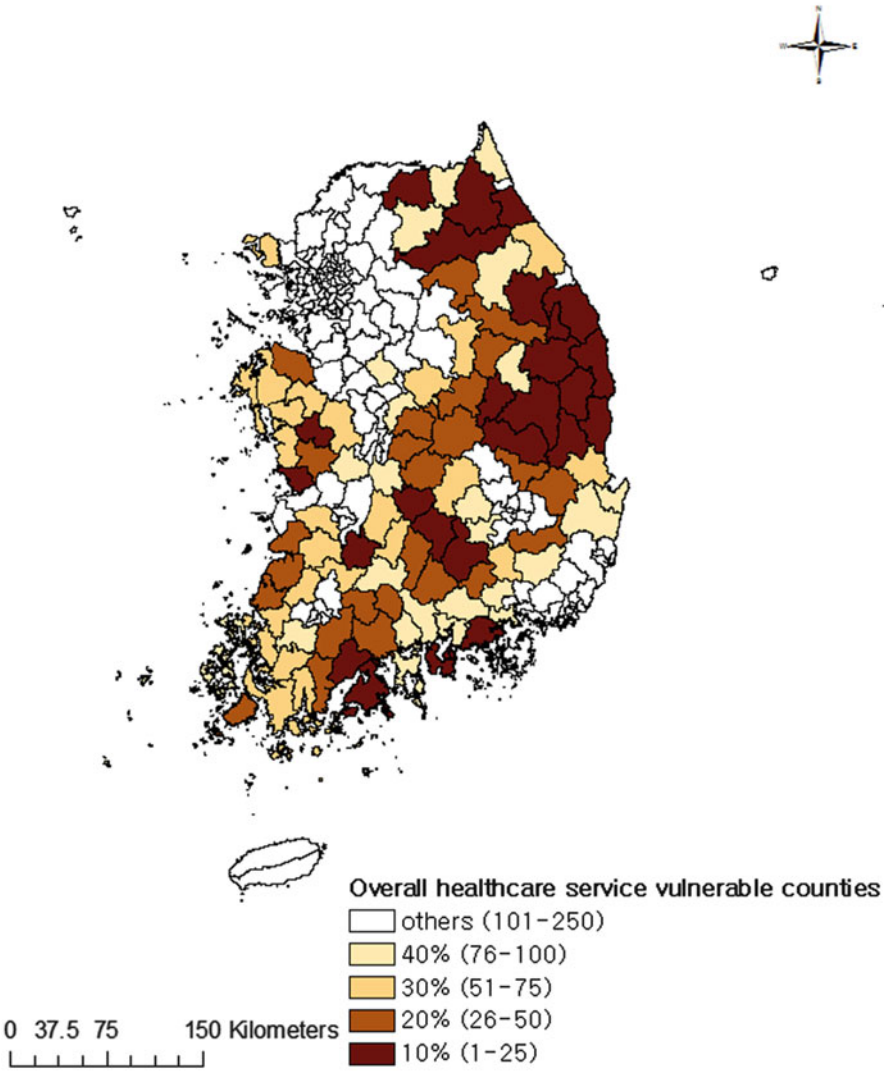


Fig. 5.6 Overall healthcare service vulnerable counties (250 counties in South Korea)

The top 10 regions with the highest SAVI values are as follows: Yeongdeok-gun, Inje-gun, Boseong-gun, Hapcheon-gun, Hongcheon-gun, Yeongyang-gun, Uiseong-gun, Samcheok-si, Yecheon-gun, and Andong-si, and these counties are all located in nonmetro provinces.

Among the top 25 regions (top 10% of 250 counties in Korea), most of them are found in the East-central province of Gyeongsangbuk-do (eight regions), while the second most are found in the northeast province of Gangwon-do (sevem regions).

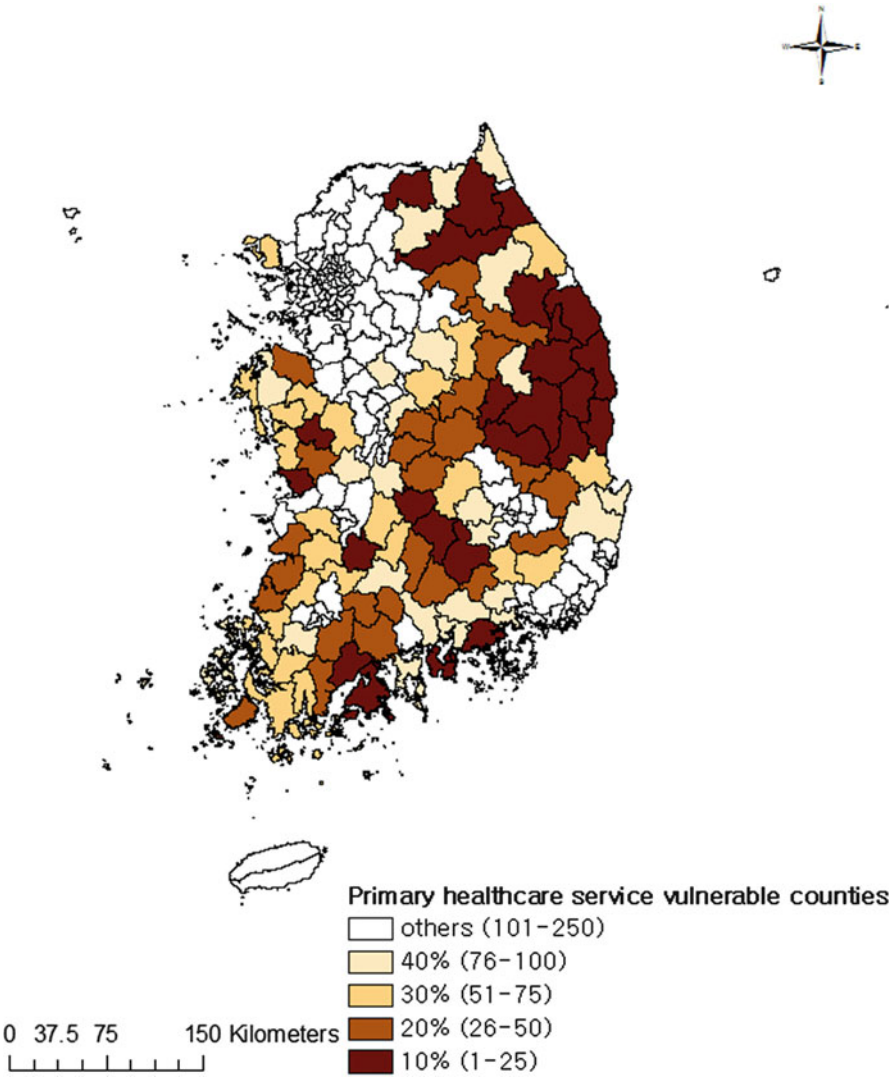


Fig. 5.7 Primary healthcare service vulnerable counties (250 counties in South Korea)

Only three small urban (i.e., "si") areas are classified as vulnerable regions, whereas all the rest regions are found in rural areas (i.e., "gun") with populations less than 100,000. This shows that there exists a big discrepancy in service accessibility between the nonmetro local cities of provinces and rural areas of provinces, even within the same provinces.

Vulnerable regions for secondary medical services are also concentrated in some provinces (i.e., "do"): Goseong-gun, Ongjin-gun, Gurye-gun, Yeongyang-gun, Cheongsong-gun, Namhae-gun, Hadong-gun, Hapcheon-gun, Taebaek-si, and

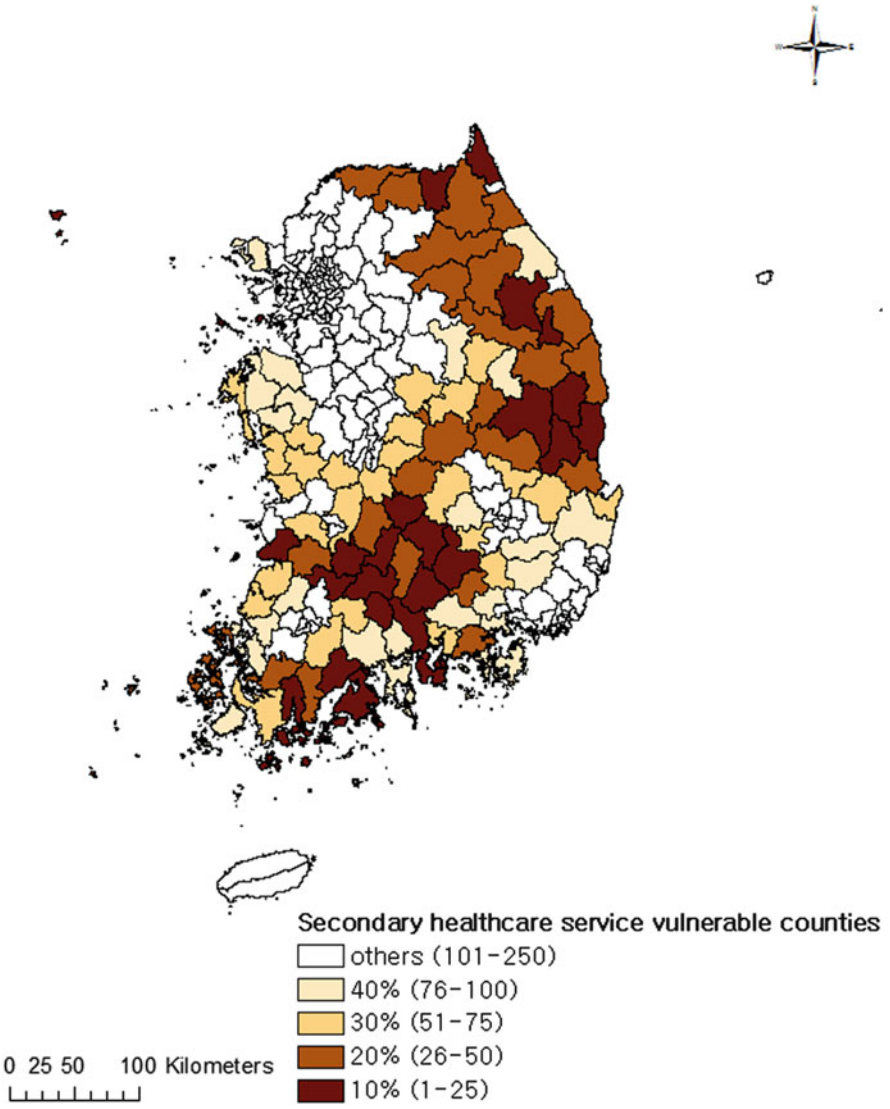


Fig. 5.8 Secondary healthcare service vulnerable counties (250 counties in South Korea)

Geochang-gun. Among the top 25, many of them are found to be in Gyeongsangnam-do (four regions) and Jeollabuk-do (six regions), while only three local cities are included in the top 10%. That is, rural areas are much more vulnerable with limited access to healthcare facilities providing secondary care services than urban areas.

Table 5.4 Healthcare SAVI (Service Accessibility Vulnerability Index)

	Primary healthcare service		Secondary healthcare service		Overall healthcare service	
Rank	Province, metropolitan city	SAVI	Province, metropolitan city	SAVI	Province, metropolitan city	SAVI
1	Gyeongsangbuk-do	0.0951	Jeollabuk-do	0.1164	Gyeongsangbuk-do	0.0946
2	Gangwon-do	0.0947	Gangwon-do	0.1151	Gangwon-do	0.0940
3	Jeollanam-do	0.0891	Gyeongsangbuk-do	0.1128	Jeollanam-do	0.0883
4	Gyeongsangnam-do	0.0853	Gyeongsangnam-do	0.1114	Gyeongsangnam-do	0.0844
5	Jeollabuk-do	0.0821	Jeollanam-do	0.1084	Jeollabuk-do	0.0817
6	Chungcheongnam-do	0.0819	Chungcheongnam-do	0.0845	Chungcheongnam-do	0.0811
7	Chungcheongbuk-do	0.0808	Chungcheongbuk-do	0.0820	Chungcheongbuk-do	0.0801
8	Sejong-si	0.0608	Incheon	0.0764	Sejong-si	0.0582
9	Gwangju	0.0519	Sejong-si	0.0566	Gwangju	0.0517
10	Daegu	0.0504	Gwangju	0.0485	Incheon	0.0496
11	Incheon	0.0498	Jeju-do	0.0462	Ulsan	0.0490
12	Ulsan	0.0493	Busan	0.0459	Daejeon	0.0477
13	Daejeon	0.0480	Ulsan	0.0448	Daegu	0.0466
14	Gyeonggi-do	0.0465	Daejeon	0.0446	Gyeonggi-do	0.0459
15	Busan	0.0451	Daegu	0.0440	Busan	0.0449
16	Jeju-do	0.394	Gyeonggi-do	0.0437	Jeju-do	0.0393
17	Seoul	0.0159	Seoul	0.0160	Seoul	0.0159

Table 5.5 Top 10 healthcare service vulnerable counties

	Primary healthcare service			Secondary healthcare service			Overall healthcare service		
Rank	Province, metropolitan city	County (si-gun-gu)	SAVI	Province, metropolitan city	County (si-gun-gu)	SAVI	Province, metropolitan city	County (si-gun-gu)	SAVI
1	Gyeongsang buk-do	Yeongdeok-gun	0.1235	Gyeongsang nam-do	Goseong-gun	0.2693	Gyeongsang buk-do	Yeongdeok-gun	0.1227
2	Gangwon-do	Inje-gun	0.1204	Incheon	Ongjin-gun	0.2671	Gyeongsangnam-do	Hapcheon-gun	0.1120
3	Jeollanam-do	Boseong-gun	0.1202	Jeollanam-do	Gurye-gun	0.2405	Gangwon-do	Inje-gun	0.1197
4	Gyeongsangnam-do	Hapcheon-gun	0.1201	Gyeongsang buk-do	Yeongyang-gun	0.2382	Gangwon-do	Hongcheon-gun	0.1187
5	Gangwon-do	Hongcheon-gun	0.1191	Gyeongsang buk-do	Cheongsong-gun	0.2189	Gyeongsang buk-do	Yeongyang-gun	0.1156
6	Gyeongsang buk-do	Yeongyang-gun	0.1156	Gyeongsang nam-do	Namhae-gun	0.1858	Jeollanam-do	Boseong-gun	0.1156
7	Gyeongsang buk-do	Uiseong-gun	0.1115	Gyeongsang nam-do	Hadong-gun	0.1765	Gyeongsang buk-do	Uiseong-gun	0.1116
8	Gangwon-do	Samcheok-si	0.1114	Gyeongsang nam-do	Hapcheon-gun	0.1719	Gyeongsang buk-do	Andong-si	0.1110
9	Gyeongsang buk-do	Yecheon-gun	0.1111	Gangwon-do	Taebaek-si	0.1678	Gangwon-do	Yangyang-gun	0.1106
10	Gyeongsang buk-do	Andong-si	0.1106	Gyeongsang nam-do	Geochang-gun	0.1650	Gyeongsang buk-do	Yecheon-gun	0.1105

5.3.3 *Vulnerability in Accessing Cultural Services*

Geographic Distribution of Cultural Services in Korea

According to the Ministry of Culture, Sports and Tourism of Korea and Korea Association of Social Welfare Centers, there are 6615 libraries (including public, small, and ones for the disabled), 345 cultural centers, and 457 social welfare centers nationwide (public cultural service facilities). Moreover, according to the Korean Film Commission (KOFIC), there are 555 movie theaters, 928 concert halls, 204 art museums, and 809 museums (private cultural service facilities).

Urban-Rural Comparisons: Number of Cultural Facilities and Distance to Services

The total number of public and private cultural service facilities in nonmetro regions (provinces) is bigger than that in metropolitan cities, 5649 in nonmetro regions, and 3961 in metropolitan cities, respectively. Overall, there are 42.6% more cultural service facilities in nonmetro regions (rural areas) than in metropolitan cities (urban areas). This can be decomposed into two parts: public service facilities and private services facilities. There are 39.3% more public service facilities in rural areas, while the gap increases to 52.8% for private service facilities. This pattern still holds when the number of cultural service facilities is normalized by 100,000 population. For public service facilities, there are 14.6 facilities per 100,000 residents in rural areas and 12.7 facilities per 100,000 residents in urban areas. Also, there are more private service facilities in rural areas, 5.2 per 100,000 rural residents compared to 4.2 per 100,000 urban residents. Most of the nonmetro regions have far more service facilities (per population) than metropolitan cities. However, the cultural service facility data used in this study does not consider the serving capacity of facilities, and the land areas of most provinces are much larger than those of metropolitan cities. This contributes to the higher number of facilities in a smaller capacity located in nonmetro regions (rural areas), whereas the lower number of larger cultural service facilities tend to locate in metropolitan cities (urban areas). Furthermore, the larger population size in urban areas may result in a smaller number of facilities per 100,000 population when the serving capacity of cultural facilities is ignored.

Looking at the distance factor, most of the nonmetro regions show a higher average distance to service facilities than the average distances in metropolitan cities. The exceptions are Gyeonggi-do, a suburb of the City of Seoul, that is part of SMA, and Jeju-do, a small island known as the tourism destination with lots of active cultural and tourism activities. The largest gap in terms of distance to cultural facilities between urban and rural areas is found between Gyeongsangbuk-do (rural) and Seoul (urban). The gap in average distance to public facilities in Seoul is 1.2 km; however, the distance in Gyeongsangbuk-do is 11.5 times longer (14.1 km). The accessibility gap between Gyeongsangbuk-do (rural) and Seoul (urban) slightly

decreases for private facilities to 8.2 times longer for the former with 19.5 km compared to 2.4 km for the latter. In this case, vulnerability with limited accessibility cannot be simply measured by the number of facilities or the distance factors exposed. Therefore, it is necessary to derive the SAVI (Service Accessibility Vulnerability Index) considering other factors (Table 5.6).

Figures 5.9 and 5.10 show the geographic distributions of public and private cultural and welfare service facilities in Korea, respectively. Among public service facilities (providing free services), libraries are relatively evenly distributed across urban and rural areas of Korea, while social welfare centers are mostly concentrated in metropolitan cities. As for the private service facilities (providing fee-based services), museums are distributed relatively equally in urban and rural areas, while movie theaters and concert halls are mostly found in urban areas (metropolitan cities).

Comparison of SAVI Between Urban and Rural Areas

Figure 5.11 indicates the distribution of SAVI values for overall cultural service. The dark brown regions are the regions with the top 10% SAVI values, representing the most vulnerable areas with limited access to cultural services. Similar to the accessibility to medical services, the major metropolitan cities and their neighboring regions appear to have low SAVI values with better accessibility. Particularly, accessibility to cultural services in Seoul, Busan, Daejeon, Gwangju, and Gyeonggi-do is high. On the other hand, other rural areas in the nonmetro provinces have limited accessibility (shaded in dark brown color) to overall cultural services, and these rural areas are mainly concentrated in East-central (Gyeongsangbuk-do).

The estimated SAVI values for the public service facilities are shown in Fig. 5.12. They are not so much different from those of overall cultural service vulnerable regions. Since libraries are the most evenly dispersed among the public service facilities, the distances to the nearest cultural service facilities were used to design the index.

Figure 5.13 shows the SAVI of private service facilities, such as art galleries, museums, movie theaters, and concert halls. The spatial distribution of vulnerable regions with limited access to private cultural service is different from that with limited access to overall and public service facilities.

Table 5.7 shows SAVI values for cultural/welfare services in metro cities and nonmetro regions. Like healthcare services, metropolitan cities like Seoul, Daejeon, Busan, and Daegu have better accessibility (low SAVI values) to cultural/welfare services. On the other hand, SAVI values of nonmetro regions (provinces) like Gyeongsangbuk-do, Jeollanam-do, and Jeollabuk-do are estimated to be high, revealing the largely lagging accessibility from that in metropolitan cities. The SAVI value of Gyeongsangbuk-do, which has the lowest accessibility to overall cultural services, is about 7.7 times higher than that of Seoul. In the case of public cultural services, the value gap is a little larger. Like healthcare services,

Table 5.6 Cultural service facilities per 100,000 population and average distance to the facilities

Metropolitan/province		Public cultural service facilities (library, social welfare center, cultural center)			Private cultural service facilities (movie theaters, concert halls, art museums, museums)		
		Number of facilities	Service facilities (per 100,000 population)	Average distance to service facilities (km)	Number of facilities	Service facilities (per 100,000 population)	Average distance to service facilities (km)
Metropolitan cities (7)	Seoul	1148	11.17	1.227	565	5.50	2.376
	Busan	412	11.50	4.380	95	2.65	6.907
	Daegu	275	10.92	4.271	74	2.94	6.354
	Incheon	287	9.75	6.620	91	3.09	15.412
	Gwangju	455	30.58	3.755	64	4.30	6.565
	Daejeon	237	15.28	4.042	60	3.87	6.254
	Ulsan	170	14.52	6.102	28	2.39	8.479
Nonmetro regions (10)	Gyeonggi-do	1559	12.32	5.768	458	3.62	8.859
	Gangwon-do	257	16.82	13.683	163	10.67	17.326
	Chungcheongbuk-do	281	17.76	11.100	94	5.94	14.312
	Chungcheongnam-do	349	16.72	8.648	108	5.17	15.276
	Jeollabuk-do	337	18.11	11.745	118	6.34	19.332
	Jeollanam-do	331	17.46	11.832	140	7.39	16.441
	Gyeongsangbuk-do	318	11.90	14.131	143	5.35	19.535
	Gyeongsangnam-do	511	15.14	10.014	143	4.24	17.259
	Jeju-do	189	30.73	4.278	115	18.70	5.326
	Sejong-si	24	11.68	7.712	11	5.35	8.203
Nation(all)		7140	13.73	7.606	2470	4.75	11.424

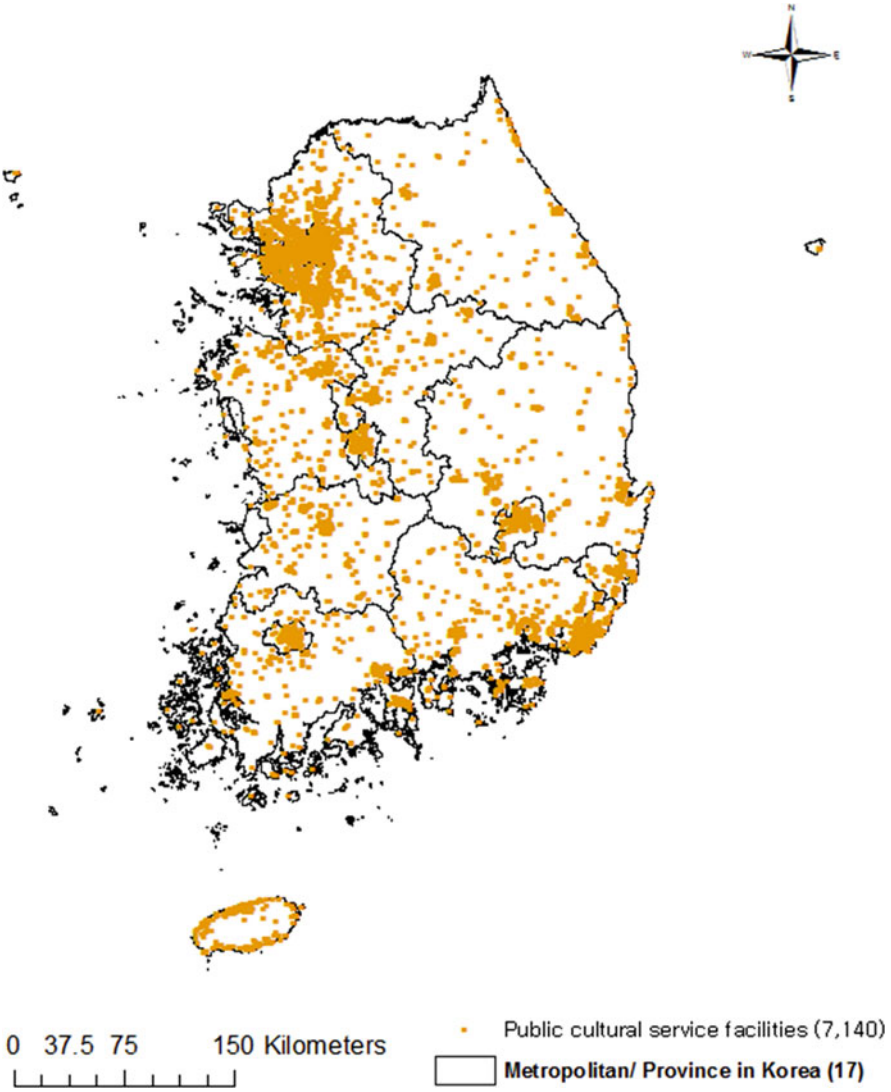


Fig. 5.9 Distribution of Public cultural service facilities in South Korea (Library, Cultural center, Social welfare center)

accessibilities to cultural service in Gyeonggi-do and Jeju-do are higher than in other provinces for the same reasons.

Table 5.8 lists the top 10 SAVI regions for cultural services among 250 self-governing local jurisdictions (i.e., si-gun-gu, equivalent to a county in the U.S.) in Korea. The top 10 SAVI regions with the least accessibility to overall cultural services include Hongcheon-gun, Boseong-gun, Yeongdeok-gun, Sangju-si, Cheongsong-gun, Bonghwa-gun, Uiseong-gun, Uljin-gun, Gimcheon-si, and

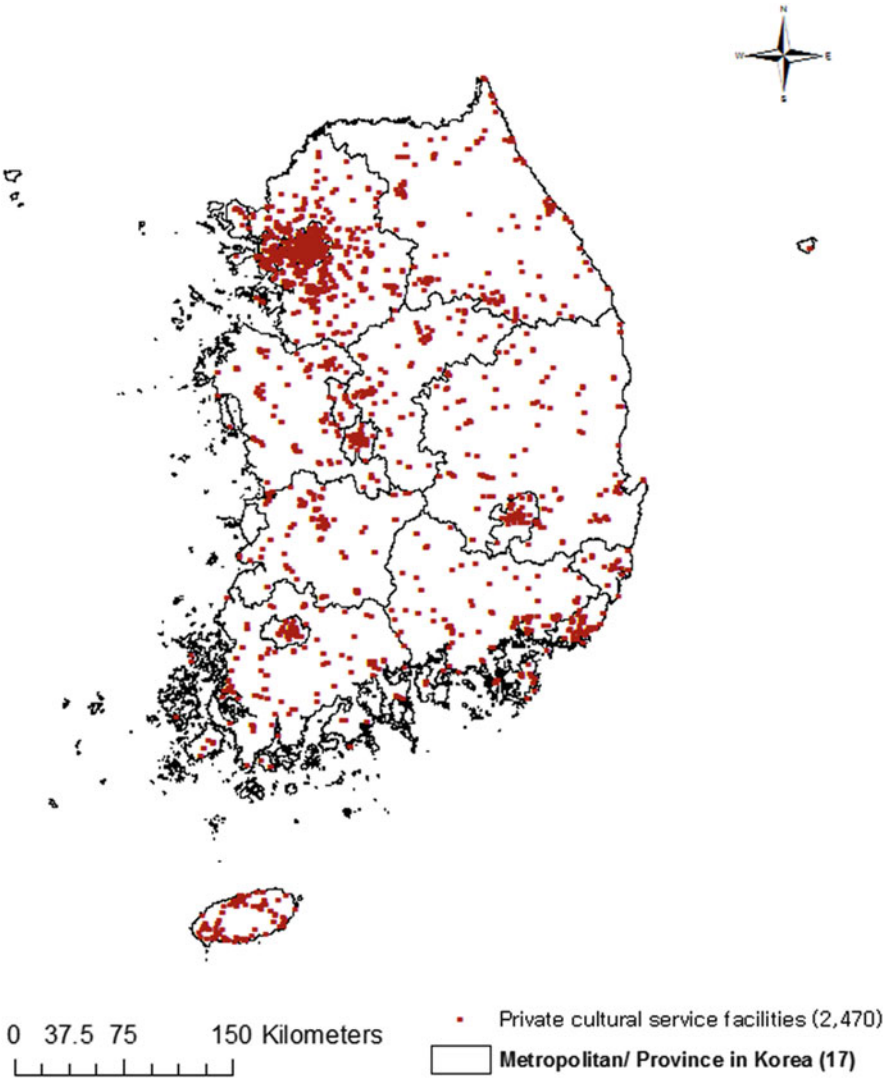


Fig. 5.10 Distribution of private cultural service facilities in South Korea (movie theaters, concert halls, art museums, and museums)

Samcheok-si. The spatial distribution of vulnerable regions with limited access to cultural services is quite similar to that of the healthcare services vulnerable regions. But, the vulnerable areas of public cultural services and private cultural services are somewhat different, but most of the regions consist of "gun," i.e., rural jurisdiction. In the case of "Ongjin-gun" in Incheon, it belongs to a metropolitan city, but the area is mostly composed of distant small islands close to North Korea.

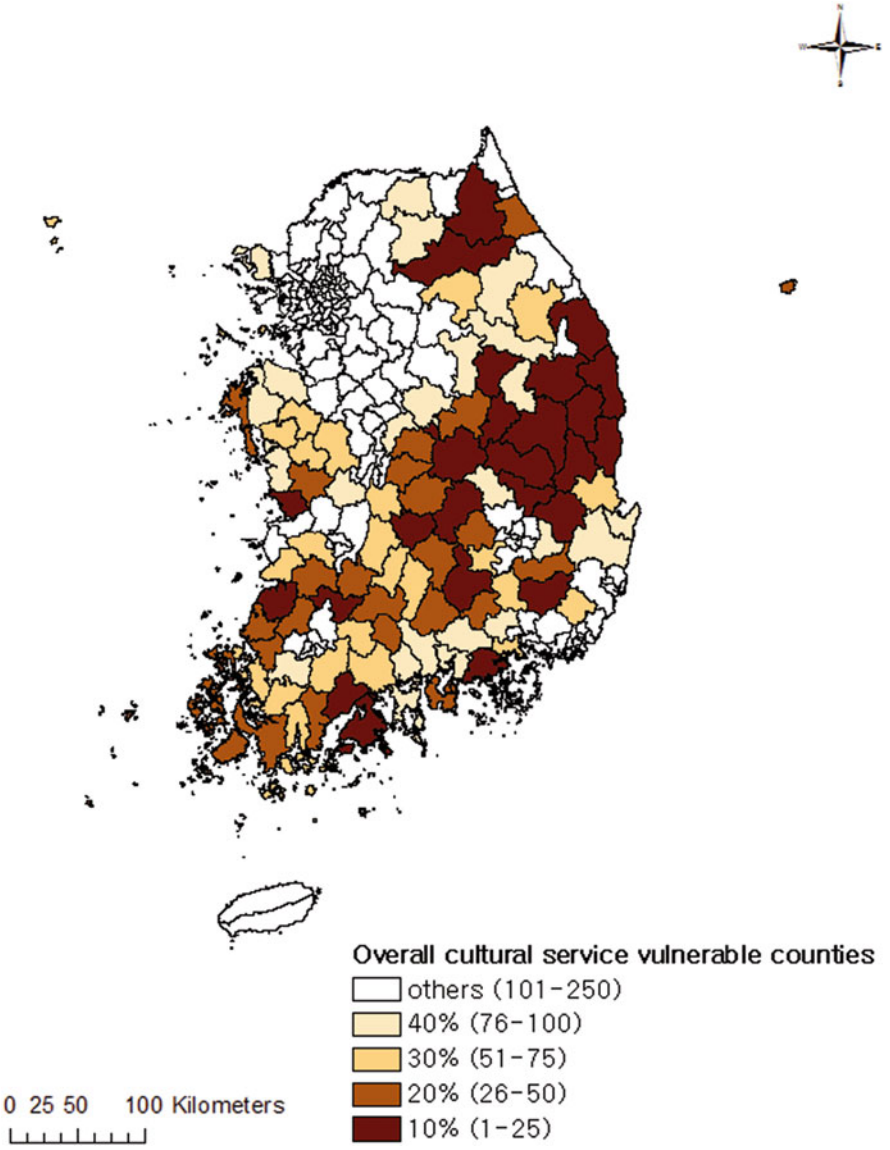


Fig. 5.11 Overall cultural service vulnerable counties (250 counties in South Korea)

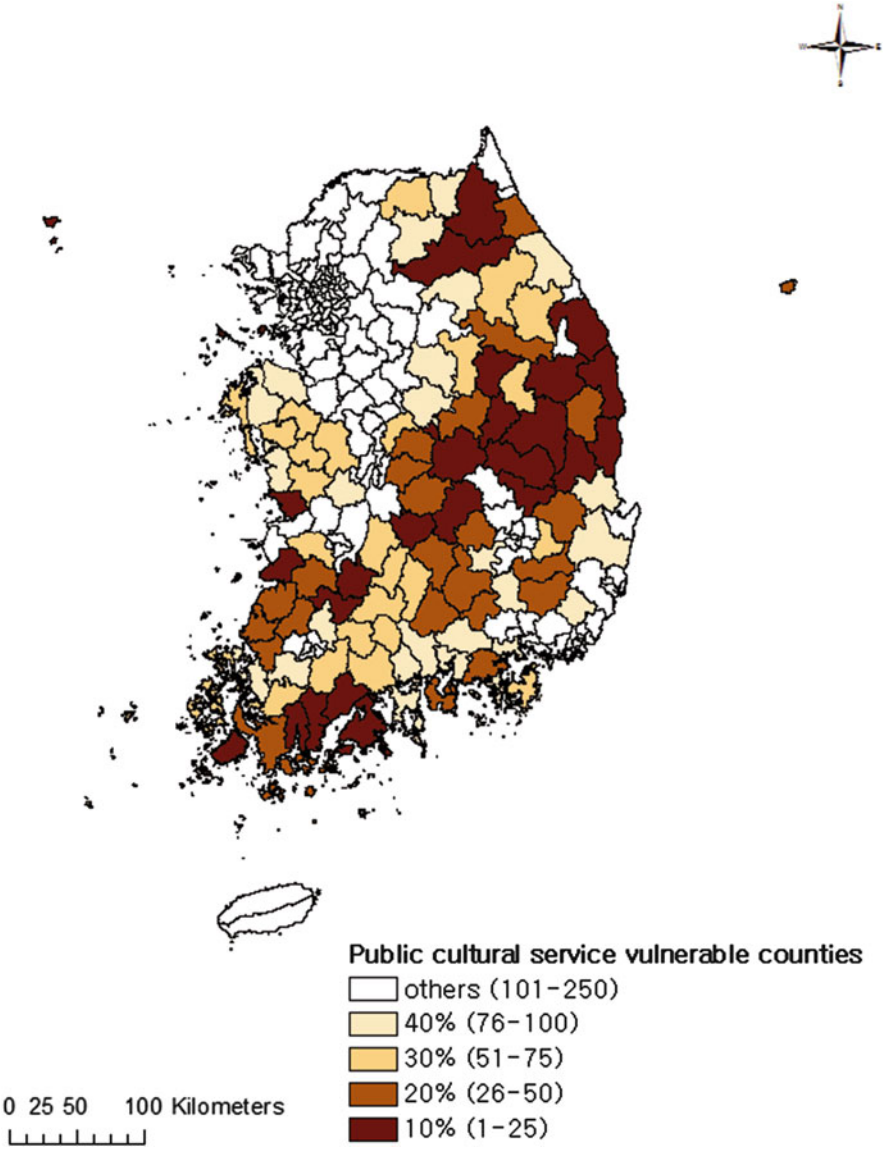


Fig. 5.12 Public cultural service vulnerable counties (250 counties in South Korea)

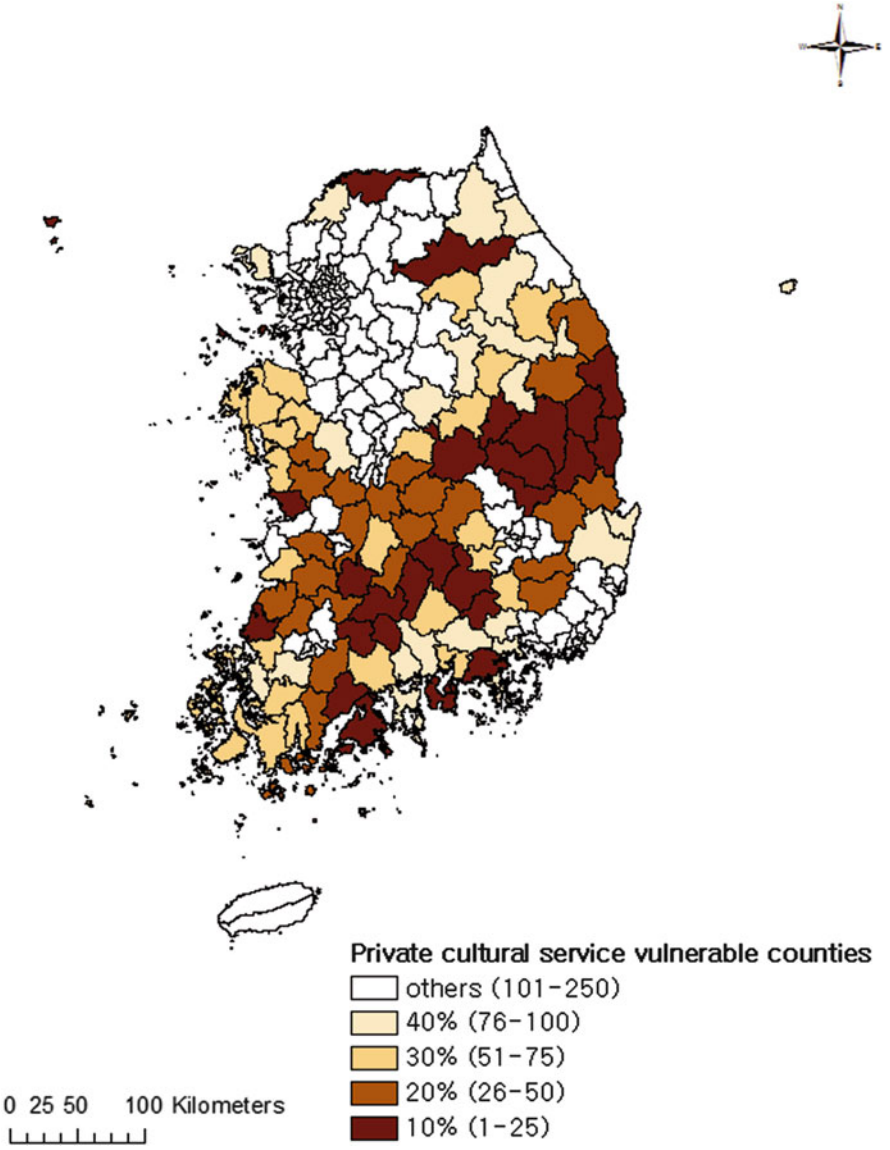


Fig. 5.13 Private cultural service vulnerable counties (250 counties in South Korea)

Table 5.7 Cultural/welfare SAVI (Service Accessibility Vulnerability Index)

	Public service (free services)		Private service (fee-based services)		Overall cultural service	
Rank	Province, metropolitan city	SAVI	Province, metropolitan city	SAVI	Province, metropolitan city	SAVI
1	Gyeongsangbuk-do	0.1310	Gyeongsangbuk-do	0.1018	Gyeongsangbuk-do	0.1207
2	Jeollanam-do	0.1186	Jeollabuk-do	0.0962	Jeollanam-do	0.1044
3	Gangwon-do	0.1136	Jeollanam-do	0.0952	Gangwon-do	0.1008
4	Jeollabuk-do	0.1103	Gyeongsangnam-do	0.0907	Jeollabuk-do	0.0997
5	Gyeongsangnam-do	0.1016	Chungcheongnam-do	0.0853	Gyeongsangnam-do	0.0968
6	Chungcheongbuk-do	0.0987	Gangwon-do	0.0809	Chungcheongbuk-do	0.0917
7	Chungcheongnam-do	0.0926	Chungcheongbuk-do	0.0771	Chungcheongnam-do	0.0911
8	Sejong-si	0.0647	Incheon	0.0730	Sejong-si	0.0600
9	Incheon	0.0641	Sejong-si	0.0533	Incheon	0.0546
10	Ulsan	0.0538	Gwangju	0.0493	Ulsan	0.0515
11	Busan	0.0531	Ulsan	0.0454	Gwangju	0.0511
12	Gwangju	0.0515	Daejeon	0.0449	Busan	0.0472
13	Daegu	0.0480	Daegu	0.0441	Daejeon	0.0471
14	Gyeonggi-do	0.0480	Busan	0.0436	Daegu	0.0462
15	Daejeon	0.0479	Gyeonggi-do	0.0430	Gyeonggi-do	0.0457
16	Jeju-do	0.0341	Jeju-do	0.0302	Jeju-do	0.0317
17	Seoul	0.0159	Seoul	0.0158	Seoul	0.0157

Table 5.8 Cultural service vulnerable counties

Rank	Public service (free charging)			Private service (fee charging)			Overall cultural service		
	Province, metropolitan city	County (si-gun-gu)	SAVI	Province, metropolitan city	County (si-gun-gu)	SAVI	Province, metropolitan city	County (si-gun-gu)	SAVI
1	Jeollanam-do	Gangjin-gun	0.2100	Incheon	Ongjin-gun	0.2462	Gangwon-do	Hongcheon-gun	0.1693
2	Gyeongsang buk-do	Yeongdeok-gun	0.1921	Gyeongsang nam-do	Hapcheon-gun	0.1526	Jeollanam-do	Boseong-gun	0.1606
3	Gangwon-do	Hongcheon-gun	0.1858	Jeollanam-do	Gurye-gun	0.1503	Gyeongsang buk-do	Yeongdeok-gun	0.1555
4	Jeollanam-do	Boseong-gun	0.1763	Gyeongsang buk-do	Yeongdeok-gun	0.1460	Gyeongsang buk-do	Sangju-si	0.1469
5	Incheon	Ongjin-gun	0.1655	Gyeongsang buk-do	Uiseong-gun	0.1393	Gyeongsang buk-do	Cheongsong-gun	0.1436
6	Gyeongsang buk-do	Cheongsong-gun	0.1654	Jeollabuk-do	Namwon-si	0.1371	Gyeongsang buk-do	Bonghwa-gun	0.1435
7	Jeollabuk-do	Muju-gun	0.1607	Jeollanam-do	Boseong-gun	0.1361	Gyeongsang buk-do	Uiseong-gun	0.1433
8	Gyeongsang buk-do	Sangju-si	0.1606	Jeollanam-do	Gokseong-gun	0.1334	Gyeongsang buk-do	Uljin-gun	0.1421
9	Jeollabuk-do	Buan-gun	0.1605	Gyeongsang nam-do	Namhae-gun	0.1291	Gyeongsang buk-do	Gimcheon-si	0.1400
10	Gangwon-do	Samcheok-si	0.1576	Gyeongsang buk-do	Cheongsong-gun	0.1232	Gangwon-do	Samcheok-si	0.1394

5.4 Service Vulnerability and Local Characteristics

In this section, we investigate the relationship between service accessibility vulnerability and local characteristics. This study includes three factors for local characteristics: demographic and labor market structure, economic conditions, and transportation and accessibility (see Table 5.9).

The following Table 5.10 summarizes the correlation estimation between the SAVI and the local characteristics. Among the local demographic and labor market structure, the share of the elderly population is positively correlated with SAVI (healthcare: 0.7980, culture: 0.8150). The share of the elderly population is an indicator that is used often in measuring service accessibility in the previous studies. However, population size and unemployment rate are negatively correlated with SAVI, while the correlation with the rate of population increase and gender ratio turns out to be relatively low. These results imply that rural areas with small population size and labor supply shortages due to the aging population are likely to suffer from low service accessibility compared to major metropolitan cities (urban areas) with large population size and labor supply surplus.

Local economic conditions are also highly correlated with SAVI. The fiscal independence rate is highly negatively correlated with healthcare and cultural service vulnerability as expected (healthcare: −0.8280, culture: −0.7975). This implies that the financial condition of local government is important to provide better service accessibility. Also, both variables, "Cultural GRDP" and "Medial GRDP" are found to be important indicators for service accessibility. The former represents the total value added (TVA) of the local healthcare/medical industry, while the latter represents the TVA of the cultural/leisure service industry. A region with a higher GRDP of the healthcare/medical service industry or a higher GRDP of the cultural/leisure service industry tends to have better accessibilities to both

Table 5.9 Statistical indicators of the regions for the correlation analysis

Local characteristics	Statistical indicators
Demographic/labor market structure	Annual population change (%)
	Share of the elderly (%)
	Population size (persons)
	Gender ratio (male to female)
	Employment rate (%)
	Unemployment rate (%)
Economic condition	GRDP (KRW)
	Fiscal independence rate (%)
	Agricultural GRDP (KRW)
	Medical service GRDP (KRW)
	Cultural service GRDP (KRW)
Transportation/accessibility	Share of paved road (%)
	Number of the registered vehicle per person
	Area of the region (km^2)

Table 5.10 Correlation between SAVI and regional variables

Demographic/labor market structure			Economic condition			Transportation/accessibility		
	Healthcare SAVI	Cultural SAVI		Healthcare SAVI	Cultural SAVI		Healthcare SAVI	Cultural SAVI
Annual pop. Growth	−0.3419	−0.3413	GRDP	−0.4827	−0.4622	Share of paved road	−0.3711	−0.3067
Share of the elderly	**0.7980**	**0.8150**	Fiscal independence	**−0.8280**	**−0.7975**	# of vehicle per person	0.2979	0.2731
Population size	**−0.6832**	**−0.6375**	Agricultural GRDP	0.1153	0.1283	Area of region	**0.5670**	**0.5321**
Gender ratio (M to F)	−0.1568	−0.2284	Medical GRDP	**−0.6219**	**−0.5813**			
Employment rate	**0.5876**	**0.6003**	Cultural GRDP	**−0.6617**	**−0.6322**			
Unemployment rate	**−0.6889**	**−0.6779**						

The correlation in bold is significant at 5%

healthcare and cultural services (lower SAVI values). The negative correlation is slightly stronger for the accessibility to healthcare services than the accessibility to cultural services.

Finally, the areas of a region and SAVI are positively correlated (healthcare: 0.5670, culture: 0.5321). The accessibility could be lower where the size of the area is larger due to a longer travel distance to service facilities. This represents the fact that most of the service facilities are geographically concentrated in the administrative centers ("eup," "myeon," i.e., the local minimum administrative unit of Korea) of sparsely populated rural areas.

5.5 Conclusion

Under Article 34 and 36 of the Korean Constitution, it is the people's fundamental human rights to obtain medical, cultural, and welfare services regardless of social and/or financial status. Therefore, such rights must be guaranteed for residents in rural areas where access to such services is relatively lower compared to metropolitan cities. Furthermore, the elderly population, lacking the means of private transportation, and financially vulnerable populations should be able to have adequate access to medical, cultural, and welfare services.

Especially, medical, cultural, and welfare services are the major components of the central government-initiated quality of life master plan in South Korea. The Ministry of Agriculture, Food and Rural Affairs, Ministry of Health and Welfare, and Ministry of Culture, Sports and Tourism in South Korea are constructing new service facilities in rural regions in lack of such basic services. And they are operating demand-driven policies such as "outreach service" that reach out to the vulnerable populations. However, the results from previous studies provide limited implications due to the lack of the spatial high-resolution data (i.e., si, gun) or the methodologies focusing only on the physical distance to identify vulnerable areas. That is, most of the previous studies were ignorant of more sophisticated methods and disaggregated spatial analysis.

Therefore, this study, hoping to make up for the limitations of precedent studies, geologically fragmentizes the nation by a 1 km grid. Furthermore, this study reflects the elderly population lacking the means of private transportation and financially vulnerable population to calculate the SAVI (Service Accessibility Vulnerability Index) value in each region. Microdata was merged into a county level for the convenience of analysis. This was again aggregated up to the nonmetro province-metropolitan city units (rural-urban dichotomies) for analyzing the nationwide pattern in South Korea.

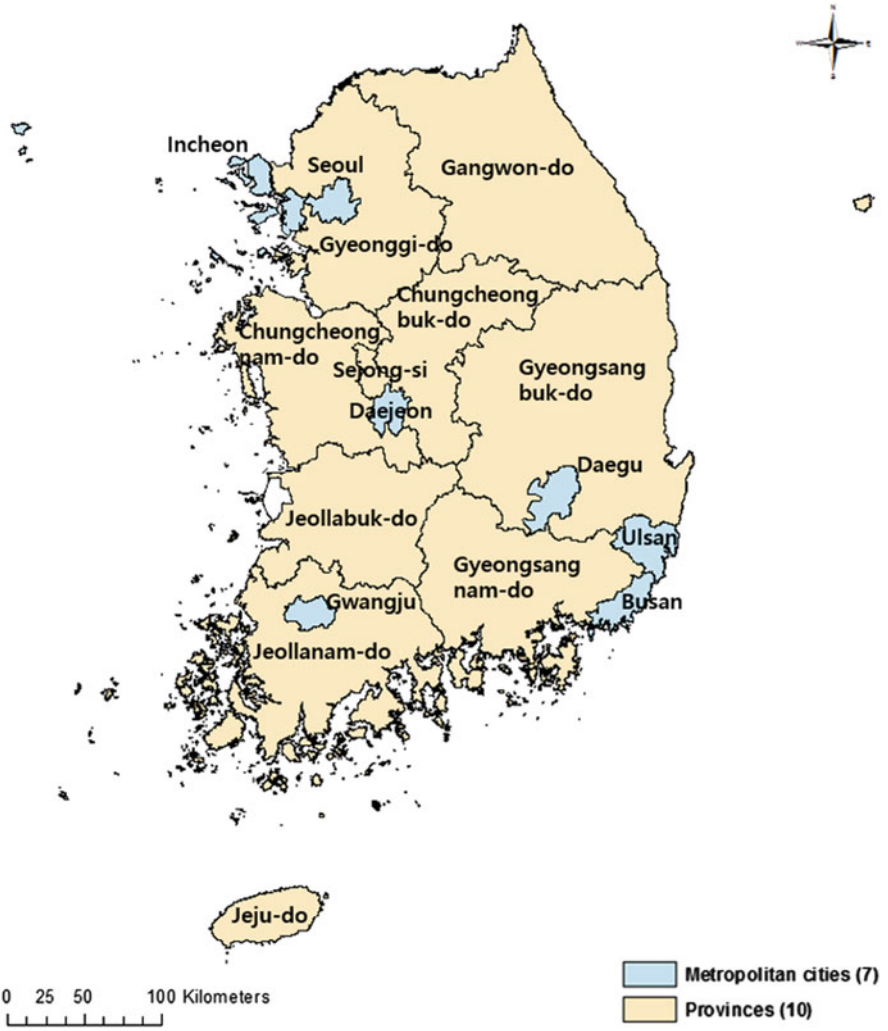
As a result of the analysis, the difference in service accessibility between metro cities (urban areas) and nonmetro province regions (rural areas) is noticeable in Korea. In particular, accessibilities to healthcare/cultural/welfare services in metro cities such as Seoul, Busan, and Daejeon are superior to that of other nonmetro regions. However, service accessibility of Gyeonggi-do and Jeju-do is relatively

high depending on regional characteristics such as proximity to the City of Seoul or the development of tourism activities.

Service accessibility also differs within the nonmetro rural areas. The most vulnerable areas with limited accessibilities found in the study are rural areas ("gun"), not local small cities ("si"), which implies that the service vulnerability needs to be measured and classified at a much finer spatial resolution compared to the previous empirical studies.

Although this study has several limitations, it is possible to identify vulnerabilities at a 1 km increments by reflecting population and sociological characteristics. Using today's evolving geotechnical technologies and more geographically disaggregated data, it is expected that more comprehensive, accurate, and advanced approaches can be developed based on the method proposed in this chapter. This helps policymakers develop more customized policies to improve the quality of life of rural residents that will eventually reduce the regional inequality in South Korea.

Appendix



Regional reference map of korea: metropolitan cities and non-metro provinces

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Chapter 6
Urban and Rural Dimensions of the Role of Education in Inequality: A Comparative Analysis Between Indonesia, Myanmar, and the Philippines

Takahiro Akita and Sachiko Miyata

Contents

Abstract In an urban-rural dual framework, this study investigates the roles of education in expenditure inequality in three ASEAN countries (Indonesia, Myanmar, and the Philippines) using data from nationwide household surveys. To reduce overall expenditure inequality, Myanmar needs to reduce expenditure inequalities within educational groups, because unlike Indonesia and the Philippines, expenditure disparities between urban and rural areas and between educational groups were not large. In Indonesia and the Philippines, narrowing urban-rural educational gap could mitigate overall expenditure inequality by reducing urban-rural expenditure

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disparity. These two countries need to further improve the quality of primary and secondary education and reduce dropout rates particularly in urban areas, thereby raising the enrollment ratio of tertiary education. At the same time, policies that could reduce variations in quality among tertiary education institutions need to be introduced, since expenditure inequality among urban households with tertiary education was relatively high.

Keywords Urban and rural dimensions · Educational inequality · Expenditure inequality · Hierarchical decomposition of Theil indices · Comparative analysis
JEL Code I24 · I25 · O15

6.1 Introduction

Education is the key to national development and considered to be one of the principal means of alleviating poverty and inequality (De Janvry and Sadoulet 2016). It is a major determinant of income, and a positive relationship is likely to exist between inequality in educational attainment and income inequality. Whether the expansion of education has narrowed or widened income inequality is of policy relevance in developing countries. Asian developing countries have made significant progress in education over the last decades. However, many of them still suffer from high poverty and inequality. Against this background, this study attempts to analyze the roles of education in the distribution of economic well-being in Asian developing countries that have developed relatively rapidly over the last two decades. The analysis is conducted in an urban and rural dual framework, since disparity between urban and rural areas is one of the main determinants of the distribution of economic well-being and there is a large difference in socioeconomic structure between urban and rural areas (Eastwood and Lipton 2004; Shorrocks and Wan 2005; Kanbur and Zhuang 2013).

This study uses data from nationwide household surveys conducted by central statistical offices. As a measure of economic well-being, it uses expenditure rather than income for the following reasons (Akita et al. 1999). First, expenditure data are usually more reliable than income data in developing countries since households in higher income groups tend to underreport their incomes. Second, welfare levels are likely to be better indicated by current expenditure than by current income. We should note, however, that expenditure inequality is usually smaller than income inequality since higher income households tend to save a larger proportion of their incomes.

We choose Indonesia, Myanmar, and the Philippines as a sample of Asian developing countries and make a comparison among these countries in terms of the roles of education in the distribution of economic well-being. These three countries belong to the Association of South East Asian Nations (ASEAN) and are among the middle-income countries whose population exceeds 50 million. Indonesia

Table 6.1 GDP and manufacturing value added at constant 2010 US Dollars

	GDP, population, and manufacturing value added				Growth rate (%)		
	2000	2005	2010	2015	00–05	05–10	10–15
GDP (million US dollars)							
Indonesia	453,414	571,205	755,094	988,129	4.6	5.6	5.4
Myanmar	15,985	29,275	49,541	70,340	12.1	10.5	7.0
Philippines	125,348	156,874	199,591	266,055	4.5	4.8	5.7
ASEAN	1,181,299	1,517,081	1,974,459	2,528,391	5.0	5.3	4.9
Population (thousand)							
Indonesia	211,514	226,289	241,834	258,383	1.4	1.3	1.3
Myanmar	46,720	48,950	50,601	52,681	0.9	0.7	0.8
Philippines	77,992	86,326	93,967	102,113	2.0	1.7	1.7
ASEAN	523,789	559,796	595,411	632,637	1.3	1.2	1.2
Per capita GDP (US dollars)							
Indonesia	2144	2524	3122	3824	3.3	4.3	4.1
Myanmar	342	598	979	1335	11.2	9.9	6.2
Philippines	1607	1817	2124	2605	2.5	3.1	4.1
ASEAN	2255	2710	3316	3997	3.7	4.0	3.7
Manufacturing value added (million US dollars)							
Indonesia	107,460	136,991	166,412	212,810	4.9	3.9	4.9
Myanmar	1145	3332	9840	15,564	21.4	21.7	9.2
Philippines	29,655	35,968	42,802	59,606	3.9	3.5	6.6
ASEAN	279,450	364,035	452,070	556,238	5.3	4.3	4.1
Ratio of manufacturing value added to total GDP (%)							
Indonesia	23.7	24.0	22.0	21.5			
Myanmar	7.2	11.4	19.9	22.1			
Philippines	23.7	22.9	21.4	22.4			
ASEAN	23.7	24.0	22.9	22.0			

Note: ASEAN excludes Brunei
Source: Authors' calculation from World Development Indicators, World Bank

is the world's largest archipelagic country and also the world's largest Muslim country. It comprises more than 13,000 islands. Meanwhile, the Philippines is the world's second largest archipelagic country, which consists of more than 7000 islands. These two countries are diverse in terms of geography, natural resource endowments, ethnicity, and culture; Indonesia and the Philippines accommodate, respectively, 300 and 110 ethnic groups. Myanmar is bordered by Bangladesh, China, India, Laos, and Thailand and joined ASEAN in 1997. In terms of land area, the country is the largest among the mainland ASEAN countries (Cambodia, Laos, Malaysia, Myanmar, Singapore, Thailand, and Vietnam). Myanmar is also ethnically diverse with more than 100 ethnic groups.

Among the three countries, Indonesia has the largest population with 258 million in 2015, and 56% of them are living in the island of Java where the city of Jakarta is located (Table 6.1). The Philippines and Myanmar follow next with 102 million and 53 million, respectively. In the Philippines, 53% of the population are in the island of

Luzon, where the city of Manila is located. Meanwhile, in Myanmar, around 14% of the population live in the region of Yangon, the largest region in the country. Indonesia is the most developed country in terms of per capita GDP, whose per capita GDP is 1.5 times that of the Philippines and 2.9 times that of Myanmar (Table 6.1). In Indonesia and the Philippines, the manufacturing share of total GDP has been declining gradually over the last two decades, while in Myanmar, it has been rising rapidly. As a result, these three countries registered the same level of the manufacturing share of total GDP in 2015. It seems that Indonesia and the Philippines have undergone premature output deindustrialization since the 2000s (Rodrik 2016).

Education system differs considerably among these three countries. In Indonesia, the formal education system consists of four levels: preprimary; basic compulsory education including 6 years of primary education (starting at 7 years of age) and 3 years of junior secondary education; 3 years of senior secondary education; and tertiary education (one to 4 years of diploma programs and international standard bachelor's, master's, and doctoral programs) (Di Gropello 2011a). At each level of education, an Islamic counterpart is available to students, which serves as an alternative to the general education system (Di Gropello 2011a). In Myanmar, the formal education system encompasses preschool, basic compulsory education (5 years of primary education starting at 5 years of age inclusive of kindergarten), 4 years of junior secondary education, 2 years of senior secondary education, and tertiary education (bachelor's, master's, and doctoral programs) (UNESCO 2011a; Hayden and Martin 2013). In addition to formal education, monastic schools run by Buddhist monks are available for needy and orphans at the primary and secondary levels (Hayden and Martin 2013). In the Philippines before 2012, the formal education system consisted of preprimary, basic compulsory education including 6 years of primary education (starting at 6 years of age) and 4 years of secondary education, and 2 years of postsecondary technical and vocational education programs or tertiary education (bachelor's, master's, and doctoral programs) (Di Gropello 2011b). Since 2013, however, basic compulsory education has been expanded to 13 years from kindergarten to senior secondary education (1 year of kindergarten starting at 5 years of age, 6 years of primary education, 2 years of junior, and 4 years of senior secondary education) (UNESCO 2011b).

All three countries have made steady progress in education over the last two decades; their gross primary education ratios have exceeded 100% since the early 1990s. As shown in Fig. 6.1, in the period from 2001 to 2015, the Philippines has raised its gross secondary enrollment ratio from 75% to 88%, while Indonesia has increased its ratio from 55% to 86%. Though the ratio is much smaller, Myanmar has increased its ratio from 38% to 52%. As shown in Fig. 6.2, however, the progress of tertiary education varies among the three countries. While Indonesia has made substantial progress in tertiary education by raising its gross tertiary enrollment ratio from 14% to 33%, Myanmar increased its ratio merely from 11% to 14% and the Philippines from 31% to 35%. In Myanmar, tertiary education is still underdeveloped, and universities are concentrated in major cities such as Yangon and

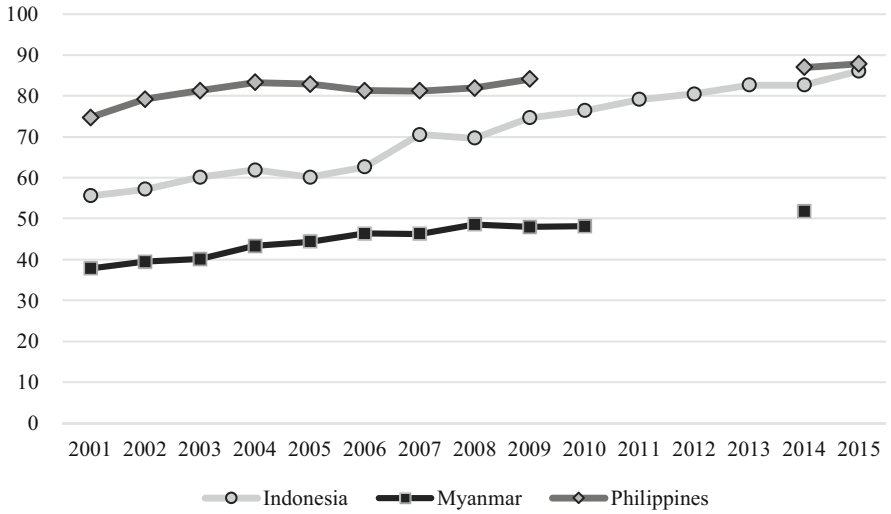

Fig. 6.1 Gross Enrollment Ratio, Secondary Education. (Source: World Development Indicators, World Bank)

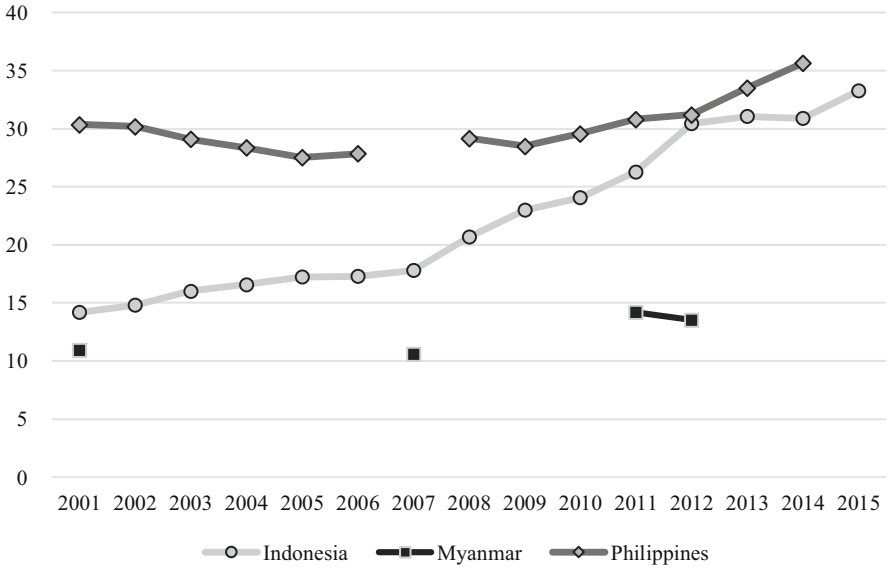

Fig. 6.2 Gross Enrollment Ratio, Tertiary Education. (Source: World Development Indicators, World Bank)

Mandalay. The gross tertiary enrollment ratio is the second lowest among ASEAN counties next to Laos.

This study first analyzes inequality in the number of years of education among households (hereafter, educational inequality) by conducting an inequality decomposition analysis by urban and rural sectors using the Gini coefficient. It then employs the Blinder-Oaxaca decomposition method to examine the effects of education on urban-rural disparity in mean per capita expenditure (hereafter, expenditure inequality) (Blinder 1973; Oaxaca 1973). Finally, using the two-stage hierarchical Theil decomposition method developed by Akita and Miyata (2013), this study analyzes the role of education in expenditure inequality after removing the effect of urban-rural differences in educational endowments on expenditure inequality. It should be noted that to measure expenditure inequality, the Theil index T is employed.[1] But, to measure educational inequality, the Gini coefficient is used since a household with no education is given 0 year of education and thus it is not possible to calculate the Theil index T. These inequality measures satisfy several desirable properties such as anonymity principle, mean independence, population-size independence, and the Pigou–Dalton transfer principle (Anand 1983; Haughton and Khandker 2009). Moreover, the Theil index T is additively decomposable by population subgroups, that is, total inequality can be expressed as the sum of the within- and between-group inequality components (Bourguignon 1979; Shorrocks 1980). However, the Gini coefficient cannot be decomposed in this way, since the residual term emerges when the distributions of population subgroups overlap (Lambert and Aronson 1993; Dagum 1997).

6.2 Literature Review

A spate of studies has been conducted to analyze the relationship between the level of education, educational inequality, and income or expenditure inequality. Some of these studies include Knight and Sabot (1983), Ram (1989, 1990), Park (1996), Chu (2000), De Gregorio and Lee (2002), Lin (2006), and Abdullah et al. (2015). Based on a dataset of around 100 countries, Ram (1990) found that there is an inverted U-shaped relationship between the level of educational attainment and educational inequality, that is, educational inequality first increases, attains the peak, and then declines with educational expansion. Ram (1990) claimed that educational inequality may decline monotonically with educational expansion for less-developed countries which have already reached a certain level of educational attainment and have adopted free and universal primary education. Using a dataset of 59 countries, Park (1996) found that a higher level of educational attainment tends to reduce income inequality, and educational inequality is positively associated with income

[1]The formula of the Theil index T will be presented in the methodology section. In this study, another Theil index, the Theil index L, is also used to perform a hierarchical inequality decomposition analysis. But the result is similar to the one by the Theil index T qualitatively and thus it is not presented.

inequality. Based on a panel dataset of more than 100 countries for the period from 1960 to 1990, De Gregorio and Lee (2002) found that higher educational attainment and more equal distribution of education appear to play a significant role in equalizing income distribution. Based on 64 empirical studies, Abdullah et al. (2015) performed a meta regression analysis to investigate the effect of education on inequality and found that education appears to be an effective means for reducing inequality.

In an urban-rural dual framework, our study analyzes the role of education in expenditure inequality using the Theil decomposition method. The studies that employed the Theil decomposition method include Ikemoto (1985) for Malaysia, Glewwe (1986) for Sri Lanka, Ikemoto and Limskul (1987) for Thailand, Ching (1991) for the Philippines, Tsakloglou (1993) for Greece, Estudillo (1997) for the Philippines, Akita et al. (1999) for Indonesia, Kanbur and Zhang (1999) for China, Parker (1999) for UK, Dickey (2001) for Great Britain, Liu (2001) for Vietnam, Gray et al. (2003) for Canada, Mukhopadhaya (2003) for Singapore, Rao et al. (2003) for Singapore, Motonishi (2006) for Thailand, Tang and Petrie (2009) for Australia, and Akita and Miyata (2013) for Indonesia. According to the studies that examined the role of education in inequality using the Theil decomposition method, education is one of the major determinants of income or expenditure inequality by accounting for around 20–40% of overall inequality. On the other hand, according to the Theil decomposition studies that analyzed the role of urban and rural locations in inequality, urban-rural disparity explains around 10–30% of overall income or expenditure inequality. It should be noted that unlike most previous studies which employed the one-stage Theil decomposition method, our study uses the two-stage hierarchical Theil decomposition method developed by Akita and Miyata (2013).

In Indonesia, there are many studies that have analyzed expenditure or income inequality using data from the National Socioeconomic Survey (*Susenas*) or the Family Life Survey (IFLS). They include Hughes and Islam (1981), Islam and Khan (1986), Asra (1989), Akita and Lukman (1999), Akita et al. (1999), Asra (2000), Akita and Miyata (2008, 2013), Hayashi et al. (2014), Yusuf et al. (2014), and Chongvilaivan and Kim (2016). Among these studies, Akita and Miyata (2008, 2013), and Hayashi et al. (2014) focused on education and examined the role of education in expenditure inequality in an urban and rural framework using the Theil decomposition method. Akita and Miyata (2008) used household expenditure data from the 1996, 1999, and 2002 *Susenas* to investigate the evolution of expenditure inequality associated with urbanization and educational expansion. According to them, widening inequality among urban households with higher levels of education, together with urbanization and educational expansion, appears to have contributed to the rise of overall inequality over the period 1996–2002. Hayashi et al. (2014) used household expenditure data from the panel *Susenas* to analyze the role of education in expenditure inequality from spatial perspectives over the period 2008–2010. Using several decomposition methods, they found that differences in educational attainment levels appear to have played an important role in expenditure inequality within urban areas and between urban and rural areas. Finally, based on the 1987, 1990, and 1993 *Susenas*, Akita et al. (1999) examined the roles of location, age,

education, gender, and household size in expenditure inequality using the one-stage Theil decomposition method. They found that expenditure disparity across educational groups accounted for more than 30% of overall expenditure inequality as measured by the Theil index *T*.

In Myanmar, most previous studies that used data from the Household Income and Expenditure Surveys (HIES) have focused on poverty, and studies on inequalities are scarce. Some of these studies include Lar et al. (2012), Shaffer (2015), Teerawichitchainan and Knodel (2015), Wagle (2016), World Bank (2017), and Mohanty et al. (2018). Using a new household-level dataset for the Mawlamyine township (capital city of the Mon state), Lar et al. (2012) analyzed the level, causes, and consequences of poverty in one of the most promising areas for economic development. By estimating the incidence, depth, and severity of poverty in rural, semi-urban, and urban sections of the township, they found that semi-urban areas had the highest amount of absolute poverty. They also measured income and expenditure inequality using the Gini coefficient and found that urban areas had the largest inequality. They argued that poverty may most effectively be reduced by education, remittances, and motorcycle ownership. Based on a poverty and vulnerability assessment survey carried out in 2013, Mohanty et al. (2018) estimated multidimensional poverty in the mountainous states of Chin and Shan and observed that almost half the population in Shan and three-quarters in Chin were multidimensionally poor, and multidimensional poverty is negatively associated with education. They urged the need for a geographical focus for poverty alleviation in Myanmar.

In the Philippines, studies on the distribution of economic well-being using data from the Family Income and Expenditure Surveys (FIES) include Ching (1991), Estudillo (1997), Balisacan and Pernia (2002), Balisacan and Fuwa (2003, 2004), Pernia (2008), Son (2008), Mapa et al. (2009), and Seriño (2014). Among these studies, Ching (1991), Estudillo (1997), and Seriño (2014) analyzed the roles of household attributes in income inequality using the one-stage Theil decomposition method. Using data from the 1985 FIES, Ching (1991) considered location, education, age, gender, and household size as major determinants of income inequality and found that income disparity across educational groups of household head was the largest contributor to overall income inequality by accounting for 39% of overall inequality as measured by the Theil index *T*. On the other hand, Estudillo (1997) used data from the 1971 and 1991 FIES in addition to the 1985 FIES to analyze the roles of location, education, and age in income inequality and obtained results similar to Ching (1991), where the contribution of income disparity across educational groups of household head was the largest amounting to 25–35% of overall income inequality as measured by the Theil index *T*. Based on the 2000 and 2006 FIES, Seriño (2014) considered location, education, and age as main determinants of income inequality in Eastern Visayas, one of the 13 regions of the Philippines. The study found that the contribution of income disparity across educational groups of household head was very large at around 40% of overall inequality as measured by the Theil index *T*.

6.3 Method and The Data

6.3.1 Methods

Decomposition of Education Gini Coefficient by Location (Urban and Rural Sectors)

To examine educational inequality, we conduct an inequality decomposition analysis by urban and rural sectors using the Gini coefficient. Unlike the Theil index T, the Gini coefficient fails to decompose additively into within- and between-group components since an extra term emerges if the distributions of educational attainment for the urban and rural sectors overlap. Nevertheless, we employ the Gini coefficient to conduct a decomposition analysis of educational inequality by urban and rural sectors, since there is a certain overlap between the urban and rural sectors in the distribution of educational attainment, and it is interesting to know how this overlap evolves with the expansion of education.

Suppose that there are N households in a country, who are classified into the urban and rural sectors (sectors 1 and 2, respectively), the educational level of a household is measured by the number of years of education completed by its household head. We let e_{ih}, μ, and N_i be the number of years of education of household h in sector i, the mean number of years of education of all households, and the total number of households in sector i.[2] Then, overall educational inequality can be measured by the following Gini coefficient.

$$G = \frac{1}{2N^2\mu} \sum_{i=1}^{2} \sum_{j=1}^{2} \sum_{h=1}^{N_i} \sum_{k=1}^{N_j} \left| e_{ih} - e_{jk} \right| \tag{6.1}$$

The education Gini defined by Eq. (6.1) can be additively decomposed into the within-sector Gini (G_{WS}), the between-sector Gini (G_{BS}), and the residual term (G_{R}) as follows (for details, see Lambert and Aronson 1993; Dagum 1997).

$$G = G_{\mathrm{WS}} + G_{\mathrm{BS}} + G_{\mathrm{R}} \tag{6.2}$$

In Eq. (6.2), G_{WS} is a weighted average of the Gini coefficients for the urban and rural sectors, which is given by:

$$G_{\mathrm{WS}} = \sum_{i=1}^{2} p_i s_i G_i,$$

[2]Table 6.15 in the Appendix presents the way how to determine the number of years of education completed by the head of household.

where p_i, s_i, and G_i are, respectively, the sector *i's* share of households, the sector *i's* share of the number of years of education, and the Gini coefficient of sector *i*. On the other hand, G_{BS} is the Gini coefficient that would be obtained if each household in a sector was given the mean number of years of education for the sector. G_{BS} is defined as:

$$G_{\mathrm{BS}} = \frac{1}{2N^2\mu}\sum_{i=1}^{2}\sum_{j=1}^{2}\sum_{h=1}^{N_i}\sum_{k=1}^{N_j}\left|\mu_i - \mu_j\right| = \frac{1}{2\mu}\sum_{i=1}^{2}\sum_{j=1}^{2}p_i p_j\left|\mu_i - \mu_j\right|$$

where μ_i is the mean number of years of education for sector *i*. We should note that the residual term, $G_{\mathrm{R}} = G - G_{\mathrm{WS}} - G_{\mathrm{BS}}$, is zero if the distributions of years of education for the urban and rural sectors do not overlap; but takes a positive value if they overlap.

Blinder-Oaxaca Decomposition Analysis

To analyze the extent to which educational endowments explain the difference in mean per capita expenditure between the urban and rural sectors, we perform a Blinder-Oaxaca decomposition analysis (Blinder 1973; Oaxaca 1973). Consider the linear regression model for the urban and rural sectors (sectors 1 and 2, respectively):

$$y_k = \boldsymbol{X}_k'\boldsymbol{\beta}_k + e_k \qquad E(e_k) = 0$$

where y_k, $\boldsymbol{X}_k$, $\boldsymbol{\beta}_k$, and e_k are, respectively, the natural log of per capita expenditure, a vector of explanatory variables, a vector of coefficients associated with explanatory variables, and the error term. If we let $\widehat{\boldsymbol{\beta}}_k$, $\widehat{\boldsymbol{\beta}}^*$, and $\overline{\boldsymbol{X}}_k$ be, respectively, a vector of the least-squares estimates for $\boldsymbol{\beta}_k$ obtained separately from the urban and rural samples, a vector of the least-squares estimates of the coefficients obtained from the pooled sample of urban and rural households, and the estimate for $E(\boldsymbol{X}_k)$, then the estimated urban-rural difference in mean per capita expenditure is given by:

$$\widehat{D} = \overline{y}_1 - \overline{y}_2 = \left(\overline{\boldsymbol{X}}_1 - \overline{\boldsymbol{X}}_2\right)'\widehat{\boldsymbol{\beta}}^* + \left(\overline{\boldsymbol{X}}_1'\left(\widehat{\boldsymbol{\beta}}_1 - \widehat{\boldsymbol{\beta}}^*\right) + \overline{\boldsymbol{X}}_2'\left(\widehat{\boldsymbol{\beta}}^* - \widehat{\boldsymbol{\beta}}_2\right)\right) \tag{6.3}$$

This is the twofold decomposition equation suggested by Neumark (1988). The first term in Eq. (6.3) is the part that is explained by urban-rural differences in the explanatory variables (endowments effect), while the second term is the unexplained part.

In the regression model, we include, as explanatory variables, years of education, age, age squared, household size, and gender. For Myanmar, another explanatory variable, unemployment, is added, while for the Philippines, another explanatory variable, agriculture, is added. Unemployment is a dummy variable, where unemployment for a household is given one if the household head is unemployed.

Agriculture is also a dummy variable, where agriculture for a household is given one if the household head is employed in the agricultural sector.

Two-Stage Hierarchical Decomposition of Expenditure Inequality by the Theil Index *T*

To investigate the roles of education in expenditure inequality in an urban-rural dual framework, we conduct a two-stage hierarchical inequality decomposition analysis by location and education using the Theil index *T*. In this analysis, all households are first classified into the urban and rural sectors and then, households in each of these sectors are classified into education groups.

We let y_{ijk}, Y, N_{ij} , and m be, respectively, the per capita expenditure of household k in education group j in sector i, total per capita expenditure of all households, the number of households in education group j in sector i, and the number of education groups. Then overall inequality in per capita expenditure is given by the Theil index T as follows:

$$T = \sum_{i=1}^{2} \sum_{j=1}^{m} \sum_{k=1}^{N_{ij}} \left(\frac{y_{ijk}}{Y}\right) \log\left(\frac{y_{ijk}/Y}{1/N}\right) \tag{6.4}$$

Next, we let Y_{ij} and Y_i denote, respectively, the total per capita expenditure of households in education group j in sector i and the total per capita expenditure of households in sector i. Then, the Theil index T in Eq. (6.4) can be decomposed hierarchically into the between-sector inequality component (T_{BS}), the within-sector between-group inequality component (T_{WSBG}), and the within-sector within-group inequality component (T_{WSWG}) as follows:

$$\begin{aligned} T &= T_{\mathrm{BS}} + \sum_{i=1}^{2} \left(\frac{Y_i}{Y}\right) T_i = T_{\mathrm{BS}} + \sum_{i=1}^{2} \left(\frac{Y_i}{Y}\right) T_{\mathrm{BG}} + \sum_{i=1}^{2} \sum_{j=1}^{m} \left(\frac{Y_{ij}}{Y}\right) T_{ij} \\ &= T_{\mathrm{BS}} + T_{\mathrm{WSBG}} + T_{\mathrm{WSWG}} \end{aligned} \tag{6.5}$$

where T_i, $T_{\mathrm{BG}i}$, and T_{ij} are, respectively, inequality within sector i, inequality between education groups in sector i, and inequality within education group j in sector i. Eq. (6.5) presents the two-stage hierarchical inequality decomposition equation for location and education (Akita and Miyata 2013).

We should note that the two-stage nested Theil decomposition method, developed by Akita (2003), is similar to Eq. (6.5). However, it is based on district-level GDP data rather than household-level data and considers a natural hierarchical structure, that is, region-province-district, in which each region is composed of a different set of provinces and each province consists of a different set of districts. By contrast, in Eq. (6.5), the urban and rural sectors have the same set of education groups.

In the two-stage hierarchical decomposition, the order of decomposition can be reversed, that is, overall inequality can be decomposed hierarchically into the between-group inequality component (T_{BG}), the within-group between-sector inequality component (T_{WGBS}), and the within-group within-sector inequality component (T_{WGWS}) as follows:

$$T = T_{BG} + T_{WGBS} + T_{WGWS} \tag{6.6}$$

We should note that T_{WGWS} in Eq. (6.6) is the same as T_{WSWG} in Eq. (6.5). In the hierarchical inequality decomposition method, therefore, the order of decomposition matters. In order to cope with this problem, Tang and Petrie (2009) proposed an alternative multivariate decomposition framework, that is, the nonhierarchical decomposition method, in which the Theil index is decomposed nonhierarchically, that is, simultaneously with respect to some nominal scaled variables such as location, education, gender, ethnicity, and age. In the context of inequality decomposition by location and education, the nonhierarchical decomposition equation is given by:

$$T = T_{BS} + T_{BG} + T_{ISG} + T_{WSWG} \tag{6.7}$$

where T_{ISG} is the sector-group interaction term. Since we have $T_{WSBG} = T_{BG} + T_{ISG}$ from Eqs. (6.5) and (6.7), the interaction term is obtained by $T_{ISG} = T_{WSBG} - T_{BG}$. We should note, however, that the nonhierarchical decomposition method is unable to examine the difference in the structure of educational attainment between the urban and rural sectors, even though it can suggest, based on an interaction term, the significance of the difference in educational endowments between them. In contrast, the hierarchical decomposition method can analyze the difference in the structure of educational attainment by performing a one-stage decomposition analysis by education for each sector.

6.3.2 The Data

Table 6.2 presents the sample sizes of nationwide household surveys in Indonesia, Myanmar, and the Philippines used by this study. It also provides the distribution of households across educational groups in urban and rural areas and the shares of urban and rural households.[3] The sample sizes are large enough to estimate inequalities by educational groups in urban and rural areas. In Indonesia, the National Socioeconomic Survey (*Susenas*) has been conducted by the Central Bureau of Statistics since 1963. This study analyzes data from the 2000, 2006, and 2011 *Susenas*. In Indonesia, households are classified into the primary, secondary, and

[3]The distributions of households are estimated using sampling household weights.

Table 6.2 Household surveys in Indonesia, Myanmar, and the Philippines

	Sample size			Distribution of households (%)		
	Urban	Rural	Total	Urban	Rural	Total
Indonesia						
2000						
Primary	32,053	87,015	119,068	45	78	64
Secondary	33,708	25,879	59,587	44	20	30
Tertiary	8168	2500	10,668	11	2	5
Total	73,929	115,394	189,323	100	100	100
Urban and rural shares				42	58	100
2006						
Primary	38,072	113,461	151,533	41	73	59
Secondary	47,973	47,047	95,020	47	24	34
Tertiary	12,193	4718	16,911	12	3	7
Total	98,238	165,226	263,464	100	100	100
Urban and rural shares				43	57	100
2011						
Primary	43,304	102,758	146,062	40	69	54
Secondary	53,520	46,127	99,647	47	28	37
Tertiary	16,573	6240	22,813	13	3	8
Total	113,397	155,125	268,522	100	100	100
Urban and rural shares				50	50	100
Myanmar						
2006						
No education	561	982	1543	3	6	5
Preprimary	4810	6387	11,197	26	44	38
Primary	4129	4078	8207	24	28	26
Secondary	6252	2592	8844	37	19	26
Tertiary	1847	358	2205	11	3	6
Total	17,599	14,397	31,996	100	100	100
Urban and rural shares				35	65	100
2012						
No education	506	637	1143	2	4	3
Preprimary	5416	7077	12,493	28	48	41
Primary	4411	4464	8875	26	32	30
Secondary	5557	1881	7438	32	14	20
Tertiary	2258	288	2546	12	2	5
Total	18,148	14,347	32,495	100	100	100
Urban and rural shares				34	66	100
Philippines						
2000						
Primary	7905	10,022	17,927	32	63	47
Secondary	8398	4298	12,696	37	27	32
Tertiary	7221	1771	8992	32	11	21

(continued)

Table 6.2 (continued)

	Sample size			Distribution of households (%)		
	Urban	Rural	Total	Urban	Rural	Total
Total	23,524	16,091	39,615	100	100	100
Urban and rural shares				49	51	100
2006						
Primary	4988	12,484	17,472	28	59	44
Secondary	6633	6109	12,742	39	29	34
Tertiary	5644	2621	8265	33	12	22
Total	17,265	21,214	38,479	100	100	100
Urban and rural shares				50	50	100

Note: The distribution of households is estimated using sampling household weights
Sources: *Susenas* in 2000, 2006, and 2011 for Indonesia, HIES in 2006 and 2012 for Myanmar, and FIES in 2000 and 2006 for the Philippines

tertiary education groups in terms of the education levels of their household heads.[4] The primary education group includes households whose heads have either no education, incomplete primary education, or primary education. The secondary group consists of households whose heads completed junior or senior secondary education, whereas the tertiary group includes households whose heads have completed 1-, 2-, or 3-year junior college (Diploma 1, 2, 3), 4-year university/college (Diploma 1 and bachelor's degree), master's degree, or doctor's degree program.

In Myanmar, the Household Income and Expenditure Survey (HIES) has been conducted every 4 to 6 years since 1997 by the Central Statistical Organization of the Ministry of Planning and Finance in collaboration with the United Nations Development Program.[5] This study uses data from the 2006 and 2012 HIES. In Myanmar, households are classified into five groups, that is, no education, preprimary, primary, secondary, and tertiary education groups since the no and preprimary education groups together constitute more than 40% of households. The preprimary education group includes households whose heads have no education but literate, monastic education or incomplete primary education. The secondary group includes households whose heads have junior or senior secondary education, while the tertiary group includes households whose heads have vocational education, bachelor's, master's, or doctor's degrees. It should be noted that in the HIES questionnaire, no distinction is made between bachelor's, master's, and doctor's degree programs.

In the Philippines, the Family Income and Expenditure Survey (FIES) has been undertaken every 3 to 6 years since 1957 by the National Statistical Office. This study uses data from the 2000 and 2006 FIES. Like Indonesia, households are classified into the primary, secondary, and tertiary education groups. The primary education group includes households whose heads have no education, preprimary

[4]See Table 6.15 in the Appendix for the classifications of households in Indonesia, Myanmar and the Philippines.

[5]Since 2015, the name of the survey has been changed to the Myanmar Living Condition Survey.

education, or primary education. The secondary group includes households whose heads have incomplete secondary or secondary education, while the tertiary group includes households whose heads have vocational education, bachelor's, master's, or doctor's degrees.

6.4 Empirical Results

6.4.1 Decomposition of Education Gini by Location (Urban and Rural Sectors)

Before examining the roles of education in expenditure inequality, it is instructive to analyze educational inequality since a positive relationship is likely to exist between educational inequality and expenditure inequality. Tables 6.3, 6.4 and 6.5 presents the result of the decomposition of education Gini by urban and rural locations.

In Indonesia, the mean level of educational attainment has increased steadily in both urban and rural areas (see Table 6.3). In 2000, the mean years of education in the urban and rural sectors were, respectively, 8.3 and 5.1 years; but they have increased gradually to 9.2 and 6.3 years in 2011. We should note that the speed of educational expansion has been faster in rural than urban areas; thus, the urban-rural ratio in mean years of education has declined to 1.46 in 2011 from 1.63. Nonetheless, a noticeable educational disparity still existed between the urban and rural sectors. Overall educational inequality has decreased gradually from 0.37 to 0.33. The expansion of secondary education appears to have not only reduced educational disparity between the urban and rural sectors but also educational inequality within the rural sector. Their combined contribution to overall educational inequality has thus declined from 60% to 49%. Meanwhile, the contribution of the residual term, which represents the overlap in the distribution of educational attainment between the urban and rural sectors, has risen from 21% to 25%. The urban sector has a much smaller educational inequality than the rural sector. Since its inequality has remained almost constant, its contribution to overall educational inequality has increased from 18% to 26%.

In Myanmar, one of the peculiar phenomena is that the preprimary and primary education groups have raised their population shares, while the secondary education group has lowered its share in both urban and rural sectors (see Table 6.2). As a result, the mean years of education have declined slightly from 5.6 years to 5.4 years. Due mainly to the expansion of preprimary and primary education, overall educational inequality has declined from 0.35 to 0.32. The expansion was more prominent in the rural sector than in the urban sector; thus, rural educational inequality has declined notably from 0.35 to 0.30. In 2012, it was slightly smaller than urban educational inequality since urban inequality has remained constant. However, since the rural sector had a much larger population share, rural inequality accounted for 35% of overall educational inequality. The contribution of the urban-rural disparity

Table 6.3 Decomposition of Educational Gini by location (urban and rural sectors), Indonesia

	Gini index	Absolute contribution	Relative contribution (%)	Population share (%)	Mean years of education
2000					
Urban sector (1)	0.297	0.068	18.3	42.2	8.3
Rural sector (2)	0.393	0.104	28.0	57.8	5.1
Within-sector (3) = (1) + (2)		0.172	46.4		
Between-sector (4)		0.120	32.4		
Urban and rural overlap (5)		0.079	21.2		
Total (6) = (3) + (4) + (5)	0.371	0.371	100.0	100.0	6.5
2006					
Urban sector (1)	0.279	0.065	19.2	43.3	8.8
Rural sector (2)	0.355	0.093	27.3	56.7	5.7
Within-sector (3) = (1) + (2)		0.158	46.5		
Between-sector (4)		0.106	31.1		
Urban and rural overlap (5)		0.076	22.4		
Total (6) = (3) + (4) + (5)	0.340	0.340	100.0	100.0	7.1
2011					
Urban sector (1)	0.291	0.086	26.0	49.9	9.2
Rural sector (2)	0.339	0.069	21.0	50.1	6.3
Within-sector (3) = (1) + (2)		0.155	47.0		
Between-sector (4)		0.093	28.2		
Urban and rural overlap (5)		0.082	24.8		
Total (6) = (3) + (4) + (5)	0.330	0.330	100.0	100.0	7.7

Source: Authors' calculation from *Susenas* in 2000, 2006 and 2011

to overall educational inequality has risen from 25% to 28%. By contrast, the contribution of the residual term, which shows the overlap in the distribution of educational attainment between the urban and rural sectors, has declined from 25% to 23%.

In the Philippines, the mean level of educational attainment has risen in both urban and rural areas, where the primary education group has lowered its population share while the secondary and tertiary groups have raised their shares (see Table 6.2). In 2000, the mean years of education in the urban and rural sectors were, respectively, 9.0 and 6.3 years; but they increased to 9.2 and 6.6 years in 2006. With the expansion of secondary education, urban and rural educational inequalities

Table 6.4 Decomposition of Educational Gini by location (urban and rural sectors), Myanmar

	Gini index	Absolute contribution	Relative contribution (%)	Population share (%)	Mean years of education
2006					
Urban sector (1)	0.313	0.047	13.5	34.9	7.0
Rural sector (2)	0.349	0.129	36.7	65.1	4.9
Within-sector (3) = (1) + (2)		0.176	50.3		
Between-sector (4)		0.086	24.6		
Urban and rural overlap (5)		0.088	25.2		
Total (6) = (3) + (4) + (5)	0.350	0.350	100.0	100.0	5.6
2012					
Urban sector (1)	0.310	0.046	14.1	34.0	6.9
Rural sector (2)	0.299	0.112	34.7	66.0	4.7
Within-sector (3) = (1) + (2)		0.158	48.8		
Between-sector (4)		0.091	28.2		
Urban and rural overlap (5)		0.074	23.0		
Total (6) = (3) + (4) + (5)	0.323	0.323	100.0	100.0	5.4

Source: Authors' calculation from HIES in 2006 and 2012

have both declined, though their contributions to overall inequality have remained almost constant, respectively, at 23% and 23–24%. Since the expansion of secondary and tertiary education was slightly faster in the rural than in the urban sector, urban-rural educational disparity has also decreased. Overall educational inequality has thus declined, though slightly from 0.29 to 0.28 by the Gini coefficient.

In sum, overall educational inequality has declined in all three countries over the study periods. In Indonesia, declining rural inequality induced by the expansion of secondary education contributed to reducing overall educational inequality, while in Myanmar, declining rural inequality induced by the expansion of preprimary and primary education contributed to the decrease in overall inequality. On the other hand, declining urban and rural inequalities brought about by the expansion of secondary education contributed equally to the reduction of overall inequality. In Indonesia, secondary education has expanded more rapidly in rural than in urban areas. This has not only reduced rural educational inequality but also narrowed educational disparity between the urban and rural sectors.

Table 6.5 Decomposition of Educational Gini by location (urban and rural sectors), the Philippines

	Gini index	Absolute contribution	Relative contribution (%)	Population share (%)	Mean years of education
2000					
Urban sector (1)	0.232	0.067	23	49	9.0
Rural sector (2)	0.320	0.068	23	51	6.3
Within-sector (3) = (1) + (2)		0.134	46		
Between-sector (4)		0.089	31		
Urban and rural overlap (5)		0.067	23		
Total (6) = (3) + (4) + (5)	0.290	0.290	100	100	7.6
2006					
Urban sector (1)	0.218	0.063	23	50	9.2
Rural sector (2)	0.308	0.065	24	50	6.6
Within-sector (3) = (1) + (2)		0.128	46		
Between-sector (4)		0.083	30		
Urban and rural overlap (5)		0.065	24		
Total (6) = (3) + (4) + (5)	0.275	0.275	100	100	7.8

Source: Authors' calculation from FIES in 2000 and 2006

6.4.2 *Blinder-Oaxaca Decomposition Analysis*

We found in the previous subsection that the expansion of compulsory education appears to have reduced overall educational inequality in all three countries. In this subsection, we analyze the role of education in urban-rural disparity in mean per capita expenditure using the Blinder-Oaxaca decomposition method. Tables 6.6, 6.7 and 6.8 present the result. In all three countries, the urban-rural difference of educational endowments has been the major determinant of urban-rural difference in mean per capita expenditure as it accounted for around 30–40% of the expenditure difference. This suggests that narrowing urban-rural educational gap is the key to reduce the expenditure disparity. As discussed previously, primary education has been compulsory in all three countries; thus, its gross enrollment ratio has exceeded 100%. However, many rural households have completed only primary education or less. Particularly in Myanmar, more than half of rural households have not completed primary education. Thus, promoting and strengthening primary education is essential in rural Myanmar to decrease urban-rural educational gap; this would in turn reduce urban-rural expenditure disparity. On the other hand, in Indonesia and the Philippines, promoting and strengthening secondary education is necessary in

Table 6.6 Blinder-Oaxaca decomposition of urban-rural difference in mean per capita expenditure, Indonesia

	Coefficient	*z* value	Contribution (%)
2000			
Differential			
Prediction for urban	11.923	5880.5	
Prediction for rural	11.523	8705.5	
Difference	0.400	165.4	100.0
Explained part			
Years of education	0.136	111.0	33.9
Age	−0.006	−6.3	−1.5
Age squared	0.004	5.6	0.9
Household size	−0.012	−11.7	−3.0
Gender	0.000	6.3	0.1
Total	0.122	80.3	30.5
Unexplained part			
Total	0.278	127.9	69.5
2006			
Differential			
Prediction for urban	12.751	6715.0	
Prediction for rural	12.280	10,000.0	
Difference	0.472	210.7	100.0
Explained part			
Years of education	0.143	128.7	30.3
Age	−0.012	−13.0	−2.5
Age squared	0.008	12.2	1.8
Household size	−0.006	−6.4	−1.2
Gender	0.000	3.1	0.0
Total	0.134	100.7	28.4
Unexplained part			
Total	0.338	169.3	71.6
2011			
Differential			
Prediction for urban	13.338	6679.1	
Prediction for rural	12.921	8858.1	
Difference	0.417	168.6	100.0
Explained part			
Years of education	0.176	134.8	42.3
Age	−0.013	−13.0	−3.1
Age squared	0.010	12.7	2.5
Household size	0.004	5.1	1.0
Gender	0.000	4.3	0.0
Total	0.178	122.0	42.8
Unexplained part			
Total	0.239	107.6	57.2

Source: Authors' calculation from *Susenas* in 2000, 2006 and 2011

Table 6.7 Blinder-Oaxaca decomposition of urban-rural difference in mean per capita expenditure, Myanmar

	2006			2012		
	Coefficient	*z* value	Contribution (%)	Coefficient	*z* value	Contribution (%)
Differential						
Prediction for urban	10.752	14,000		11.627	13,000	
Prediction for rural	10.589	20,000		11.249	20,000	
Difference	0.163	173		0.378	357	
Explained part						
Years of education	0.066	208	40.6	0.114	273	30.1
Age	0.008	22	4.6	0.047	75	12.5
Age squared	−0.005	−15	−3.0	−0.041	−67	−10.8
Household size	−0.003	−13	−1.8	0.005	19	1.3
Gender	0.000	3	0.1	−0.001	−12	−0.3
Unemployment	−0.012	−84	−7.2	0.000	10	0.0
Total	0.054	125	33.3	0.124	234	32.9
Unexplained part						
Total	0.109	116	66.7	0.254	239	67.1

Source: Authors' calculation from HIES in 2006 and 2012

rural areas to reduce urban-rural educational gap in addition to improving the quality of primary education.

6.4.3 *Hierarchical Decomposition of Expenditure Inequality by Location and Education*

Tables 6.9, 6.10 and 6.11 present, hierarchically, the results of an inequality decomposition analysis by urban and rural locations and an inequality decomposition analysis by educational groups in each of the urban and rural sectors, where the contributions are all measured against overall expenditure inequality rather than urban and rural expenditure inequalities.[6]

[6]Tables 6.16, 6.17 and 6.18 in the Appendix summarizes these results based on the hierarchical decomposition equation (Eq. 6.5). It also presents the result of a non-hierarchical decomposition analysis (Eq. 6.7).

Table 6.8 Blinder-Oaxaca decomposition of urban-rural difference in mean per capita expenditure, the Philippines

	2000			2006		
	Coefficient	*z* value	Contribution (%)	Coefficient	*z* value	Contribution (%)
Differential						
Prediction for urban	10.062	2027.4		10.445	1803.4	
Prediction for rural	9.448	1893.7		9.768	2211.7	
Difference	0.614	87.3		0.676	92.9	
Explained part						
Years of education	0.216	55.6	35.1	0.218	56.5	32.2
Age	−0.004	−1.3	−0.7	−0.013	−4.5	−1.9
Age squared	0.004	1.8	0.7	0.007	4.0	1.1
Agriculture	0.114	40.0	18.6	0.105	40.4	15.5
Household size	0.002	0.9	0.4	0.008	3.1	1.2
Gender	0.004	7.1	0.6	0.005	7.6	0.7
Total	0.336	62.7	54.7	0.329	62.3	48.7
Unexplained part						
Total	0.278	44.4	45.3	0.347	55.0	51.3

Source: Authors' calculation from FIES in 2000 and 2006

Indonesia

In Indonesia, overall expenditure inequality has increased prominently from 0.20 to 0.32 over the study period (see Table 6.9). According to the expenditure shares of decile groups, the richest decile group has raised its expenditure share significantly from 26.8% in 2000 to 32.2% in 2011, while most other decile groups lost their shares (see Table 6.19 in the Appendix). According to Table 6.1, the economic growth was not high in Indonesia compared to other ASEAN countries, but it has favored the richest segment of the population disproportionately. While poverty incidence has declined, the growth in this period was not pro-poor in the strict sense (Kakwani and Pernia 2000; De Silva and Sumarto 2014).[7] Like other Asian countries, the urban sector has a much larger expenditure inequality than the rural sector due to the heterogeneous nature of its economy accommodating a wide variety of job opportunities (Eastwood and Lipton 2004). During the study period, urbanization has proceeded rapidly; in 2000, the urban sector accounted for 42% of all households, but its share has risen to 50% in 2011 (see Table 6.2). Due in part to the rising share of urban households, the level and trends of overall inequality resemble very closely those of urban inequality. Meanwhile, expenditure disparity between the urban and rural sectors was not large. After increasing to 0.044 in 2006 from 0.030 in

[7]Growth is strictly pro-poor if it is accompanied by the reduction of inequality.

Table 6.9 Decomposition of Expenditure Inequality by location and education, Indonesia

	Theil *T*	Contribution (%)	Expenditure share (%)		Theil *T*	Contribution (%)	Expenditure share (%)
2000							
Total (1) = (2) + (3)	0.200	100.0	100.0				
B-sector (2)	0.030	14.9					
W-sector (3) = (a) + (d)	0.171	85.1					
Urban (a) = (c) + (d)	0.220	59.7	54.4	Rural (d) = (e) + (f)	0.112	25.4	45.6
B-group (c)	0.035	9.6		B-group (e)	0.006	1.2	
W-group (d)	0.185	50.1		W-group (f)	0.106	24.2	
Primary	0.148	14.1	19.1	Primary	0.101	17.1	33.9
Secondary	0.195	24.7	25.4	Secondary	0.117	6.1	10.4
Tertiary	0.230	11.2	9.8	Tertiary	0.156	1.0	1.3
2006							
Total (1) = (2) + (3)	0.248	100.0	100.0				
B-sector (2)	0.044	17.7					
W-sector (3) = (a) + (d)	0.204	82.3					
Urban (a) = (c) + (d)	0.251	58.7	58.1	Rural (d) = (e) + (f)	0.139	23.6	41.9
B-group (c)	0.051	11.9		B-group (e)	0.010	1.7	
W-group (d)	0.200	46.8		W-group (f)	0.129	21.9	
Primary	0.170	11.7	17.1	Primary	0.115	13.3	28.6
Secondary	0.190	21.5	28.1	Secondary	0.154	7.2	11.6
Tertiary	0.263	13.6	12.9	Tertiary	0.197	1.4	1.8
2011							
Total (1) = (2) + (3)	0.322	100.0	100.0				
B-sector (2)	0.034	10.5					
W-sector (3) = (a) + (d)	0.288	89.5					
Urban (a) = (c) + (d)	0.330	64.5	62.9	Rural (d) = (e) + (f)	0.217	25.0	37.1

B-group (c)	0.076	14.8		B-group (e)	0.019	2.2	
W-group (d)	0.255	49.7		W-group (f)	0.198	22.8	
Primary	0.232	11.8	16.4	Primary	0.183	12.9	22.6
Secondary	0.241	22.3	29.8	Secondary	0.216	8.2	12.2
Tertiary	0.301	15.6	16.6	Tertiary	0.242	1.8	2.4

Source: Authors' calculation from *Susenas* in 2000, 2006 and 2011

Table 6.10 Decomposition of Expenditure Inequality by location and education, Myanmar

	Theil *T*	Contribution (%)	Expenditure share (%)		Theil *T*	Contribution (%)	Expenditure share (%)
2006							
Total (1) = (2) + (3)	0.400	100.0					
B-sector (2)	0.006	1.6					
W-sector (3) = (a) + (d)	0.393	98.4					
Urban (a) = (b) + (c)	0.468	47.0	40.2	Rural (d) = (e) + (f)	0.344	51.4	59.8
B-group (b)	0.026	2.6		B-group (e)	0.006	1.0	
W-group (c)	0.442	44.4		W-group (f)	0.337	50.4	
No education	0.789	1.8	0.9	No education	0.267	1.7	2.5
Preprimary	0.382	7.7	8.1	Preprimary	0.354	22.3	25.2
Primary	0.326	6.8	8.3	Primary	0.301	12.5	16.6
Secondary	0.432	17.2	16.0	Secondary	0.360	11.9	13.2
Tertiary	0.630	10.9	7.0	Tertiary	0.361	2.0	2.2
2012							
Total (1) = (2) + (3)	0.520	100.0					
B-sector (2)	0.028	5.3					
W-sector (3) = (a) + (d)	0.492	94.7					
Urban (a) = (b) + (c)	0.574	49.9	45.3	Rural (d) = (e) + (f)	0.425	44.8	54.7
B-group (b)	0.038	3.2		B-group (e)	0.013	1.5	
W-group (c)	0.536	46.7		W-group (f)	0.412	43.3	
No education	0.339	0.4	0.6	No education	0.928	3.4	1.9
Preprimary	0.446	7.9	9.2	Preprimary	0.447	20.1	23.5
Primary	0.537	10.9	10.5	Primary	0.315	10.7	17.7
Secondary	0.498	15.3	15.9	Secondary	0.364	6.8	9.7
Tertiary	0.710	12.2	9.0	Tertiary	0.604	2.3	2.0

Source: Authors' calculation from HIES in 2006 and 2012

Table 6.11 Decomposition of Expenditure Inequality by location and education, the Philippines

	Theil *T*	Contribution (%)	Expenditure share (%)		Theil *T*	Contribution (%)	Expenditure share (%)
2000							
Total (1) = (2) + (3)	0.438	100.0	100.0				
B-sector (2)	0.076	17.3					
W-sector (3) = (a) + (d)	0.362	82.7					
Urban (a) = (c) + (d)	0.404	63.4	68.7	Rural (d) = (e) + (f)	0.270	19.3	31.3
B-group (c)	0.098	15.4		B-group (e)	0.052	3.7	
W-group (d)	0.306	48.0		W-group (f)	0.219	15.6	
Primary	0.244	7.2	13.0	Primary	0.192	7.0	16.0
Secondary	0.212	9.5	19.7	Secondary	0.212	4.2	8.8
Tertiary	0.380	31.2	36.0	Tertiary	0.292	4.4	6.6
2006							
Total (1) = (2) + (3)	0.391	100.0	100.0				
B-sector (2)	0.068	17.4					
W-sector (3) = (a) + (d)	0.323	82.6					
Urban (a) = (c) + (d)	0.343	59.5	67.8	Rural (d) = (e) + (f)	0.281	23.1	32.2
B-group (c)	0.076	13.1		B-group (e)	0.063	5.2	
W-group (d)	0.267	46.4		W-group (f)	0.218	17.9	
Primary	0.227	6.7	11.5	Primary	0.190	7.1	14.7
Secondary	0.247	13.9	22.0	Secondary	0.213	5.2	9.6
Tertiary	0.294	25.8	34.3	Tertiary	0.278	5.6	7.8

Source: Authors' calculation from FIES in 2000 and 2006

2000, it has declined to 0.034 in 2011, due in part to declining urban-rural disparity in educational endowments (see Table 6.3). The contribution of the between-sector inequality to overall inequality has thus declined to 10.5% in 2011 from 17.7% in 2006 (see Table 6.9).[8] In 2011, 90% of overall inequality was due to inequalities within the urban and rural sectors.

To further explore the determinants of inequalities within the urban and rural sectors, we conducted a Theil decomposition analysis by educational groups in each sector. According to Table 6.9, there is a notable difference between the urban and rural sectors in the contribution of disparity between educational groups. In urban areas, expenditure disparity between educational groups was a prominent contributor to overall inequality, but not in rural areas. Expenditure disparity between educational groups has risen in both urban and rural areas. Particularly, the urban sector increased its between-group disparity notably from 0.035 to 0.076. The contribution of urban sector's between-group disparity has thus risen from 9.6% to 14.8% (see Table 6.9). In both urban and rural areas, higher educational group tends to have a larger within-group inequality. In 2011, the tertiary education group had the highest within-group inequality at 0.30 in urban areas, which is followed by the secondary and primary education groups, respectively, at 0.24 and 0.23. The contribution of tertiary group's inequality in urban areas has increased from 11.2% to 15.6%. In sum, the rise in overall expenditure inequality is due mainly to the rise in disparity between educational groups and tertiary group's inequality in urban areas. Their combined contribution has increased notably from 20.8% (= 9.6% + 11.2%) in 2000 to 30.4% (14.8% + 15.6%) in 2011.

Since junior secondary education was made compulsory in 1994, secondary education has expanded prominently. According to Fig. 6.1, the GER of secondary education has increased from 55.5% in 2001 to 79.1% in 2011. Tertiary education has also expanded very rapidly, with the labor market requiring more formal professional qualifications and demanding a more skilled workforce (Hill and Wie 2013). According to Fig. 6.2, the GER of tertiary education was 14.2% in 2001; but it increased prominently to 26.3% in 2011. The expansion of secondary and tertiary education, particularly in urban areas, appears to have played an important role in the rise of overall expenditure inequality by raising not only disparity between educational groups but also inequalities within the tertiary education group.

Based on the 2011 *Susenas*, Table 6.12 presents the distribution of households according to occupation in each of the three educational groups. In the tertiary education group, about 8.5% of urban households are engaged in the information/communication and finance/real estate sectors. This share is much larger than the shares in the primary and secondary education groups (0.3% and 2.4%, respectively). These two sectors have been growing very rapidly; their annual average GDP growth rates, respectively, at 21.1% and 6.7% over the period 2000–2011, are much larger than the country's growth rate of 5.3%. Though not as rapid as the

[8]The between-sector inequality refers to expenditure disparity between the urban and rural sectors, while the between-group disparity refers to expenditure disparity between educational groups.

Table 6.12 Distribution of Households According to Occupations in Each Educational Group in 2011 in Indonesia

	Urban sector					Rural sector					
	Mean PCE (1000 Rp.)	Primary (%)	Second. (%)	Tertiary (%)	Total (%)	Mean PCE (1000 Rp.)	Primary (%)	Second. (%)	Tertiary (%)	Total (%)	GDP growth rate 2000–2011 (%)
Agriculture	476	28.3	7.5	3.1	14.8	421	67.5	47.3	13.5	59.7	3.5
Mining/ quarrying	1004	1.2	1.6	1.5	1.4	552	1.9	2.4	0.8	2.0	1.1
Manufacturing	785	11.2	18.5	8.7	14.4	471	6.1	8.1	2.8	6.6	4.6
Electricity/ gas/water	1098	0.1	0.9	1.0	0.6	592	0.1	0.3	0.3	0.2	7.7
Construction	633	11.9	9.2	5.2	9.7	432	6.9	8.1	1.5	7.1	6.9
Trade/hotel/ restaurant	836	24.3	27.0	17.2	24.7	566	9.6	13.6	8.4	10.7	6.3
Transportation	663	8.7	9.3	3.2	8.3	519	3.0	6.2	1.8	3.9	6.3
Information	1446	0.1	0.8	2.6	0.7	705	0.0	0.1	0.4	0.1	21.1
Finance/real estate	1315	0.2	1.6	5.8	1.6	832	0.0	0.5	1.5	0.2	6.7
Education services	1079	0.3	1.6	18.2	3.3	780	0.1	1.6	40.6	2.0	5.5
Health services	1282	0.3	0.8	3.2	0.9	879	0.1	0.4	3.5	0.3	
Government services	904	12.1	20.0	29.5	18.2	591	3.9	10.5	24.5	6.5	
Others	881	1.5	1.3	0.8	1.3	445	0.7	0.8	0.5	0.7	
Total	782	100.0	100.0	100.0	100.0	468	100.0	100.0	100.0	100.0	5.3

Note: Mean PCE refers to mean per capita expenditure
Source: Authors' calculation from *Susenas* in 2011 and Annual Statistics Indonesia in various years

Table 6.13 Decomposition of Expenditure Inequality by Education Subgroup in 2000 and 2011 in Indonesia: Tertiary Education in Urban Areas

	Inequality	Contribution (%)	Expenditure share (%)	Mean per capita exp. (1000 Rp.)
2000				
D1, D2, and D3	0.231	28.8	28.6	272
D4 and S1	0.216	62.4	66.4	321
S2 and S3	0.279	6.0	5.0	449
W-subgroup	0.223	97.2		
B-subgroup	0.007	2.8		
Total	0.230	100.0	100.0	309
2011				
D1, D2, and D3	0.403	29.0	21.6	1409
D4 and S1	0.260	58.2	67.0	1560
S2 and S3	0.287	10.9	11.4	2060
W-subgroup	0.294	98.1		
B-subgroup	0.006	1.9		
Total	0.300	100.0	100.0	1559

Note: D1, D2, D3, and D4 are, respectively, Diploma 1, 2, 3, and 4, while S1, S2, and S3 are, respectively, bachelor, master's, and doctoral degrees
Source: Authors' calculation from *Susenas* in 2000 and 2011

information/communication and finance/real estate sectors, the education, health, and government services sectors have also grown more rapidly than the country as a whole, and these services sectors have very large shares in the tertiary education group as compared to the primary and secondary groups. Due to growing demands for technical, managerial, and professional skills required for these services sectors, households in the sectors seem to have had increasingly high wages and salaries as they have much higher mean per capita expenditures than those in other sectors in 2011. These observations are indicative of the growing inequality within the tertiary education group.

The tertiary education group comprises three subgroups of households with respect to educational attainment levels: 1-, 2-, or 3-year junior college (subgroup 1: Diploma 1, 2, or 3); 4-year university/college (subgroup 2: Sarjana 1/Diploma 4); and master's or doctoral program (subgroup 3: Sarjana 2 or 3). Thus, we can further decompose its within-group inequality into inequalities within and between these three subgroups. Table 6.13 presents the result of this inequality decomposition in urban areas for 2000 and 2011. One of the major findings is that variations in mean per capita expenditure among the three subgroups are extremely small in urban areas. In 2011, the ratio between subgroups 1 and 3 in mean per capita expenditure was 1.5, while the ratio between subgroups 1 and 2 was 1.1. This implies that tertiary group's inequality in urban areas is due largely to inequalities within its subgroups. Particularly in 2011, subgroup 1 (Diploma 1, 2, or 3) had a large inequality at 0.40, a

significant increase from 0.23 in 2000. This seems to have contributed to the rise of expenditure inequality within the tertiary education group. Large inequalities within educational subgroups indicate that there are wide variations in the quality of education at the same education level.

Myanmar

In Myanmar, overall expenditure inequality was 0.40 in 2006, but increased notably to 0.52 in 2012 (see Table 6.10). Among Asian countries, this level of expenditure inequality is extremely high (Eastwood and Lipton 2004). According to the expenditure shares of decile groups, the richest decile group has raised its expenditure share significantly from 35.2% in 2006 to 38.6% in 2012, while most other decile groups lost their shares (see Table 6.20 in the Appendix). This indicates that rapid economic growth in this period has favored the richest segment of the population disproportionately, though it has lowered the incidence of poverty (see Table 6.1). The economic growth in this period (at more than 10%) was not pro-poor in the strict sense (Kakwani and Pernia 2000). Since the urban sector offers a wide variety of job opportunities, urban inequality was much larger than rural inequality (see Table 6.10). Both urban and rural inequalities have remained at a high level and have risen significantly. In both urban and rural sectors, only the richest group gained its expenditure shares, suggesting that high economic growth in this period has favored the richest segment of the population in both sectors (see Table 6.20).

Expenditure disparity between the urban and rural sectors was not large, though showing an increasing trend; by the Theil index T, it accounted for only 1.6% and 5.3% of overall expenditure inequality, respectively, in 2006 and 2012 (see Table 6.10). In other words, within-sector inequalities are mostly responsible for high overall expenditure inequality; thus, it is necessary to explore the factors of expenditure inequality within the urban and rural sectors. However, unlike many other Asian countries, where income or expenditure disparity between educational groups accounts for around 15–20% of overall inequality, expenditure disparity between five educational groups was very small in both urban and rural sectors by accounting, respectively, for 2–3% and 1–2% of overall expenditure inequality. As shown in Table 6.17 in the Appendix, the within-sector between-group inequality component (WSBG) accounted for 4.7% of overall expenditure inequality in 2012 (= 3.2% in urban +1.5% in rural). The combined contribution of the between-sector inequality component (BS) and the within-sector between-group inequality component (WSBG) was 10.0% (= 5.3% + 4.7%) in 2012 (see Table 6.17). In other words, 90% of overall expenditure inequality was due to the within-sector within-group inequality component (WSWG), where WSWG is the weighted average of expenditure inequalities within educational groups in the urban and rural sectors.

In the urban sector, the tertiary education group had the highest within-group expenditure inequality in 2012 at 0.71 and this was followed by primary at 0.54 and secondary at 0.50. They together accounted for 38.4% of overall expenditure inequality (= 10.9% + 15.3% + 12.2%). On the other hand, in the rural sector, the

combined contribution of expenditure inequalities within the preprimary and primary educational groups to overall inequality was 30.9% (= 20.2% + 10.7%). These observations suggest that to alleviate overall expenditure inequality, inequalities within these educational groups need to be reduced.

To further explore the determinants of expenditure inequality, a decomposition analysis by age groups, gender, and employment status is conducted in each of these educational groups. However, these household attributes are found to be insignificant in determining expenditure inequality in both urban and rural sectors. It should be noted that in the urban primary and secondary education groups, expenditure inequality increases as we move from younger to older age groups (see Table 6.14). In the urban tertiary educational group, no such tendency exists; but the oldest group (aged 61 and more) had the highest within-group inequality. These observations suggest that in urban areas, formal job opportunities are limited for older households and many of these households are likely to be unemployed or work in the informal sector.[9] In Myanmar, pension coverage is also very low, mainly because only civil servants and political and defense personnel receive pensions at present; thus, retired households in the private sector need to rely on their savings and/or children for livings. In the rural preprimary and primary education groups, the 51–60 age group had the highest expenditure inequality, and this is followed by the oldest group. The 51–60 age group accounted for one-third of expenditure inequality in the rural preprimary and primary groups. One of the reasons why expenditure inequality is high among older households in rural areas would be that land assets are not distributed equitably, and older landless households are less likely to be employed as laborers in agriculture.

The Philippines

In the Philippines, unlike Indonesia and Myanmar, overall expenditure inequality has declined notably from 0.44 to 0.39 over the study period (see Table 6.11). But this level of expenditure inequality is still high among Asian countries (Eastwood and Lipton 2004). According to the expenditure shares of decile groups, the richest decile group has lowered its expenditure share slightly from 36.1% in 2000 to 35.1% in 2006, while the other decile groups raised their shares (see Table 6.21 in the Appendix). According to Table 6.1, the country grew at around 4.5% in the study period. While the growth was not high among ASEAN countries, it was highly pro-poor (Kakwani and Pernia 2000).[10] Like other Asian countries, urban expenditure inequality has been much larger than rural inequality since the urban sector offers a wide variety of job opportunities (Eastwood and Lipton 2004). During the study period, urban inequality has declined prominently from 0.40 to 0.34, while

[9]According to the World Development Indicators, informal employment as a proportion of total non-agricultural employment was high at 83% in 2015.

[10]Economic growth is highly pro-poor if the growth is accompanied by the fall of inequality.

Table 6.14 Decomposition of Expenditure Inequality by age groups in the urban and rural sectors in 2012 in Myanmar

Urban sector									
	Primary			Secondary			Tertiary		
Age group	Theil *T*	Contribution (%)	Population share (%)	Theil *T*	Contribution (%)	Population share (%)	Theil *T*	Contribution (%)	Population share (%)
≤40	0.345	13	20	0.408	16	19	0.779	31	24
41–50	0.459	22	27	0.479	26	26	0.636	24	26
51–60	0.592	31	28	0.503	28	28	0.602	20	25
61≥	0.704	34	25	0.581	30	27	0.799	24	25
W-group	0.536	100		0.497	100		0.704	99	
B-group	0.001	0		0.001	0		0.006	1	
Total	0.537	100	100	0.498	100	100	0.710	100	100

Rural sector						
Age group	Preprimary			Primary		
	Theil *T*	Contribution (%)	Population share (%)	Theil *T*	Contribution (%)	Population share (%)
≤ 40	0.393	14	19	0.309	25	27
41–50	0.383	20	24	0.283	27	30
51–60	0.524	35	26	0.357	34	29
61 ≥	0.441	30	30	0.298	14	15
W-group	0.444	99		0.314	100	
B-group	0.003	1		0.001	0	
Total	0.447	100	100	0.315	100	100

Source: Authors' calculation from HIES in 2006 and 2012

rural inequality has risen slightly from 0.27 to 0.28. On the other hand, expenditure disparity between the urban and rural sectors has fallen from 0.076 to 0.068. However, the contribution of the between-sector expenditure inequality has remained constant at around 17% of overall inequality. In other words, more than 80% of overall inequality was due to inequalities within urban and rural areas.

To explore the determinants of inequalities within the urban and rural sectors, we conduct a Theil decomposition analysis by educational groups in each sector. Like Indonesia and Myanmar, there is a notable difference between the urban and rural sectors in the contribution of disparity between educational groups to overall expenditure inequality. In urban areas, expenditure disparity between educational groups was a prominent contributor to overall inequality; but its contribution has decreased from 15.4% to 13.1% (see Table 6.11). Unlike Indonesia and Myanmar, however, the contribution of the between-group expenditure inequality in rural areas was not negligible and has increased from 3.7% to 5.2%. The contribution of the within-sector between-group expenditure inequality (WSBG) has remained almost constant at around 18–19% (see Tables 6.11 and 6.18). In both urban and rural areas, higher educational group tends to have a larger within-group inequality. In 2006, the tertiary education group had the highest within-group inequality at 0.29 in urban areas, which is followed by the secondary and primary education groups, respectively, at 0.25 and 0.23. In rural areas, the tertiary group also had the highest within-group inequality at 0.28, which is followed by the secondary and primary education groups.

In urban areas, inequality in the tertiary education group has declined substantially from 0.38 to 0.29; thus, its contribution to overall inequality has decreased from 31.2% to 25.8% (see Table 6.11). We should note that in the Philippines, tertiary education's GER was relatively high at around 28–30% during the study period (see Fig. 6.2). The tertiary education group thus accounted for one-third of urban households (see Table 6.2). From these observations, the substantial reduction of overall expenditure inequality appears to have been due to decrease in inequality among urban households with tertiary education. On the other hand, inequality in the secondary education group has risen from 0.21 to 0.25; thus, its contribution to overall inequality has increased from 9.5% to 13.9%. Since expenditure inequalities among urban households with secondary and tertiary education play an important role in determining overall expenditure inequality, we further explore the determinants of these within-group inequalities by conducting an inequality decomposition analysis by age groups, gender, and marital status. However, these household attributes are not significant in determining the inequalities. We should note that in urban sector's secondary education group, inequality among female-headed households has increased notably from 0.24 to 0.32 by the Theil index T. Though female headed households accounted for 22% of urban households, this appears to have raised inequality among urban households with secondary education. In urban areas, around 60% of female household heads are either widowed or divorced, which was much larger than that of male household heads (4%). Female household heads are also much older than male heads. Female headed households with lower education are thus more vulnerable to economic shocks.

6.5 Conclusion

Using data from nationwide household surveys, this study investigated the roles of education in expenditure inequality in the following three ASEAN countries: Indonesia, Myanmar, and the Philippines. Since disparity between urban and rural areas is one of the main determinants of expenditure inequality and there is a large difference in the socioeconomic structure between urban and rural areas, an analysis was made in an urban-rural framework.

In all three countries, education plays an important role in determining expenditure disparity between the urban and rural sectors, since urban-rural difference in educational endowments accounted for around 30–40% of the difference in mean per capita expenditure. Thus, narrowing urban-rural educational gap is the key to the reduction of expenditure disparity between the urban and rural sectors. In Myanmar, about half of rural households have not completed primary education. This is true even for younger age groups, though primary education has been compulsory. Furthermore, due to insufficient government funding, schools are in poor condition, salaries for teachers are unattractive, and teachers need to manage large classes (Hayden and Martin 2013). Therefore, it is essential to strengthen primary education in rural areas to narrow the urban-rural educational gap. However, unlike Indonesia and the Philippines, the contribution of urban-rural expenditure disparity to overall expenditure inequality was not large. Additionally, in both urban and rural areas, the contribution of expenditure disparity between educational groups was not large either. Therefore, to alleviate overall expenditure inequality, inequalities within educational groups need to be reduced. In urban areas, expansion of secondary education is important given the nature of skills and knowledge required by urban sector jobs. On the other hand, formal job opportunities are limited for older households and many of these households are likely to be unemployed or work in the informal sector. Since older age groups tend to have larger expenditure inequalities in urban areas, the government needs to strengthen social safety net programs and raise pension coverage in the private sector.

In Indonesia and the Philippines, urban-rural expenditure disparity accounted, respectively, for 11% and 17% of overall expenditure inequality; thus, narrowing urban-rural educational gap could mitigate overall expenditure inequality by reducing expenditure disparity between the urban and rural sectors. Since a large proportion of rural households had only primary education or less even though primary and secondary education has been compulsory for many years, to reduce urban-rural educational gap, the government needs to improve the quality of primary education and reduce dropout rates at the primary level in rural areas.

In Indonesia and the Philippines, expenditure disparity between educational groups was large in urban areas by accounting for more than 10% of overall expenditure inequality. It is thus important to reduce expenditure disparity between educational groups in these two countries. To reduce the educational disparity in urban areas, the government needs to further improve the quality of primary and secondary education and reduce dropout rates at these education levels, thereby

raising the enrollment ratio of tertiary education. But, at the same time, the government needs to introduce policies that could reduce variations in quality among tertiary education institutions, since expenditure inequality among urban households with tertiary education was high compared to those with primary and secondary education. Since there seems to have been mismatches between the qualifications of university and college graduates and the needs of employers, the government should also introduce policies that could promote linkages between industry and academia to remove the mismatch. We should note that unlike Indonesia and Myanmar, in the Philippines, the rural sector had a relatively high expenditure disparity between educational groups. Particularly, the ratio of the tertiary to primary and secondary education groups in mean per capita expenditure was high. Thus, in rural Philippines, improving the quality of education and reducing dropout rate are important not only at the primary but also at the secondary education level.

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Appendix

Table 6.15 Years of Education

	Education	Years of education
Indonesia		
Primary	No education	0
	Incomplete primary education	3
	General and Islamic primary education	6
Secondary	General and Islamic junior secondary education	9
	General, Islamic, and vocational senior secondary education	12
Tertiary	Diploma I and II programs	13
	Diploma III programs	15
	Diploma IV or bachelor's degree programs	16
	Master's or doctor's degree programs	18
Myanmar		
No education	No education (illiterate)	0
Preprimary	No education (literate)	1
	Monastic education	2
	Incomplete primary education	4
Primary	Primary education	5
Secondary	Junior secondary education	9
	Senior secondary education	11

(continued)

Table 6.15 (continued)

	Education	Years of education
Tertiary	Vocational education	13
	Bachelor's, master's, and doctor's degree programs	14
Philippines		
Primary	No education	0
	Preprimary education	3
	Primary education	6
Secondary	Incomplete secondary education	8
	Secondary education	10
Tertiary	Technical and vocational education	12
	Bachelor's degree programs	14
	Master's or doctor's degree programs	16

Sources: *Susenas* for Indonesia, HIES for Myanmar, and FIES for the Philippines

Table 6.16 Hierarchical versus nonhierarchical decomposition of expenditure inequality, Indonesia

	Hierarchical decomposition		Nonhierarchical decomposition	
	Theil *T*	Contribution (%)	Theil *T*	Contribution (%)
2000				
Total	0.200	100.0	0.200	100.0
B-sector (BS)	0.030	14.9	0.030	14.9
B-group (BG)			0.038	19.0
Interaction term (ISG)			−0.016	−8.2
W-sector B-group (WSBG)	0.022	10.8		
W-sector W-group (WSWG)	0.149	74.3	0.149	74.3
2006				
Total	0.248	100.0	0.248	100.0
B-sector (BS)	0.044	17.7	0.044	17.7
B-group (BG)			0.057	23.2
Interaction term (ISG)			−0.024	−9.6
W-sector B-group (WSBG)	0.034	13.6		
W-sector W-group (WSWG)	0.171	68.7	0.171	68.7
2011				
Total	0.322	100.0	0.322	100.0
B-sector (BS)	0.034	10.4	0.034	10.4
B-group (BG)			0.075	23.4
Interaction term (ISG)			−0.021	−6.4
W-sector B-group (WSBG)	0.054	17.0		
W-sector W-group (WSWG)	0.233	72.6	0.233	72.6

Source: Authors' calculation from *Susenas* in 2000, 2006, and 2011

Table 6.17 Hierarchical versus nonhierarchical decomposition of expenditure inequality, Myanmar

	Hierarchical decomposition		Nonhierarchical decomposition	
	Theil T	Contribution (%)	Theil T	Contribution (%)
2006				
Total	0.400	100.0	0.400	100.0
B-sector (BS)	0.006	1.6	0.006	1.6
B-group (BG)			0.017	4.3
Interaction term (ISG)			−0.003	−0.9
W-sector B-group (WSBG)	0.014	3.4		
W-sector W-group (WSWG)	0.380	95.0	0.380	95.0
2012				
Total	0.520	100.0	0.520	100.0
B-sector (BS)	0.028	5.3	0.028	5.3
B-group (BG)			0.040	7.7
Interaction term (ISG)			−0.016	−3.0
W-sector B-group (WSBG)	0.024	4.7		
W-sector W-group (WSWG)	0.468	90.0	0.468	90.0

Source: Authors' calculation from HIES in 2006 and 2012

Table 6.18 Hierarchical versus nonhierarchical decomposition of expenditure inequality, the Philippines

	Hierarchical decomposition		Nonhierarchical decomposition	
	Theil T	Contribution (%)	Theil T	Contribution (%)
2000				
Total	0.438	100.0	0.438	100.0
B-sector (BS)	0.076	17.3	0.076	17.3
B-group (BG)			0.129	29.6
Interaction term (ISG)			−0.046	−10.5
W-sector B-group (WSBG)	0.083	19.0		
W-sector W-group (WSWG)	0.279	63.7	0.279	63.7
2006				
Total	0.391	100.0	0.391	100.0
B-sector (BS)	0.068	17.4	0.068	17.4
B-group (BG)			0.112	28.6
Interaction term (ISG)			−0.040	−10.3
W-sector B-group (WSBG)	0.071	18.3		
W-sector W-group (WSWG)	0.251	64.3	0.251	64.3

Source: Authors' calculation from FIES in 2000 and 2006

Table 6.19 Expenditure Shares of Decile Groups in Urban and Rural Sectors in Indonesia (in %)

	Urban			Rural			Total		
Decile	2000	2011	Change	2000	2011	Change	2000	2011	Change
1	3.6	2.8	−0.81	4.5	3.7	−0.83	3.8	3.0	−0.87

(continued)

Table 6.19 (continued)

	Urban			Rural			Total		
Decile	2000	2011	Change	2000	2011	Change	2000	2011	Change
2	4.8	3.7	−1.05	5.9	4.7	−1.14	5.1	3.9	−1.12
3	5.7	4.6	−1.11	6.8	5.6	−1.20	5.9	4.8	−1.14
4	6.5	5.5	−1.03	7.5	6.4	−1.10	6.7	5.6	−1.08
5	7.4	6.5	−0.89	8.4	7.4	−0.91	7.5	6.6	−0.94
6	8.4	7.8	−0.65	9.2	8.6	−0.65	8.5	7.8	−0.74
7	9.8	9.4	−0.33	10.3	10.0	−0.31	9.8	9.3	−0.45
8	11.6	11.8	0.17	11.8	11.9	0.15	11.5	11.5	−0.01
9	14.7	15.7	1.04	14.1	14.8	0.78	14.4	15.3	0.90
10	27.6	32.3	4.66	21.6	26.8	5.22	26.8	32.2	5.45
T20/B20	5.1	7.4		3.4	5.0		4.6	6.9	

Note: T20/B20 is the ratio of the share of the top 20% to the share of the bottom 20%
Source: Authors' calculation from *Susenas* in 2000 and 2011

Table 6.20 Expenditure shares of Decile Groups in urban and rural sectors in Myanmar (in %)

	Urban			Rural			Total		
Decile	2006	2012	Change	2006	2012	Change	2006	2012	Change
1	2.2	1.7	−0.43	2.4	2.3	−0.19	2.3	2.0	−0.34
2	3.3	2.8	−0.50	3.7	3.5	−0.27	3.6	3.1	−0.48
3	4.2	3.7	−0.47	4.7	4.3	−0.38	4.5	3.9	−0.57
4	5.1	4.7	−0.41	5.6	5.2	−0.42	5.4	4.8	−0.59
5	6.0	5.7	−0.36	6.6	6.2	−0.40	6.4	5.8	−0.54
6	7.2	6.9	−0.24	7.9	7.5	−0.41	7.6	7.0	−0.55
7	8.7	8.5	−0.15	9.4	9.0	−0.41	9.0	8.6	−0.41
8	11.0	10.7	−0.30	11.4	11.3	−0.11	11.2	11.1	−0.09
9	14.8	14.6	−0.19	15.1	15.5	0.38	15.0	15.1	0.14
10	37.6	40.7	3.04	33.1	35.3	2.23	35.2	38.6	3.43
T20/B20	9.5	12.1		7.8	8.9		8.5	10.6	

Note: T20/B20 is the ratio of the share of the top 20% to the share of the bottom 20%
Source: Authors' calculation from HIES in 2006 and 2012

Table 6.21 Expenditure Shares of Decile Groups in urban and rural sectors in the Philippines (in %)

	Urban			Rural			Total		
Decile	2000	2006	Change	2000	2006	Change	2000	2006	Change
1	2.1	2.2	0.09	3.0	3.0	0.02	2.1	2.2	0.06
2	3.3	3.4	0.12	4.2	4.1	−0.07	3.1	3.1	0.05
3	4.2	4.4	0.19	5.0	5.0	−0.09	3.9	4.0	0.07
4	5.1	5.4	0.25	5.9	5.8	−0.07	4.8	4.9	0.09
5	6.2	6.5	0.31	6.9	6.7	−0.11	5.9	6.0	0.11
6	7.5	7.8	0.29	8.0	7.9	−0.13	7.2	7.4	0.17

(continued)

Table 6.21 (continued)

	Urban			Rural			Total		
Decile	2000	2006	Change	2000	2006	Change	2000	2006	Change
7	9.2	9.5	0.31	9.6	9.4	−0.23	9.0	9.2	0.24
8	11.6	11.9	0.29	11.8	11.6	−0.23	11.6	11.8	0.27
9	15.7	16.0	0.24	15.6	15.5	−0.14	16.1	16.4	0.37
10	35.0	32.9	−2.10	30.1	31.1	1.05	36.5	35.1	−1.42
T20/B20	9.4	8.8		6.4	6.6		10.1	9.7	

Note: T20/B20 is the ratio of the share of the top 20% to the share of the bottom 20%
Source: Authors' calculation from FIES in 2000 and 2006

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Part IV
Conflict

Chapter 7
Spatial Spillover Effects: Domestic Violence in Nepal

Alice Louise Kassens and Yana van der Meulen Rodgers

Contents

Abstract One possible reason for the persistence of domestic violence in Nepal is a domestic violence spatial spillover effect in which the occurrence of domestic violence in one household or area impacts the incidence of domestic violence in a neighboring one. To test the hypothesis of a domestic violence spillover effect, we use the 2016 Nepal Demographic and Health Survey, including global positioning system (GPS) data, to provide a detailed assessment of the spatial relationship between neighboring households' opinions and incidence of domestic violence. Our a multivariate spatial autoregression model provides evidence of spatial spillover of less severe violence, the most common form of physical violence in Nepal, while controlling for other factors. Results suggest that focusing policy efforts to mitigate domestic violence in one area may reduce the incidence in neighboring areas, leading to an overall reduction across the country.

Keywords Nepal · Spatial spillover · Domestic violence · Violence against women

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7.1 Introduction

The end of Nepal's civil war in 2006 brought sweeping political, social, and economic changes, including improvements in women's economic empowerment as measured by greater employment, women's say in decision-making processes, and stronger attitudes against domestic violence (Menon and Rodgers 2015; Paudel and de Araujo 2017). Nepal's new government did not wait long to pass the 2008 Domestic Violence Act, which defined domestic violence (one of the most common types of gender-based violence) as any kind of abuse—physical, emotional, sexual, or economic—directed against one person in a family against another. The government also initiated a National Strategy and Action Plan to empower women and fight gender-based violence. Ending gender-based violence in Nepal had been a policy goal since the mid-1990s because of pressure from women's groups and some government bodies. However, it took the adoption of a human rights framework in Nepal's new constitution and the promotion of human rights by powerful political actors such as the Prime Minister for a domestic violence law to be implemented and a strategic plan for ending gender-based violence to be developed (Colombini et al. 2015).

Despite documented improvements in women's economic status and the legal efforts to end abuse within the home, gender-based violence in Nepal remains high. In 2016, 22% of all women of reproductive age had experienced some form of physical violence at least once since the age of 15, with almost one-half of those women reporting that the violence occurred sometimes or even frequently in the past year (Nepal Ministry of Health, New ERA, and ICF 2017). In addition, one quarter of all ever-married women reported that their husbands directed some form of violence—emotional, physical, or sexual—against them. Moreover, a 2014 report produced by the Informal Sector Service Center suggested that violence against women was on the rise (Nepal Ministry of Health, New ERA, and ICF 2017).

One possible reason for the persistence of domestic violence in Nepal despite the government's legal changes is that the country is characterized by a domestic violence spatial spillover effect in which the occurrence of domestic violence in one household or area impacts the incidence of domestic violence in a neighboring one. The assertion that spatial effects are associated with domestic violence in Nepal is supported with evidence in Tuladhar et al. (2013) that broad ecological zones in Nepal have a statistically significant association with the incidence of spousal violence in Nepal in 2011. Specifically, women living in Nepal's mountain and hill zones had lower odds of reporting domestic violence compared to women living in Nepal's lowland region. However, the study did not examine spillover effects within the ecological zones or within regions.

In principle, spatial effects can operate through a number of channels to increase the risk of gender-based violence, including cultural and social acceptance of such behavior, statutory laws and enforcement, and copycat actions from neighbor to neighbor. In a theoretical model of the determinants of domestic violence, Koenig et al. (2003) posit that community-level characteristics such as social norms,

economic development, and crime levels interact with individual- and household-level characteristics in impacting domestic violence. Because norms, development, and crime often vary within countries by geographical domains, the model implies that the determinants of domestic violence have an inherent spatial dimension. This implication is supported with evidence from Bangladesh that the risk factors in predicting domestic violence are conditioned by the socioeconomic and cultural environments where women live.

To test the hypothesis of a domestic violence spillover effect in Nepal, our study uses household data from the 2016 Nepal Demographic and Health Survey, including global positioning system (GPS) data, to provide a detailed assessment of the spatial relationship between neighboring households' opinions and incidence of domestic violence. Identifying a spillover effect is important for policy as it can, theoretically, work in reverse in efforts to reduce domestic violence. If proximate households do influence abusive behavior, then concentrating and targeting abuse reduction efforts may be a more efficient and cost-effective method than diluting and diffusing the efforts nationwide.

Research on domestic violence is particularly important during the Covid-19 pandemic. Emerging evidence suggests that domestic violence has increased in frequency and severity across countries; the United Nations Secretary-General reported that in some countries the number of calls for domestic violence support services has doubled. Indeed, researchers have found associations between a range of natural disasters and increases in domestic violence (Campbell 2020). Risk factors contributing to this increase include increased psychological and financial stress, social isolation, and increases in the amount of time that a victim must spend with their abuser as a result of shelter-in-place orders (Peterman et al. 2020). Much of this violence is perpetrated by men toward women. The results of this analysis will help in the design of evidence-based policies and programs that reduce risks and limit adverse effects during the Covid-19 aftermath.

7.2 Geospatial Patterns: Previous Evidence

Previous studies on gender-based violence have included geographic characteristics in their analyses and found them to matter. For example, Gracia et al. (2015) finds that neighborhood effects play an important role in the incidence of intimate partner violence in Spain. In particular, neighborhoods in the city of Valencia characterized by physical delay, low socioeconomic status, high rates of misdemeanors and crime, and a relatively large immigrant population experience a greater risk of intimate partner violence. The finding that intimate partner violence is spatially patterned rather than randomly distributed across the city suggests that prevention efforts can be more effectively targeted if they take into account neighborhood risk factors. As another example, distance to the nearest health facility is modeled as a determinant of the likelihood of reporting gender-based violence in Palermo et al. (2013) for a sample of 24 countries. For most countries, this measure is not a statistically

significant predictor for reporting gender-based violence. However, in two countries (India and Zimbabwe), as the distance increases, women are more likely to experience some type of gender-based violence.

Less research on gender-based violence has used spatial regression methods to explore spatial spillover effects. Such effects are not captured using traditional/non-spatial regression techniques. One exception is Habyarimana et al. (2018), which finds that in Rwanda there is substantial spatial variation in rates of domestic violence across districts as well as residual effects from one district to the next. In addition to the spatial variation, some of the largest risk factors for domestic violence include the husband's or partner's alcohol consumption, a lower level of education for the husband, polygamy, the woman's lack of property ownership, and the woman's use of contraception. Another exception is Miles-Doan (1998), a paper that accounts for spatial autocorrelation and finds that disadvantaged neighborhoods characterized by high concentrations of people living in poverty, male unemployment, and single parents are also associated with higher rates of intimate partner violence. The author suggests that at least some of the neighborhood effect is due to the concentration of resource deprivation, which heightens violent behavior between spouses and intimate partners.

Looking beyond gender-based violence, a growing number of studies in health and economics are using geospatial measures combined with multivariable regression analysis to examine how spatial dimensions affect outcomes of interest, including health, criminal activity, conflict, and macroeconomic aggregates such as tax rates, government spending, and economic growth. As an example of a geospatial analysis in health, Barankanira et al. (2016) use a spatial statistical approach applied to DHS data to examine HIV prevalence in Burundi. Although the overall HIV prevalence rate is 1.4% among adults, there is a high degree of spatial heterogeneity ranging from zero to 10%. The study's geostatistical approach accounts for both spatial autocorrelation and individual characteristics such as education, age, wealth, and sexual activity in estimating the determinants of HIV infection. Results from multivariate spatial logistic regressions indicate that after controlling for spatial heterogeneity, the largest determinants of HIV infection include being female, over the age of 35, sexually active, wealthy, and having a history of sexually transmitted infection. These results suggest targeting prevention efforts toward particular locations and populations.

Substantial spatial heterogeneity is also found in child mortality rates and key indicators of child and maternal health in 27 Sub-Saharan African countries (Burgert-Brucker et al. 2015; Pezzulo et al. 2016). Findings point to the importance of individual and household characteristics (such as birth intervals, maternal education, access to health care facilities, and stunting) and geospatial factors (such as malaria prevalence, average temperatures, and the variety of ethnic groups) in explaining variations in child mortality, which helps targeting health research and delivery of services.

Spatial patterns also apply to criminal activity. For example, previous research has found spillover effects in the success of community action programs in reducing violent assaults in Sweden. The programs use several strategies to reduce alcohol

consumption and train staff in conflict management across several municipalities. Results indicate that the indirect effect of the program on adjacent municipalities exceeds the direct impact within the municipality (Brännström et al. 2016). Another example of spatial spillover effects is the case of homicides across municipalities in Mexico. Flores and Rodriguez-Oreggia (2014) find a positive spillover effect on homicide rates attributable to law enforcement and the informal sector. Interestingly, these spillover effects are larger in magnitude in those municipalities exposed to military operations run jointly by the state and federal governments, implying that the military operations did not effectively reduce levels of violence in the targeted areas. Rather, these enforcement efforts actually contributed to the spread of crime to neighboring municipalities, implying that other actions are needed to prevent the diffusion of homicides (Flores and Rodriguez-Oreggia 2014).

There is a growing literature on spatial spillover effects in conflict at the country level, with numerous studies revealing that civil war is more likely to break out in a country if a neighboring country is already engaged in civil strife. In a review of this scholarship and a close exploration of this issue, Carmignani and Kler (2017) find a contagion effect if a country's neighbor is at war, and the contagion is more likely if the ethnic composition of their populations is similar and refugees are crossing the border. To prevent the diffusion of civil war, the authors recommend regional economic communities to promote trade and peace-keeping (Carmignani and Kler 2017). Closely related, political risk can also have cross-border effects and affect macroeconomic aggregates such as economic growth. Zallé (2017) reaches this conclusion in the case of 34 African countries and finds significant spatial interdependence of economic growth rates that is manifested through political risk. Government stability, religious tensions, and rents from natural resources impact not only individual country growth rates but also those of neighboring countries.

7.3 Data and Methodology

The statistical analysis is conducted using the 2016 Nepal Demographic and Health Surveys (NDHS), a large nationally representative sample of women aged 15–49 and members of their households. The NDHS surveys provide detailed information on woman's education, literacy, age, marital status, employment status, region of residence, religion, and ethnicity; and her husband's education, literacy, and use of alcohol. Importantly, the 2016 wave of the Nepal DHS also includes household spatial data. As shown in Figs. 7.1 and 7.2, Nepal is a landlocked country of almost 26.5 million people distributed across three ecological regions: Mountain, Hill, and Terai (lowlands) (Government of Nepal, Central Bureau of Statistics 2012). One of the geographical boundaries used in this analysis combines ecological and regional divisions, resulting in seven areas, defined by an indicator in the DHS data file and is common to analysis of Nepal. Henceforth, these geographical areas are called spaces, which are also differentiated at times by urban status: (1) Center Hill,

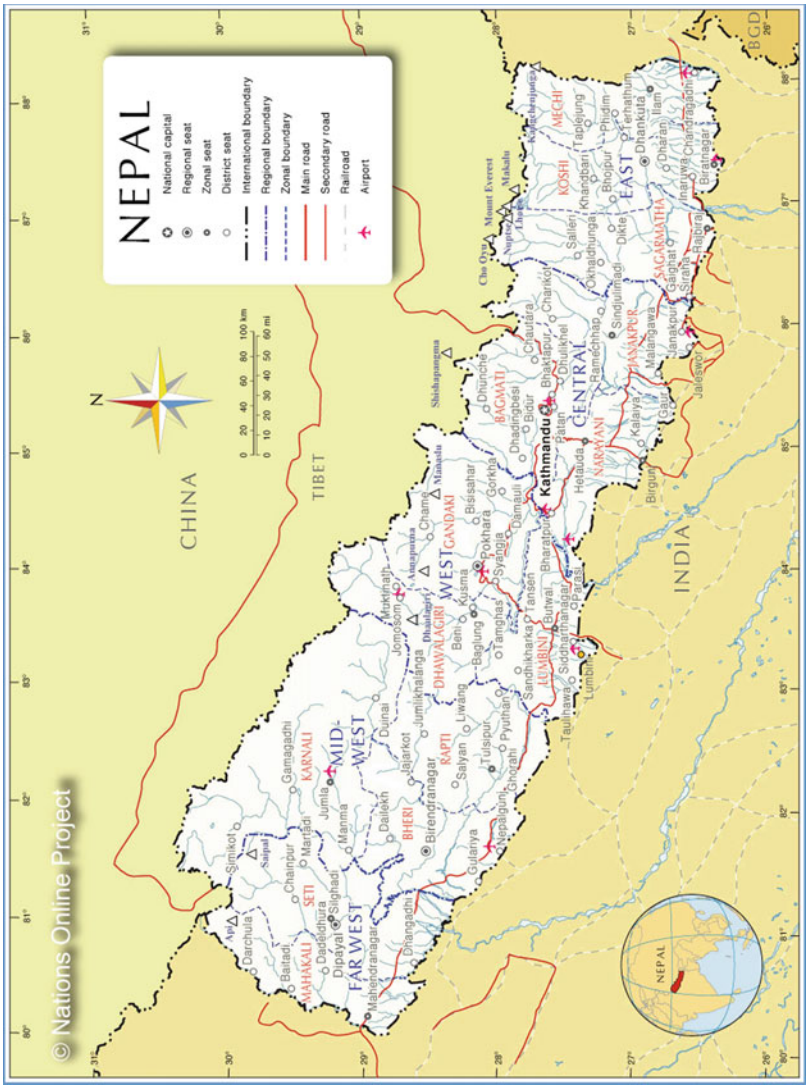

Fig. 7.1 Map of Nepal by region. (Source: (Nations Online Project n.d.))

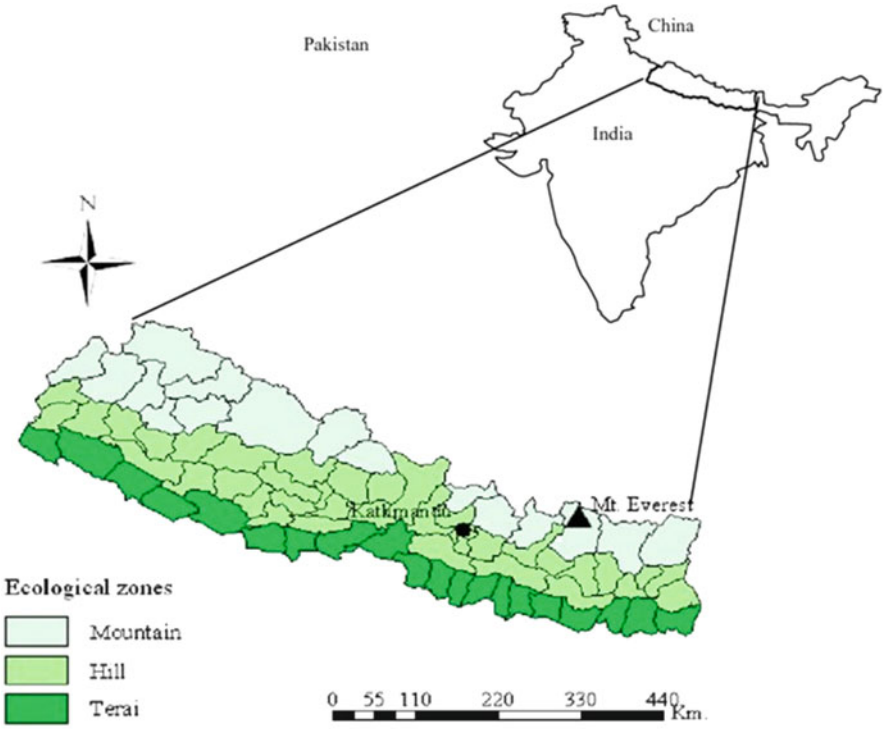

Fig. 7.2 Map of Nepal by ecological zones. (Source: (Chhetri 2009))

(2) Center Mountain, (3) Center Terai, (4) East Hill, (5) East Mountain, (6) East Terai, and (7) Far Western Hill.

The 2016 NDHS data also include a module on gender-based violence addressing physical, emotional, and sexual forms of violence. Our sample retains all women aged 15–49 who participated in the domestic violence module, amounting to 4447 observations. Following the precedent set in Palermo et al. (2013), we included both never married and ever-married women in the sample to examine the role of marital status as a determinant of domestic violence. Some questions were only asked of married women, so those samples are slightly smaller.

To reduce disclosure risk for participating households, all geocoded DHS datasets go through a masking process (Burgert et al. 2013). First, the households are aggregated into clusters, with each household in the cluster assigned the coordinates of the cluster centroid. Second, each cluster is geomasked by a displacement process, encompassing errors ranging from 0 to 2 km and 0 to 5 km in urban and rural areas, respectively. The displacement method is restricted to ensure that households remain within their country and regional borders. Clusters are another spatial division used in this analysis. However due to masking, it is not possible to use clusters when producing maps. Separate and precise publicly available GIS national and regional data is used for this purpose.

This paper utilizes cross-sectional, multivariate regression, grounded in a conceptual model of partner abuse with gender-specific levels of economic empowerment, to study the spatial nature of domestic violence. Spatial analysis permits the investigation of spatial heterogeneity and the identification of hotspots for domestic violence which is not possible in a standard statistical analysis using predetermined geographical boundaries, such as provinces and states. If spatial relationships are present and not accounted for, and those same relationships are correlated with an included explanatory variable, the estimated coefficients suffer from the omitted variable bias.

The methodology for this analysis is a multivariate spatial autoregression (SAR) model in which the proximity of domestic violence and related unobservable characteristics are explicitly included as determinants of domestic violence by geographic cluster. The SAR model is an extension of the linear regression model and permits various spatial effects on the outcome variable (Anselin 1988). For a full analysis and comparison, a standard regression including dummy variables for spaces and domestic violence rates within are also included.

The general one-period SAR model is:

$$D_{i,N} = \lambda \sum_{j=1}^{N} W_{i,N} D_{it,N} + \beta X_{i,N} + \theta \sum_{j=1}^{N} W_{i,N} X_{it,N} + \alpha + \varepsilon_{i,N} \tag{7.1}$$

where $\varepsilon_i = \rho \sum_{j=1}^{N} W_{i,N} \varepsilon_{it,N} + \mu_{i,N}$. D_i is an indicator of domestic violence in region i; X_i is a set of exogenous regressors including measures of economic empowerment, W_i is a spatial weight matrix equal to some positive number if cluster j is a neighbor of cluster i and zero if it is not or if $i = j$. The parameters λ, θ, and ρ are the spatial autoregressive parameters. Specifically, λW is the endogenous spatial interaction effect allowing other nearby outcomes to affect outcomes, θW is the exogenous spatial interaction effect allowing nearby covariates to affect outcomes, and ρW is the spatial autoregressive error effect allowing nearby errors to affect outcomes. The general model is adjusted by restricting λ, θ, and ρ. For example, the standard linear regression model implicitly sets these parameters equal to zero. If spatial spillovers exist and are associated with an included variable in X, then omitted variable bias exists.

In SAR models, the spatial weighting matrix, W, is specified prior to estimation. Because of the geomasking procedure used in the DHS, the model must rely on regional relationships (clusters) rather than exact points (households), without knowledge of potential shared borders. The spatial distance-weighting matrix is constructed as an inverse distance ratio for household clusters rather than a normalized contiguity matrix. The matrix W is scaled so that the largest eigenvalue is equal to 1 to avoid explosive solutions.

7.4 Summary Statistics

Table 7.1 shows summary statistics for our sample. Most women are married (78%), Hindu (86%), literate (68%), and have at least a primary level of schooling (65%.) Amongst married women, their husbands are on average more educated, as 88% have at least a primary level of schooling. Almost half of the husbands report drinking alcohol (44%.)

The analysis focuses on physical violence. Given the large number of questions pertaining to domestic violence, particularly in the domestic violence module, and the likelihood of significant correlation between the resulting variables, we aggregate measures via indexes. All ever-married women in the domestic violence module are asked several questions about physical violence perpetrated by their spouse

Table 7.1 Summary statistics, women in DHS domestic violence module

	# Obs. (unweighted)	% of sample (weighted)
Women characteristics		
Married	3710	0.776
Never married	619	0.198
Divorced/separated/widowed	118	0.026
Age, under 21	822	0.233
Age, 21–34	2177	0.446
Age, 35 or over	1448	0.321
Hindu	3901	0.860
Socioeconomic		
Education, at least primary	2822	0.654
Literate	3041	0.678
Wealth: first quintile	1023	0.173
Wealth: second quintile	932	0.194
Wealth: third quintile	893	0.207
Wealth: fourth quintile	871	0.222
Wealth: fifth quintile	728	0.204
Husband characteristics		
Education, at least primary	3869	0.875
Drinks alcohol	1809	0.443
Geographic indicators		
Center Hill	663	0.169
Center Mountain	689	0.201
Center Terai	603	0.213
East Hill	575	0.098
East Mountain	672	0.171
East Terai	641	0.058
Far Western Hill	604	0.089
Urban	2822	0.624

Note: Weight is the domestic violence weight provided by DHS. $N = 4447$

Table 7.2 Violence Index Means by Region in Nepal

	Less severe violence	Severe violence	Sexual violence
Nepal	0.227	0.100	0.070
Center Hill	0.186	0.090	0.063
Center Mountain	0.347	0.116	0.066
Center Terai	0.213	0.104	0.079
East Hill	0.119	0.066	0.044
East Mountain	0.240	0.117	0.083
East Terai	0.148	0.101	0.074
Far West Hill	0.189	0.076	0.079

including slapping, punching, kicking, strangling, burning, threatening/attacking with a weapon, and forced sex/sexual acts which are grouped into three categories: (1) less severe violence, (2) severe violence, and (3) sexual violence. The three physical violence variables are converted to the [0, 1] scale indicating the presence of any physical violence in the past 12 months and constitute our three physical violence indexes.

The values for the three violence indexes are shown in Table 7.2 for each space. Less severe physical violence is more common than severe and sexual violence and is most prevalent in the Mountains (East and Center). The lowest prevalence of less severe violence is in the East Hill and East Terai spaces. Severe and sexual violence is not only less common overall, but also consistently so across spaces. Those spaces with greater incidence of less severe violence also show the highest levels of severe and sexual violence.

Moran's I (I) is commonly used to test for global spatial autocorrelation (relationships between regions). Generally, the global I is defined as:

$$I = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij} z_i z_j}{\sum_{i=1}^{n} z_i^2} \tag{7.2}$$

where n is the number of regions, z_i is the standardized value of variable z in region i, and w_{ij} is the ijth element of a row-standardized spatial weight matrix (W). The metric is on the $[-1, 1]$ range, where a positive (negative) value indicates a positive (negative) spatial autocorrelation across the regions. In this analysis, a positive I indicates that a high (low) incidence of domestic violence in one cluster is associated with a high (low) incidence in neighboring clusters. A common null hypothesis is spatial randomization, or $I = 0$ where the test statistic is:

$$\text{Standardized Moran}'\text{s } I = \frac{I - E[I]}{\sqrt{Var[I]}} \tag{7.3}$$

A statistically significant value indicates spatial autocorrelation. Table 7.3 shows I for each domestic violence index. Both less severe and severe physical violence are

Table 7.3 Moran's *I* and Getis-Ord Statistic Summaries

		Getis-Ord (counts (%))	
	Moran's *I*	Cold	Hot
Less severe violence	0.265***	0 (0.0)	15 (3.9)
Severe violence	0.106*	0 (0.0)	20 (5.2)
Sexual violence	0.073	0 (0.0)	22 (5.7)
N	383	383	383

Note: ***, **, * denotes Moran's *I* significant at the 1%, 5%, and 10% levels, respectively. Hot and cold spots significant between 1% and 5% levels. An exponential spatial weight matrix is used for both Moran's *I* and the Getis-Ord statistics

positive and statistically significant supporting the idea that those clusters with high levels of these types of violence are proximate to others also with high levels of the same types of violence.

Another spatial correlation measure is the Getis-Ord $G_i^*(d)$ statistic which detects hot and cold spots from a local perspective (Kondo 2016). $G_i^*(d)$ is defined generally as:

$$G_i^*(d) = \frac{\sum_{j=1}^{N} w_{ij}(d)x_j}{\sum_{j=1}^{N} x_j} \tag{7.4}$$

where $w_{ij}(d)$is the ijth element of the spatial weight matrix w. This $w_{ij}(d)$ element is equal to 1 if $d_{ij} < d$ and 0 otherwise. The numerator is the local sum of variable x within a circle of d kilometers (radius) from the centroid of region i. The denominator is the sum of x for all regions. Thus the $G_i^*(d)$ statistic is the ratio of the local sum to the total sum for each region, and hot/cold spots are identified as spatial outliers. The standardized Getis-Ord is the equivalent of a z-value:

$$\text{Standardized}\, G_i^*(d) = \frac{G_i^*(d) - E\left[G_i^*(d)\right]}{\sqrt{Var\left[G_i^*(d)\right]}} \tag{7.5}$$

For statistically significant positive values of the standardized $G_i^*(d)$, the larger the z-score, the more the intense the clustering of high values or hot spots. Table 7.3 shows the number of hot and cold clusters in Nepal. There are no cold spots, but there is evidence of 15, 20, and 22 cases of less severe, severe, and sexual violence, respectively. Figure 7.3 shows how the hotspots for less severe and severe physical violence and sexual violence are distributed across regions in Nepal. The darker the color the "hotter" the spot is. The western part of the country has hotspots for all forms of violence. Central and Eastern Nepal also have considerable hot spots for severe physical and sexual violence. Western Nepal shows evidence of hot spots for these types of violence, but they are not as severe.

Table 7.4 defines the four combinations of Moran's *I* (positive or negative) and $G_i^*(d)$ (high or low) and their implications. For example, when Moran's *I* is positive

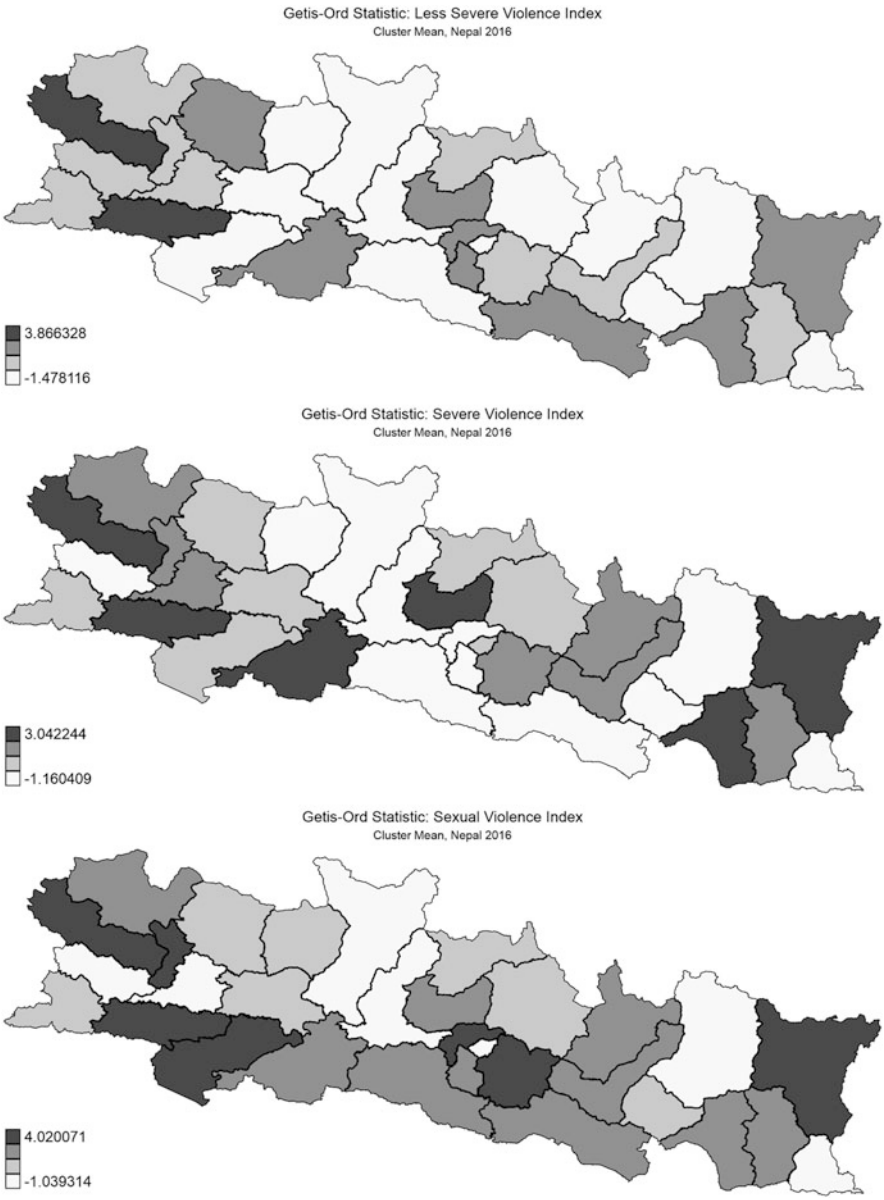

Fig. 7.3 Getis-Ord Statistics, 2016

and $G_i^*(d)$ is high, then high value observations (e.g., high incidence of domestic violence) tend to cluster together and their neighbors are similar. Closely related, when Moran's I is positive and $G_i^*(d)$ is low, then low value observations tend to cluster together and their neighbors are similar. Applying this interpretation of

Table 7.4 Combinations of Moran's *I* and Getis-Ord G(d) Statistics

		Moran's *I*	
		Negative	Positive
Getis-Ord G(d)	Low	Low value observations tend to cluster together, their neighbors are dissimilar	Low value observations tend to cluster together, their neighbors are similar
	High	High value observations tend to cluster together, their neighbors are dissimilar	High value observations tend to cluster together, their neighbors are similar

combinations of different values of Moran's *I* and $G_i^*(d)$, we now go back to our estimates in Table 7.3 for each violence index cluster mean in 2016. Moran's *I* is positive and statistically significant for two of the three measures of physical violence, and hotspots exist for each measure. The greatest number of hotspots exist for sexual violence although the associated Moran's *I* is not statistically significant. The interpretation is that the incidence of sexual violence is high and clustered together while neighbors tend to be neither similar nor dissimilar. In contrast, the least number of hotspots exist for less severe violence while it is for this type of physical violence that Moran's *I* has the largest magnitude and is measured with the most precision. Hence, there is a lower incidence of less severe violence among households that cluster together geographically, and their neighbors are similar.

7.5 Regression Results

Table 7.5 shows regression results for the three physical violence indexes using OLS and SAR models. Each model includes measures for female characteristics, socioeconomic status, and husband characteristics. The correlation coefficient between female literacy and educational status is 0.73 so only literacy is included in the regression to avoid collinearity. The OLS models include dummy variables for geographic spaces. The SAR models are estimated at the cluster level, using a dependent spatial lag (endogenous).

The less severe violence index models have greater explanatory power than the other two violence models. Female literacy and husband drinking are statistically significant across both models for less severe and severe violence, with the predicted sign: Literate women are less likely to be physically abused and women with husbands who drink are more likely to be physically abused. The less severe SAR model provides evidence of spatial spillover of less severe violence, the most common form of physical violence in Nepal, while controlling for other factors. This is stronger evidence than the spatial summary statistics discussed earlier.

Table 7.5 Regression Results: OLS and SAR

	Less severe violence index		Severe violence index		Sexual violence index	
	OLS	Spatial	OLS	Spatial	OLS	Spatial
Women characteristics						
Age, under 21	0.13	0.10	0.21**	0.14**	0.09	0.09*
Age, 21–34	0.00	−0.02	0.01	−0.01	−0.01	0.01
Hindu	−0.02	0.00	−0.03	−0.02	−0.04	−0.02
Socioeconomic						
Literate	−0.26***	−0.23***	−0.16***	−0.09***	−0.05	−0.02
Wealth: first quintile	−0.06	−0.10**	−0.03	−0.01	−0.09**	−0.07***
Wealth: second quintile	0.06	0.07	−0.02	−0.01	−0.06	−0.04
Wealth: third quintile	0.15**	0.13***	0.08**	0.08**	−0.01	−0.01
Wealth: fourth quintile	0.02	0.02	−0.02	0.01	−0.09**	−0.07*
Husband characteristics						
Education, at least primary	−0.19**	−0.22***	−0.02	−0.05	0.02	−0.03
Drinks alcohol	0.20***	0.15***	0.08***	0.08***	0.07**	0.09***
Geographic indicators						
Center Hill (urban)	0.06		0.04		0.02	
Center Hill (rural)	0.09**		0.05**		−0.01	
Center Mountain (urban)	0.10*		−0.02		−0.02	
Center Mountain (rural)	0.07		0.00		0.01	
Center Terai (urban)	0.14***		0.06**		−0.01	
Center Terai (rural)	0.04		0.01		0.01	
East Hill (urban)	0.03		0.02		−0.02	
East Hill (rural)	0.01		0.03		−0.01	
East Mountain (urban)	0.11**		0.05*		0.00	
East Mountain (rural)	0.09**		0.05*		0.01	
East Terai (urban)	0.09**		0.09***		0.03	
East Terai (rural)	0.01		0.02		0.02	
Farwest Hill (urban)	0.09*		0.03		0.04	
Spatial controls						
Spatial_dep		0.45**		0.45		0.10
(Pseudo)R^2	0.43	0.35	0.22	0.14	0.08	0.07
N	4444	383	4444	383	4444	383

Note: OLS uses cluster means of all variables for comparison with the spatial regressions
Note: ***, **, * significant at the 1%, 5%, and 10%, respectively. Results from 2016 NDHS

7.6 Conclusion

Understanding the extent to which there are spatial spillover effects helps to improve the effectiveness of policy efforts to reduce domestic violence. Focusing policy efforts in one area may reduce the incidence in neighboring areas, leading to an overall reduction across the country. Policies to educate men and women about the social, economic, and legal consequences of domestic violence can work to reduce the acceptance and justifiability of abusive behaviors. Spillover effects facilitate the spread of violence prevention efforts across households, which is crucial for curtailing and ending domestic violence in Nepal. If such policies lead to real changes in the patriarchal culture where physical abuse is accepted, fewer children will be exposed to environments in which their mothers are abused. It has been found that boy children with mothers who are abused are more likely to become abusers themselves in adulthood, while girl children are more likely to enter into abusive intimate relationships as adults (Kishor and Johnson 2004). Breaking that cycle is a step toward permanent reductions in violence against women in the home.

Policy efforts to address domestic violence are particularly relevant for the Covid-19 pandemic and its aftermath. Efforts to mitigate domestic violence as tensions mounted within households from the health crisis and associated economic insecurity should be prioritized. Domestic violence intensifies during disasters and crises (Bahn et al. 2020). The COVID-19 crisis is longer term, more people are confined to their homes, there is an uncertain endpoint, many are struggling financially, and people are scared and grieving. Even before Covid-19, domestic violence was a major public health issue, associated with a range of negative physical and mental health consequences (Ellsberg et al. 2008; Bonomi et al. 2009). Globally, one in three women are survivors of domestic violence (Garcia-Moreno et al. 2006). Despite the negative health consequences associated with DV, survivors are often unable to leave their abusive relationships due to a lack of finances and other resources (Fugate et al. 2005). In addition to being disproportionately impacted by DV, on average women are also less financially secure than men (Anderson et al. 2003). It is difficult to overstate the scale of this problem for those who are subject to abuse of all kinds. Our results imply that resources cannot be diverted away from shelters and care services that meet the needs of victims of abuse.

Such efforts can have important economic repercussions outside the home as well. A number of studies have linked domestic violence to women's productivity in the workforce. Macroeconomic effects of violence against women include a decrease in women's labor force participation rates. Evidence for India indicates that more violence against women is associated with lower labor force participation rates, where strong stigmas around sexual violence act as a disincentive for women travel to work. This effect is even stronger for women in patriarchal households characterized by domestic violence (Chakraborty et al. 2018).

More broadly, Nepal's objective of reducing gender-based violence is consistent with the United Nations' Sustainable Development Goals (SDGs). In fact, SDG#5 (out of a total 17 goals) calls for gender equality and the empowerment of women

and girls, including the specific target to "eliminate all forms of violence against all women and girls in public and private spheres, including trafficking and sexual and other types of exploitation," (Garcia-Moreno and Amin 2016). Moreover, SDG #16 calls for the promotion of peace, justice, and institutions for sustainable development, with the specific target of ending abuse and violence against children. This attention given to addressing all types of violence against women and girls, and violence against children, is unprecedented at the international level. There is mounting evidence regarding the link between achieving gender equality and empowering women and girls, poverty reduction, and sustainable economic growth. Crucial to attaining these SDGs is an integrated approach where social, economic, and political aspects are equally considered and addressed. Our results suggest that such an approach necessarily consider spatial effects in how households respond to education and policy reforms related to gender-based violence.

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Chapter 8
An Economic Analysis of Regional Conflict, Secession, and Bargaining Power Under Uneven Resource Distribution

Tohru Naito

Contents

Abstract This chapter analyzes the behavior of sovereign states and their regions when small regions with rich natural resources try to secede. When the region secedes from the sovereign, it is likely to benefit from the natural resources, but it will lose the benefits of the diversity of goods. The model in this chapter analyzes the problem of secession of a small region with a simple new economic geography model and shows that the decision of the small region with them to secede depends on the distribution of natural resource interests after secession.

Keywords Secession · Natural resources · Natural resource interests · Love of variety

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8.1 Introduction

The purpose of this chapter is to analyze the conditions wherein a minor region has the incentive to secede from its home country. A simple model is used for theoretical analysis of the relation between secession and the bargaining power of natural resources. Many regions have been constantly divided throughout human history. The Roman Empire and the Kingdom of the Franks were first divided into the Eastern and Western Roman Empires, respectively, and latter into France, Germany, and Italy. More recently, the East Timor Republic seceded from Portugal. Scotland, a part of Ukraine, and the Catalunya State have tried to secede from the United Kingdom, Ukraine, and Spain, respectively.

In East Asia we can see some conflicts caused by resources. For instance, China (Rep. of China) are in conflict with Philippines, Vietnam, and Japan as to some natural resources. In stark contrast, integration also occurs among countries, as was the case of West and East Germany. In terms of economic integration, European countries economically integrated to form the European Union (EU). In Japan, many municipalities have integrated since the twenty-first century. Integration and secession are attributable to political system, economy, culture, and religion.

Secession and independence issues are sometimes caused by the allocation of these undistributed resource interests. In fact, they have always been a cause of conflict. Consequently, when regions consider secession from a home country, the bargaining power of these beneficial resources are important factors. Generally, we think of minerals such as oil, coal, or iron when we hear the words “resources”. In this chapter, we use a wider concept because resources can contribute to the economic development of countries. Important properties of these resources considered in this study include their immobility and uneven distribution among regions, as owing to these reasons natural resources often become sources of conflict. These resources are immobile and generate benefits or tax revenue from tourists. Therefore, local governments cannot ignore them in terms of public finance and sustainable economic growth.

The government of a region has an incentive to secede from its home country if it can seize natural resources after secession. Collier and Hoeffler (1998, 2004) demonstrated that resource dependence exerted a strong curvilinear effect on the onset and duration of war or conflict. Brunnschweiler and Bulte (2009) examined the effects of resource abundance on the onset of conflict using empirical analysis. They showed that resource abundance lowered the risk of conflict via indirect income effects; however, resource dependence was not particularly addressed. These empirical results suggest that natural resources affect the behavior of secession and independence, but no discussion has been reported about the importance of the empirical studies.

Many theoretical studies have analyzed the issue of regional secession and integration. Some studies presented explanations of how borders or relative sizes of countries were endogenously determined. In political economics, Alesina and Spolaore (1997) authored a pioneer study addressing this issue. After they

considered how several countries were endogenously determined, they derived the stability condition of the examined countries' equilibrium. Furthermore, they assumed that population was a key factor in determining the number of countries. Moreover, the equilibrium number of countries was larger than that controlled by social planners who maximize the average utility of all countries. Bolton and Roland (1997) constructed a model of national integration and disintegration. They introduced a voting model into the secession decision and analyzed its related mechanisms. They reported that secession could occur in equilibrium when income distributions varied across regions and when the efficiency gains from unification were small. In such cases, no one has the incentive to secede when all production factors are mobile across a country.

Ohno (2018) introduced natural resources, considered as causing conflict among countries by Collier and Hoeffler (1998, 2004), into the political economics models of Alesina and Spolaore (1997) and Bolton and Roland (1997). Additionally, they analyzed the taxation policy of a major region to prevent the secession of a minor region. However, they specified the effects of agglomeration as an exogenous function and did not explain the microeconomic foundation clearly though Ohno (2018) considered population agglomeration and economies of scale. Buchanan and Faith (1987) or Bolton and Roland (1997) also deal with secession and refer to the "Internal exit", which is an alternative to the "Voting their feet". Moreover, Gregoire (2003) pointed out that Buchanan and Faith (1987) ignore the effect of secession on each private gross income. Their models, however, do not describe the cost of secession by the decreasing in the number of varieties under monopolistic competition model and consider the ubiquity of natural resources.

In terms of spatial economics, Krugman (1991), Ottaviano et al. (2002), Tabuchi (1998) and others using new economic geography models have contributed to the construction of the model clarifying how cities occur and populate, and how firms agglomerate in a particular region. These studies apply monopolistic competition with increasing returns to scale to regional models and thus clarify the mechanisms of regional agglomeration and dispersion. At the same time, they demonstrate that home–market effects result in regional agglomeration and that population size plays an important role in regional agglomeration. Whereas these studies contributed to explaining economic integration in cases such as the EU, they ignored the political aspects of determining borders. Furthermore, Takatsuka et al. (2015) analyzed the effects of natural resources on agglomeration or dispersion under a core–periphery model, but they did not incorporate the endogenous determination of borders.

We extend a model including natural resources that is similar to that of Ohno (2018) and Takatsuka et al. (2015), by altering a political economic model to incorporate secession. Results show that the government of a minor region does not consider secession from the home country when the interests of natural resources in the minor region are not strong. However, we also show that the government in a major region can deter secession in a minor region with bargaining power reflecting their interests in their ubiquitous natural resources.

The remainder of the chapter is organized as follows. Section 8.2 introduces the integrated economy as a benchmark. Section 8.3 describes construction of the

model, wherein a minor region secedes. Section 8.4 compares the equilibrium under an integrated economy with that under secession and presents the derivation of the condition wherein the government of a minor region chooses secession from the home country. Finally, we conclude the article and provide some possible extensions of this research in Sect. 8.5.

8.2 The Model

8.2.1 Integrated Economy

Households

First, as a benchmark, we analyze the case wherein an economy is integrated. To this end, we consider a country comprising two regions: region 1 and region 2. We assume that region 1 has a larger population than region 2. Therefore, we define regions 1 and 2 as major and minor regions, respectively. This economy employs two kinds of labor. Some are employed in the manufacturing goods sector, whereas the others are employed in the agricultural goods sector. Following Krugman (1991), Tabuchi (1998), and other new economic geography models, the number of workers employed in the manufacturing goods sector and that of the peasants employed in the agricultural goods sector are denoted as μL and $(1-\mu)L$, respectively. Both regions have a manufacturing goods sector and an agricultural goods sector denoted as X and Y, respectively. Moreover, the number of peasants in each region is fixed and given as $(1-\mu)L/2$.[1] Because we assume that region 1 is a major region, the number of workers in region 1 is larger than that in region 2. Let L_X^i represent the number of workers employed in the manufacturing goods sector of region $i(=1,2)$. We define θ as the ratio of workers in region 1 to the total number of workers in a country denoted by L, i.e., $L_X^1 = \theta\mu L$, $L_X^2 = (1-\theta)\mu L$, and $\theta > 1/2$. Akin to most core–periphery models, the manufacturing goods sector is differentiated under a monopolistic competition market. Let $s(m)$ represent the consumption of variety, m, of households. We regard agricultural goods as numeraire. In an integrated economy, both goods are transported between regions without any trade obstruction. We consider that natural resources exist in an integrated economy. Region 1 has more households than region 2; however, natural resources are unevenly distributed in region 2. They are owned by the central government that supervises both regions and provides benefits denoted by $\overline{R}$ under an integrated economy.[2] Because the central

[1] We do not consider movements of workers and peasants between sectors because we assume that workers employed in the agricultural goods sector have no skills to work in the manufacturing goods sector. Consequently, the respective sector's wages are not necessarily equivalent.

[2] For a simplification of analysis, we assume that the resources are not consumed in the economy. The central government, which manages resources, sells the resources outside of the country. Therefore, we deal with them as an exogenous parameter.

government owns the resources in an integrated economy, their benefit is evenly redistributed among all households regardless of the region. Furthermore, all households have a common preference regardless of the region, and all of them obtain utility via the consumption of differentiated manufacturing and agricultural goods. Because the variety of manufacturing goods is differentiated, we assume that its market has a monopolistic competition, as specified by Dixit and Stiglitz (Collier and Hoeffler 2004). Next, we specify the utility function of households in a country as follows:

$$U_i = \left(C_X^i\right)^{\mu}\left(C_Y^i\right)^{1-\mu}, \tag{8.1}$$

where C_X^i is given as

$$C_X^i \equiv \left[\int_0^N s(m)^{(\sigma-1)/\sigma} dm\right]^{\sigma/(\sigma-1)}, \quad \sigma > 1,$$

where $s(m)$ and N denote the consumption of variety m and the number of varieties, respectively. Each household has a unit of labor and inelastically supplies the same. When we designate w_j by the wage of sector $j(=X, Y)$, the budget constraint is given as

$$w_j^i + I = \int_0^N p(m)s(m)dm + C_Y, \tag{8.2}$$

where I, N, and $p(m)$ stand for redistribution of benefit from natural resources, the amount of variety, and the price of variety m, respectively. They determine the consumption of each variety and of agricultural goods to maximize the utility function subject to (8.2). Moreover, substituting the demands of each variety, m, and the consumption goods for (8.1), we can obtain the following indirect utility function in an integrated economy:

$$V_j = \mu^{\mu}(1-\mu)^{1-\mu}P^{-\mu}\left(w_j + I\right), \tag{8.3}$$

where P is price index of the manufacturing goods market in an integrated economy, as shown below.

$$P \equiv \left[\int_0^N p(m)^{1-\sigma} dm\right]^{\frac{1}{1-\sigma}}. \tag{8.4}$$

Products

Further, we refer to the production sectors of an integrated economy. First, we explain the agricultural goods sector. Here, labor is the only input factor, regardless of sectors. We assume that the agricultural goods market is perfectly competitive and that one unit of goods is produced with one unit of labor. Moreover, the equilibrium wage in an integrated economy is 1 because there are no trade obstructions.[3] Therefore, w_Y is equal to 1. Regarding the production of the manufacturing goods sector, it is mutually differentiated and faces a monopolistic competition market. We describe the monopolistic competition market following Dixit and Stiglitz (1977). All varieties of manufacturing goods use α units of labor as the marginal input to produce one unit of variety. Moreover, each variety pays a fixed input requirement comprising β units of labor. Hence, the labor input of variety, m, is given by $\alpha s(m) + \beta$. All manufacturing good varieties maximize profits with respect to $p(m)$ under the monopolistic market. All manufacturing good varieties deal with the constant elasticity of substitution, σ, and has no effect on the price index of the manufacturing goods market, denoted by P. Consequently, the price of each variety is derived as demonstrated below.

$$p^*(m) = \left(\frac{\alpha\sigma}{\sigma - 1}\right) w_X. \tag{8.5}$$

Because σ is assumed to be larger than one, the equilibrium price of manufacturing goods variety in an integrated economy is given as a mark-up of the marginal cost. Assuming the free entry and exit of variety in this sector, the equilibrium profit of each variety becomes zero. When $S^*(m)$ denotes the equilibrium output of variety in an integrated economy, the following zero-profit condition is given as

$$\left(\frac{\alpha\sigma}{\sigma - 1}\right) w_X S^*(m) - w_X(\alpha S^*(m) + \beta) = 0. \tag{8.6}$$

Assuming that each variety in the manufacturing goods sector is symmetric, the equilibrium price and the output is also symmetric. Therefore, we define p^* and S^* as the equilibrium price and output of variety in the manufacturing goods sector in an integrated economy.

$$p^* \equiv p^*(m), S^* \equiv S^*(m), m \in [0, N].$$

Although we treat the number of varieties of the manufacturing goods sector as given, it is necessary to determine it endogenously as well. The labor demand of each variety in the equilibrium is given as $\beta\sigma$. Because the number of workers in the

[3] Although most new economic geography studies have interpreted transportation costs as trade obstructions, we instead consider customs and tariffs as such.

manufacturing goods sector in an integrated economy is given by μL, the labor market-clear condition in this sector is as follows:

$$\mu L = N\beta\sigma.$$

Consequently, we derive the number of varieties of manufacturing goods under an integrated economy as follows:

$$N^* = \frac{\mu L}{\beta\sigma}. \tag{8.7}$$

From the assumption of production symmetry, we revise the following equilibrium price index of the manufacturing goods sector in an integrated economy.

$$P^* = \left[\int_0^N p(m)^{1-\sigma} dm\right]^{\frac{1}{1-\sigma}} = \left(\frac{\alpha\sigma w_X}{\sigma - 1}\right)\left(\frac{\mu L}{\beta\sigma}\right)^{\frac{1}{1-\sigma}} \tag{8.8}$$

Using comparative statics of (8.8), we know that the increase of workers in the manufacturing goods sector results into a decrease in the equilibrium price index and an increase in the indirect utility function in the equilibrium. Considering the equilibrium price of variety, the price index of the manufacturing goods sector, and the zero-profit function, we derive the equilibrium wage of the manufacturing goods sector as follows[4]:

$$w_X^* = \frac{1 - \mu + \overline{R}}{(1 - \mu)L}. \tag{8.9}$$

Natural Resources

As discussed in Sect. 8.1, we consider natural resources in a wider concept in this study. Generally, they are oil fields, coal mines, and fisheries are considered natural resources. Nevertheless, one of the most important properties of natural resources is its immobility among regions. Beautiful mountains, attractive sea coasts, etc. are also immobile. Historic monuments, traditional festivals, and artificial ports, are although not strictly natural resources yet immobile. Therefore, we have regarded them as a part of natural resources in our wider concept.

With regard to natural resources as considered in this study, although they are located in region 2, they are owned by the central government for both the regions in

[4]For the derivation of this wage, see Appendix A.

the integrated economy. Therefore, the central government derives a benefit from these natural resources and redistributes them to households comprising workers and peasants. Let $\overline{R}$ represent the benefit from these natural resources. Considering that the number of households is denoted as L, the redistribution for each household is $I = \overline{R}/L$. Because the indirect utility function and the equilibrium wage of manufacturing goods sector are given as (8.3) and (8.9), respectively, we derive the equilibrium utility function of workers and peasants as

$$V_X^* = \mu^\mu (1-\mu)^{1-\mu} P^{-\mu} \left(w_X^* + \frac{\overline{R}}{L} \right), \tag{8.10}$$

and

$$V_Y^* = \mu^\mu (1-\mu)^{1-\mu} P^{-\mu} \left(1 + \frac{\overline{R}}{L} \right). \tag{8.11}$$

From the comparative static analyses of indirect utility functions in terms of the total number of households in an integrated economy and the benefit from natural resources, we know their effects on each indirect utility in equilibrium. However, the increase in population does not necessarily increase utility. In this model, the increasing population provides two kinds of effects because it does so in our model. Although the increase in population increases the amount of manufacturing good variety, it also decreases the income effect because of the decrease in redistribution of benefits from natural resources. Thus, we derive the following proposition.

Proposition 1 In an integrated economy, an increase in population increases (or decreases) the equilibrium utility when the effects of a population increase on the variety of manufacturing goods are larger (or smaller) than those on income redistribution.

8.2.2 The Objective Function of Government

Finally, we define the weighted utility of an integrated economy, comprising manufacturing goods and agricultural goods sectors as the benchmark for the comparison with the economy after secession. This is done because an important policy is usually affected by public consensus, and we must account for the political decision-making mechanism and specify it. When a minor region chooses among secession alternatives, its determination could be made through steps such as voting. Therefore, judgment criteria are required regardless of the decision maker if the minor region determines secession. Furthermore, because this model does not include public goods, the government can do nothing except to make a determination about secession. Following Alesina and Spolaore (1997), we assume that the government of a minor region after secession remains the same as that before

secession. If the weighted indirect utility after secession is larger than that before secession, secession is chosen. Considering (8.10) and (8.11), the weighted indirect utility function, defined by V^*, is given as

$$\begin{aligned} V^* &= \mu V_X^* + (1-\mu)V_Y^* \\ &= \left[\mu\left(w_X^* + \frac{\overline{R}}{L}\right) + (1-\mu)\left(1 + \frac{\overline{R}}{L}\right)\right]\mu^{\mu}(1-\mu)^{1-\mu}(P^*)^{-\mu}. \end{aligned} \tag{8.12}$$

When the government of the minor region (region 2) considers secession, it must compare the weighted indirect utility function after secession with (8.12). As explained in an earlier report (8.12), the weighted utility function under an integrated economy depends on L and I, which are the populations in the economy and the amounts of natural resources. In the next section, we consider the case wherein a minor region secedes.

8.3 Secession

8.3.1 Economy after Secession

Households

In the previous section, we considered an integrated economy with two regions. Because we assumed that the central government owned the natural resources of region 2 and redistributed their benefits to each household in an integrated economy, there is no difference between the major region (region 1) and minor region (region 2) in this regard. In this section, we consider the case wherein region 2 secedes from the integrated economy (e.g., home country). Because we assumed that region 2 had less population than region 1, the populations in region 1 and region 2 are represented by θL and $(1 - \theta)L$, respectively. Presuming that the ratio of manufacturing goods workers to total population in each region is common, the numbers of workers in region 1 and region 2 are represented by $\mu\theta L$ and $\mu(1 - \theta)L$, respectively. However, the numbers of peasants in region 1 and region 2, are represented as $(1 - \mu)L/2$. Although there is no obstruction on trade between the regions in an integrated economy, we assume that obstructions could occur after secession. Generally, trade between different countries (or regions) requires restrictions such as customs, tariff, etc. Regarding trade obstructions, we adopted the iceberg type of trade obstruction after secession. Following Krugman and Elizondo (1996), we define τ as a trade obstruction after secession.[5]

Next, we assume that τ exists from 0 to 1: $\tau \in [0, 1]$. $p_i(m)$ denotes the *freight-on-board* (f.o.b.) price of manufacturing goods variety, m, produced in region i.

[5]Krugman and Elizondo (1996) described trade openness with the iceberg type.

Consequently, the *cost of insurance and freight* (c.i.f) is given by $p_i(m)/\tau$. Therefore, we revise the budget constraint (8.2) as follows.

$$\widehat{w}_j^i + \widehat{I}_i = \int_0^{\widehat{N}_i} \widehat{p}_i(m)\widehat{s}_{ii}(m)dm + \int_0^{\widehat{N}_h} (\widehat{p}_h(m)/\tau)\widehat{s}_{hi}(m)dm + \widehat{C}_Y^i, \quad i,h = 1,2, \quad i \neq h \tag{8.13}$$

Maximizing (8.1) with regard to $\widehat{s}_{ii}(m)$ and $\widehat{s}_{hi}(m)$ subject to (8.13), we obtain

$$\frac{\widehat{s}_{ii}(m)}{\widehat{s}_{hi}(m)} = \left(\frac{\widehat{p}_1(m)\tau}{\widehat{p}_2(m)}\right)^{-\sigma}. \tag{8.14}$$

Let $\widehat{V}_j^i$ represent the indirect utility function of households $j(=X,Y)$ in region i $(=1,2)$ after secession. Assuming that the preference of households does not change after the secession of region 2, we obtain a demand function and an indirect utility function akin to the functions of an integrated economy. Although the preference of a household is no different than that of the previous section, we define the price and demand of variety in the manufacturing goods sector and the price index $(\widehat{P}_i)$ after secession to distinguish it from the prior discussion. Here, we define $\widehat{p}_i(m)$, $\widehat{s}_i(m)$, $\widehat{N}_i$, and $\widehat{P}_i$ as the *f.o.b* price and demand of variety, m, produced in region i, the number of variety produced in region i, and price index of the manufacturing goods sector in region i after secession, respectively. Using resolving the utility maximization issue by using these definitions, we obtain the following indirect utility function of households employed in sector j in region i.

$$\widehat{V}_j^i = \mu^\mu(1-\mu)^{1-\mu}\widehat{P}_i^{-\mu}\left(\widehat{w}_j^i + \widehat{I}_i\right), (i = 1,2, j = X,Y), \tag{8.15}$$

where $\widehat{P}_i$ is defined as follows:

$$\widehat{P}_i \equiv \left[\int_0^{\widehat{N}_i} \widehat{p}_i^{1-\sigma}(m)dm + \int_0^{\widehat{N}_h} \left(\frac{\widehat{p}_h(m)}{\tau}\right)^{1-\sigma} dm\right]^{\frac{1}{1-\sigma}}, \quad (i,h = 1,2, \ \ i \neq h).$$

Here, $\widehat{N}_i$ and $\widehat{N}_h$ denote the amount of manufacturing goods variety produced in region i and h, respectively. Because we assumed θ as larger than 1/2, $\widehat{N}_1$ differs from $\widehat{N}_2$. Consequently, $\widehat{P}_1$ also differs from $\widehat{P}_2$.

Products

Regarding the production sector, we assume an economy with manufacturing and agricultural goods sectors. Although the agricultural goods market is perfectly competitive, the manufacturing goods market faces a monopolistic competition. Akin to the previous section, we deal with it as numeraire. Because we assumed that one unit of labor is necessary to produce one unit of agricultural goods, the wages in the agricultural goods sector are equal to one, (i.e., $\widehat{w}_Y^1 = \widehat{w}_Y^2 = 1$). The profit function of variety m in region i is given as

$$\widehat{pi}_i(m) = \widehat{p}_i(m)\widehat{S}_i(m) - \widehat{w}_X^i\left(\alpha\widehat{S}_i(m) + \beta\right) \quad (i = 1, 2). \tag{8.16}$$

Although varieties of manufacturing goods are mutually differentiated, the behavior of each variety does not affect the price index in the manufacturing goods sector under a monopolistic competition model. Considering this point, we obtain the price of variety of manufacturing goods sector in equilibrium as follows:

$$\widehat{p}_i^*(m) = \left(\frac{\alpha\sigma}{\sigma - 1}\right)\widehat{w}_X^i(i = 1, 2). \tag{8.17}$$

According to Dixit and Stiglitz (1977), the equilibrium price of variety in a monopolistic competition is described by a mark-up of the marginal cost in this sector. Substituting (8.17) for the profit function of manufacturing goods sector, we derive the number of varieties in equilibrium from the zero-profit function. Let L_x^i represent the number of workers in the manufacturig goods sector in region $i(=1, 2)$. The equilibrium amount of variety in region i is given as follows:

$$\widehat{N}_i^* = \frac{L_X^i}{\sigma\beta}, \quad (i = 1, 2), \tag{8.18}$$

where L_X^1 and L_X^2 are given as $\theta\mu L/\sigma\beta$ and $(1 - \theta)\mu L/\sigma\beta$. Finally, we endogenously derive the equilibrium wages in each region. We define M_i as total income in region i before deriving the equilibrium wages. Noting that agricultural goods are numeraire, the total incomes of peasants in each region are given by $(1 - \mu)L/2$. Therefore, $M_i(i = 1, 2)$ are given as

$$M_1 = L_X^1 w_X^1 + \frac{(1 - \mu)L}{2} + (1 - \phi)\overline{R}, \tag{8.19}$$

and

$$M_2 = L_X^2 w_X^2 + \frac{(1-\mu)L}{2} + \phi \overline{R}, \tag{8.20}$$

where ϕ denotes the allocation ratio of interest of natural resources for region 2. Here, following Krugman (1991) and Tabuchi (1998), the total income of workers in region i is equal to the total households' spending on manufacturing goods produced in region i. Therefore, the following equations must hold.

$$L_X^1 \widehat{w}_X^1 = \mu \left[\left(\frac{z_{11}}{1+z_{11}} \right) M_1 + \left(\frac{z_{12}}{1+z_{12}} \right) M_2 \right], \tag{8.21}$$

and

$$L_X^2 \widehat{w}_X^2 = \mu \left[\left(\frac{1}{1+z_{11}} \right) M_1 + \left(\frac{1}{1+z_{12}} \right) M_2 \right], \tag{8.22}$$

where z_{11} and x_{12} are defined as follows.

$$z_{11} \equiv \frac{L_X^1}{L_X^2} \left(\frac{\widehat{w}_X^1}{\widehat{w}_X^2/\tau} \right)^{1-\sigma}, \tag{8.23}$$

$$z_{12} \equiv \frac{L_X^1}{L_X^2} \left(\frac{\widehat{w}_X^1/\tau}{\widehat{w}_X^2} \right)^{1-\sigma}. \tag{8.24}$$

When we deal with the population distribution of workers between regions 1 and 2 as given, equilibrium wages in each are determined endogenously by solving (8.21) and (8.22).[6] However, it is impossible to obtain analytical solutions in an explicit form because these simultaneous equations are highly nonlinear. Thus, let $\widehat{w}_X^{1*}$ and $\widehat{w}_X^{2*}$ represent equilibrium wages of workers in each region after secession, respectively.

8.3.2 Natural Resources Under Secession

Next, we consider the allocation of benefits from natural resources. As noted earlier, we establish the definition of natural resources liberally. Because the central government in an integrated economy controls the management of natural resources, it is reasonable for the government in the home country (region 1) to not easily waive its

[6] Because most of the core–periphery model considers migration of workers between regions, the distribution of workers between regions (θ) is endogenously determined. However, we deal with their distribution with θ as a fixed parameter because no workers move to the other region.

interest in natural resources after secession. However, it is difficult for it to perfectly retain the interest because the resources are relocated to another country after secession. Therefore, we assume that the government in region 1 can retain a part of its interest the secession of region 2. Next, we define ϕ as the allocation ratio of the right of natural resources for region 2. We can interpret ϕ as the bargaining power for natural resources in region2. For a simplification of analysis, we assume that the government of each region consider ϕ as given. Because we assumed that the central government distributed the benefit from natural resources as a lump sum to every household in the integrated economy, we intend to follow the population in regions 1 and 2 after secession. Assuming that the government in region 1 obtains the benefits of the natural resources, $(1-\phi)\overline{R}$, each household in region 1 receives $(1-\phi)\overline{R}/\widehat{L}_1$ from the government. Similarly, each household in region 2 gets $\phi\overline{R}/\widehat{L}_2$.

The larger is the ϕ, the greater is the natural resource benefits received by households in region 2. Therefore, the redistribution of benefits from natural resources for households in region $i(=1,2)$ is given as $\widehat{I}_1^*$ and $\widehat{I}_2^*$.

$$\widehat{I}_1^* = \frac{(1-\phi)\overline{R}}{\widehat{L}_1}, \quad \widehat{I}_2^* = \frac{\phi\overline{R}}{\widehat{L}_2}, \tag{8.25}$$

where $\widehat{L}_1$ and $\widehat{L}_2$ denote the total population in regions 1 and 2 after secession. Thus,

$$\widehat{L}_2 \equiv \theta\mu L + \frac{(1-\mu)}{2},$$

and

$$\widehat{L}_2 \equiv (1-\theta)\mu L + \frac{(1-\mu)}{2}.$$

Substituting these equilibria for (8.15), the indirect utility functions of workers and peasants in each region are presented as

$$\widehat{V}_X^{1*} = \mu^\mu(1-\mu)^\mu \widehat{P}_1^{*-\mu}\left(w_X^{1*} + \frac{(1-\phi)\overline{R}}{\widehat{L}_1}\right), \tag{8.26}$$

$$\widehat{V}_Y^{1*} = \mu^\mu(1-\mu)^\mu \widehat{P}_1^{*-\mu}\left(1 + \frac{(1-\phi)\overline{R}}{\widehat{L}_1}\right), \tag{8.27}$$

$$\widehat{V}_X^{2*} = \mu^\mu(1-\mu)^\mu \widehat{P}_2^{*-\mu}\left(w_X^{2*} + \frac{\phi\overline{R}}{\widehat{L}_2}\right), \tag{8.28}$$

and

$$\widehat{V}_Y^{2*} = \mu^{\mu}(1-\mu)^{\mu}\widehat{P}_2^{*-\mu}\left(1+\frac{\phi\overline{R}}{\widehat{L}_2}\right). \tag{8.29}$$

8.4 Remaining or Seceding

In the previous section, we derived the equilibrium utilities of workers and peasants in each region after secession. Here, we analyze the behavior of the government in region 2 (i.e., the minor region). The government in region 2 considers whether to secede.[7] We must specify the objective function of the government in region 2 to analyze its decisions about secession. We assume that its government compares the weighted utility of workers and peasants before and after secession. To describe the weighted indirect utility, we adopt the ratio between workers and peasants. The ratio between the two in region 2 is given by $(1-\theta)\mu L : \frac{(1-\mu)L}{2}$. Thus, $2(1-\theta)\mu : 1-\mu$, considering which, the weighted indirect utility in region 2 is derived as follows:

$$\begin{aligned}\widehat{V}_2^* &= 2(1-\theta)\mu\widehat{V}_X^{2*} + (1-\mu)\widehat{V}_Y^{2*} \\ &= \left[2(1-\theta)\mu\widehat{w}_X^{2*} + 1 - \mu + (1+(1-2\theta)\mu)\frac{\phi\overline{R}}{\widehat{L}_2}\right]\mu^{\mu}(1-\mu)^{1-\mu}\widehat{P}_2^{*-\mu}. \end{aligned} \tag{8.30}$$

Recall that we have already derived (8.12) as the weighted indirect utility in an integrated economy. The government in region 2 compares the weighted indirect utility before secession to that after secession in an integrated economy. Then, it decides whether it will secede. Thus, the government of region 2 has an incentive to secede when the following inequality holds:

$$\frac{\widehat{V}_2^*}{V^*} \geq 1. \tag{8.31}$$

We call (8.31) as the secession condition. Substituting (8.12) and (8.30) for (8.31), we revise the secession condition of region 2 as follows:

$$\frac{\widehat{V}_2^*}{V^*} = \left[\frac{2(1-\theta)\mu\widehat{w}_X^{2*} + 1 - \mu + (1+(1-2\theta)\mu)\frac{\phi\overline{R}}{\widehat{L}_2}}{\mu\left(w_X^* + \frac{\overline{R}}{L}\right) + (1-\mu)\left(1+\frac{\overline{R}}{L}\right)}\right]\left(\frac{\widehat{P}_2^*}{P^*}\right)^{-\mu} \geq 1 \tag{8.32}$$

[7] Home country is an integrated economy that includes region 1 (major region) after secession.

It is difficult to derive $\widehat{w}_X^{1*}$ and $\widehat{w}_X^{2*}$ analytically because (8.21) and (8.22) are nonlinear systems. Thus, we analyze some special cases: an infinite trade obstruction ($\tau = 0$) and no trade obstruction ($\tau = 1$).

8.4.1 *Infinite Trade Obstruction*

Let us supposed that τ approached 0, and the trade obstruction after secession is extremely high. In this situation, the manufacturing goods produced in region i are consumed in region i, i.e., in an autarky.[8] When the trade obstruction is infinite, the total wage income in region i is equal to the total expenditure for manufacturing goods produced in region i. Thus, resolving (8.21) and (8.22) subject to $\tau = 0$ and substituting the equilibrium wages of manufacturing goods in the region i for (8.32), it is presented as

$$\left\{\frac{2(1-\theta)\mu\left(w_X^{2*}+\frac{\phi\overline{R}}{\widetilde{L}_2^*}\right)+(1-\mu)\left(1+\frac{\phi\overline{R}}{\widetilde{L}_2}\right)}{\mu w_X^*+1-\mu+\frac{\overline{R}}{L}}\right\}^{\frac{1}{\mu}} \geq \frac{\widehat{P}_2^*}{P^*} \tag{8.33}$$

Considering that ϕ exists from 0 to 1, the government in region 2 has no bargaining power of natural resources when ϕ is 0. On the other hand, it has full bargaining power when ϕ is 1. To simplify the analysis, we treat this bargaining power as given. The left-hand side (LHS) of (8.33) implies the ratio of the weighted income of workers and peasants in region 2 after secession to that of the integrated economy. According to (8.33), the LHS of (8.33) is an increasing function of ϕ and convex with respect to ϕ.[9] However, the right-hand side (RHS) of (8.33) is constant in terms of ϕ. Hence, there are three types of relation between LHS and RHS in (8.33), as demonstrated in Fig. 8.1.

In case (1), the LHS of (8.33) is larger than the RHS of (8.33), regardless of ϕ. Therefore, the secession condition is always held for any ϕ. The ratio of the weighted income of workers and peasants in region 2 after secession to that of the integrated economy is larger than the ratio of the price index in region 2 after secession to that in the integrated economy. Therefore, the government in region 2 always chooses to secede to have any bargaining power over natural resources. Secondly, in case (2), the LHS of (8.33) is smaller (or larger) than the RHS of (8.33) when ϕ is relatively small (large). In this case, the weighted income of workers and peasants is not relatively large after secession when the bargaining power of natural resources in

[8] We can reinterpret this case into a service market analysis because service goods are immobile between regions. Consequently, service goods produced in region i are consumed by workers and peasants from the same region.

[9] Regarding the shape of the LHS in (8.33), see Appendix B.

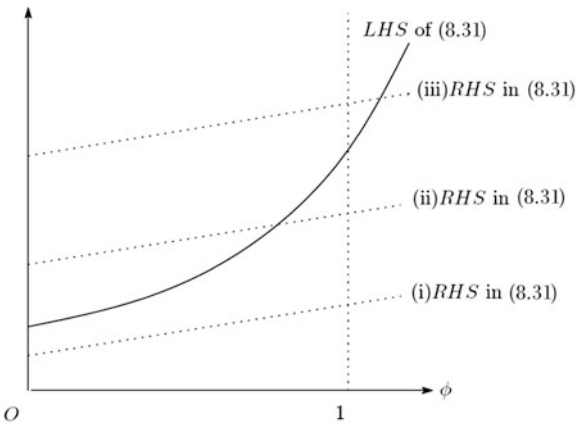

Fig. 8.1 The effect of ϕ on LHS and RHS in Eq. (8.33) under infinite trade obstruction

region 2 is relatively small. Consequently, the government in region 2 has no incentive to choose secession from the integrated economy. In contrast, the ratio of the weighted income of workers and peasants after secession to that in the integrated economy is relatively large when the bargaining power of natural income is large. Thus, it is possible for the government in region 2 to choose to secede from home country when ϕ is relatively large. Finally, we refer to case (3), wherein the LHS of (8.33) is always larger than the RHS of (8.33), regardless of ϕ. In this case, the decision of secession of the region 2 government is independent of the bargaining power of natural resources. Consequently, it chooses to secede from home country regardless of ϕ.

8.4.2 No Trade Obstruction

Next, we consider the polar opposite case wherein there is no trade obstruction. When τ is equal to 1, manufacturing goods produced in each region are mobile between the regions. Following Krugman and Elizondo (1996), no trade obstruction has been described by $\tau = 1$. From (8.21), (8.22), (8.23), and (8.24), we obtain $\widehat{w}_X^{1:} = \widehat{w}_X^{2*}$. Consequently, the price index in region 2 and that of the integrated economy before secession are common. Considering this, the secession condition under no trade obstruction is presented as

$$\left\{ \frac{2(1-\theta)\mu\left(\widehat{w}_X^{2*} + \frac{\phi\overline{R}}{\widehat{\sim}_{L_2}}\right) + (1-\mu)\left(1 + \frac{\phi\overline{R}}{\widehat{\sim}_{L_2}}\right)}{\mu w_X^* + 1 - \mu + \frac{\overline{R}}{L}} \right\}^{\frac{1}{\mu}} \geq 1 \tag{8.34}$$

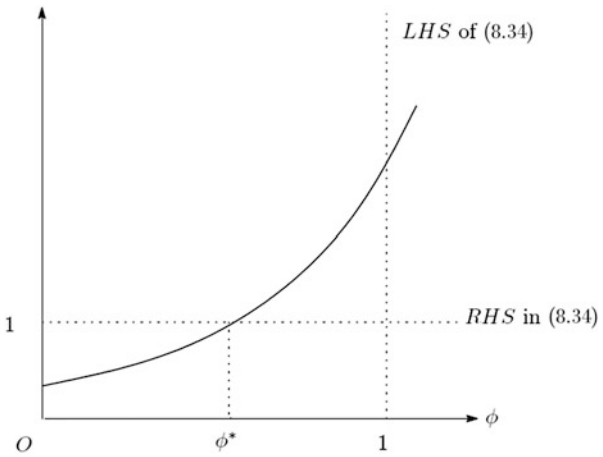

Fig. 8.2 Effect of ϕ on LHS and RHS in (8.34) under no trade obstruction

When ϕ is equal to 0, the LHS of (8.34) is smaller than 1. Figure 8.2 shows the relation between LHS and RHS in (8.34) under no trade obstruction. As shown in Fig. 8.2, the government of region 2 chooses to secede when ϕ is larger than ϕ^* in Fig. 8.2.

8.4.3 Numerical Example

We consider two post-secession polar cases: infinite trade obstruction and no trade obstruction. It is difficult to analytically derive equilibrium except for some special cases because this system is a nonlinear general equilibrium model. Therefore, we use the numerical example to analyze the model akin to Krugman (1991), Krugman and Elizondo (1996), Tabuchi (1998), and others.

Figure 8.3 describes the non-polar case where τ is not equal to 1 or infinite. Because it is difficult to analytically resolve the equilibrium, owing to the nonlinear general equilibrium system, we use numerical analysis with some adequate parameters. Moreover, we analyze two kinds of cases as middle-trade obstructions. One of them, τ, is 0.3, which means that trade obstruction is relatively difficult. The other, τ, is 0.8, which means that trade obstruction is not difficult.[10] From Fig. 8.3, we understand that the government of region 2 has an incentive to secede under a relatively large ϕ. If ϕ is relatively large, region 2 obtains a benefit from natural resources after secession. Moreover, its redistributed benefit increases because the number of households decreases after secession. Consequently, this effect exceeds

[10]We use common parameters except for τ to confirm the numerical simulation. The parameters used in the simulation are as follows: $\theta = 0.6$, $\alpha = 2$, $\beta = 0.5$, $\sigma = 3$, $\mu = 0.6$, $L = 1$.

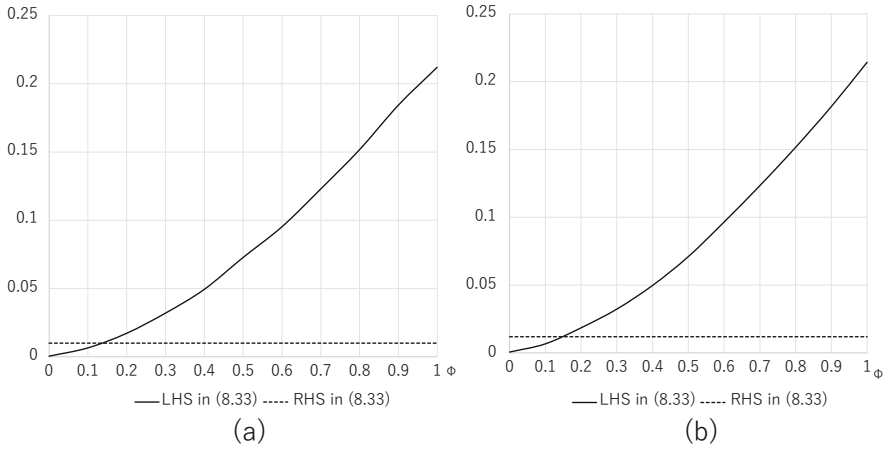

Fig. 8.3 Effect of ϕ on LHS and RHS in (8.34) under middle-trade obstruction

the negative price index effect caused by the decrease in variety, regardless of the trade obstruction.

8.5 Concluding Remarks

In this chapter, we constructed a simple model to analyze regional secession issues. We focused on natural resources that are unevenly distributed among regions. When these natural resources, including more than just oil or iron, are unevenly distributed among regions, it is possible that such an uneven distribution may become the cause of contention. If a minor region containing the resources can assume the benefits from the resources after secession, its government is incentivized to secede. However, such secession can also cause a loss. Whereas natural resources may be the origin of economic development, the decrease in population and trade obstructions after secession may counter the positive effects. Many previous studies theoretically and empirically analyzed these issues. Regarding the theoretical model, only few previous studies have approached this problem from the perspective of a new economic geography model. We introduced a political factor, i.e., the negotiation power denoted by ϕ, into the model. Our analysis reveals that this negotiation power of natural resources plays a crucial role when the government in the minor region decides to secede. It does not always choose to secede from the home country because the decrease in population after secession may increase the price index of its manufacturing goods and decrease variety. Therefore, the government in the minor region compares the benefit from natural resources with the loss of variety or price index. In this model, we highlighted the relation between benefits and losses after secession and derived the conditions under which the minor region (region 2) government possesses unevenly distributed natural resources. Consequently, it has

an incentive for secession under strong negotiation power (large ϕ) but not with weak negotiation power (small ϕ). For simplifying the model, we have left some points to be addressed in future studies. First, we dealt with the negotiation power of ϕ as an exogenous parameter. In the real world, the ratio of interest of natural resources between regions is the most important and difficult aspect when a certain region tries to secede. Therefore, it is necessary to endogenously determine ϕ. Second, we do not consider the migration of a household. As most of the core–periphery model highlights the movement of labor or capital between regions, the migration is determined endogenously. Future research must take these aspects in consideration.

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Part V
Reforms and Their Impacts

Chapter 9
Liberalisation and Structural Change with Rural–Urban Dichotomies: A General Equilibrium Outlook

Soumyatanu Mukherjee and Shreya Banerjee

Contents

Abstract This chapter deals with the structural change and employment outcomes of welcoming FDI and opening the import-competing sector of the economy to more foreign competition within the framework of a three-sector mobile capital version of Harris–Todaro (HT hereafter) type general equilibrium model, describing rural–urban migration, with the existence of a rural nonfarm sector producing non-traded intermediate input. Main findings support the fact that because of different trade reform policies, registered urban manufacturing sectors have experienced increased competition from foreign markets which has forced them to switch towards relatively capital-intensive techniques of production, resulting in the retrenchment of relatively less productive workers and ending up with jobless pattern of growth in these sectors during the liberalised regime. These results are predominantly fascinating for the counterintuitiveness of the predictions, as opposed to the standard HT model.

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9.1 Introduction

Dualism has a long intellectual history in development economics, famously in the seminal work of Nobel Laureate Arthur Lewis in the 1950s: how does one develop a modern manufacturing sector in a poor economy dominated by an underdeveloped rural (agriculture, largely subsistence) sector. Developed (or Northern) countries achieved this transformation following agricultural and industrial revolutions. Developing countries had to achieve this same agricultural transformation (to a commercial agriculture that would support industrial growth) without the benefit of their own (endogenously generated) revolution, which required coordinated sector policies. However, from the 1950s in many developing countries the emphasis was solely on industrialisation with neglect of agriculture. This failure is pronounced in sub-Saharan Africa, where the failure to support agriculture undermined economic development in the whole economy; economic policies had not recognised the importance of agriculture in low-income countries (Morrissey 2007) and had often generated disincentives to agricultural producers (e.g. on Tanzania see Morrissey and Leyaro 2009). Similar neglect can be observed in India and other South Asian economies.

This neglect of dualism and agriculture in particular, is also reflected in the literature on economic growth. Although there is an established literature on economic dualism that allows for the economy having distinct sectors with different characteristics (e.g. Banerjee and Newman 1997), most of the standard cross-country empirical literature on economic growth considered the economy as only one sector (e.g. Barro 1991; Mankiw et al. 1992). Recent papers (e.g. Eberhardt and Teal 2011, 2012; Lin 2011; McMillan and Rodrik 2011; Vollrath 2009) highlight the importance of allowing for the economy as comprising distinct sectors with differing characteristics (building on the older literature on economic dualism).

In order to understand why a developing open economy, with emerging importance of rural nonfarm sectors (as opposed to the household own-account enterprises to factories) supporting non-agricultural activities (ranging from mining and quarrying, processing, repair, construction, community and personal services, transport and other services) in villages and an urban registered manufacturing sector to migrate, this piece explores the thread of channels through which liberalised trade policy and inward foreign investment, in conjunction with rapid urbanisation and open unemployment, could affect income (wages) and employment scenarios of the relatively marginalised workers with respect to the specific economic and policy conditions designed to represent a developing country such as India.

Available empirical evidence such as Bhaduri (2007) and Bhalotra (1998), is suggestive of the fact that India observed stagnation in organised sector employment

in the late 1980s. Surprisingly, even after extensive economic reforms in 1991, India continues to face substantial adjustment costs in implementing economic liberalisation programs (Jha 2003). As demonstrated in Goldar (2000), Nagaraj (2004) and so on; after reform, India immediately witnessed a boom for 4 years, 1992–1996, followed by a retrenchment, but soon India experienced loss in employment of 15% of the workforce employed in 11 major industry groups in organised manufacturing in 17 major states from 1996 to 2001. According to the National Sample Survey (NSS) round conducted from July 2009 to June 2010, organised sector employment declined dramatically between 2004–2005 and 2009–2010, especially when compared to the earlier five-year period. This is quite unanticipated given that this was a period of very rapid GDP expansion and points to the growing possibility of 'jobless growth' in the organised manufacturing sectors in the reform period. Resulting from increased competition, greater substitution from labour to capital has engendered the opportunity of the organised sectors' employers to pay the workers at a rate closer to the market-determined one, which, in turn, would make easier for these employers to fire the relatively less productive workers without much protest, since the wage-differences to the outside options has declined. According to the relevant NSS rounds (NSSO 1989–2010), the labour force growth rate in the organised sectors was 2.43% per annum (p.a.) between 1983–84 and 1993–94, and then it came down to 1.31% p.a. between 1993–94 and 1999–2000.

Therefore, one can infer that trade liberalisation during the 1990s did not result in any significant increase in productive job opportunities for the organised sector labour force. This records typically similar outcome as Dani Rodrik's concept of 'Premature Deindustrialisation' from the employment front in the organised sectors,[1] where registered manufacturing experiences more rapid productivity growth than the rest of the economy. Since withdrawal of the non-tariff barriers coupled with significant reduction in import tariffs, the domestic organised sector firms which have been protected as yet have not been able to cope with foreign competitors and have been forced to pull their shutters down leading to widespread open unemployment. The unorganised sector expanded but has not been able to absorb all retrenched workers from the organised sector. The consequence has been a steep increase in the level of open unemployment. On the other hand, this will not hamper the growth of the economy as the organised sector benefits from the higher productivity of the remaining workforce and can emerge as competitive in the international market. This has generated scepticism regarding the allocation of the benefits of growth owing to reform. The growth India is experiencing in this liberalised regime, is indeed 'jobless' (Sen 2005). This may tempt us to analyse the impact of economic reform on welfare and open unemployment in a developing economy in terms of a general equilibrium framework.

Owing to speedy urbanisation and globalisation, coupled with improved transport and communication networks, rural nonfarm producers of agro-dominated developing dual economies like India can facilitate successful backward linkages as

[1] See Rodrik (2016) in this context.

suppliers of intermediate inputs and services ranging from leather and rubber products to repair services as downstream industry. This enables developing important economic linkages between urban and rural areas, creating new opportunities for rural households to withstand their livelihoods. Notable works like Fan et al. (2003), Mukherjee and Zhang (2007) etc. have discussed in detail how the nonfarm sector has played a crucial role in the process of economic development in China.

On the other hand, even though the welfare aspects of FDI and removal of protectionist policy have been widely studied in multi-sector general equilibrium models of production and trade under different settings, the interactions between the rural farm and nonfarm sectors and the resultant implications on per-capita GDP and the urban unemployment problem have not yet been explored.

In this chapter, we intend to execute these exercises using a three-sector Harris–Todaro type general equilibrium model for a 'price-taking' open economy with rural-urban dichotomy with a non-traded intermediate input, where capital has partial mobility between nonfarm and the industrial sectors. In other words, the rural nonfarm sector uses capital apart from labour and land to produce intermediate input for sector 3. This, however, has not been considered in existing related models (with intermediate input-producing local rural/informal sector) such as Marjit (2003) or Chaudhuri et al. (2018); since all these models considered the short-run situation with immobility of capital to address similar research question. Here lies the contribution of this modelling set-up in the context of analysing implications of trade reform measures on rural competitive wage and urban unemployment. We are intending to use a holistic setting that blends Heckscher-Ohlin-Samuelson (HOS) type economy with sector-specificity of the factors and rural–urban migration with open urban unemployment.

The remainder of the chapter is organised as follows. Section 9.2 discusses the model environment, Sect. 9.3 analyses the comparative static responses, while Sect. 9.4 concludes.

9.2 The Model

Consider a small open economy, broadly divided into an urban manufacturing sector and a rural sector, which is subdivided into an agricultural exportable producing sector (sector X) and a rural nonfarm sector, sector N, producing an internationally non-traded intermediate input for the import-competing urban manufacturing sector, sector M. Sector X uses labour and land as inputs. Sector N uses land, labour and capital. Sector M uses labour, capital and the intermediate input. Sector M is the import-competing sector of the economy and is protected by an import tariff, imposed at an *ad-valorem* rate.[2] The per-unit requirement of the intermediate input

[2]We assume ad-valorem equivalence of any quantitative or other restrictions on imports, such as quotas.

is assumed to be technologically fixed in urban sector.[3] Workers in the urban sector earn an institutionally given wage, W^*,[4] while the wage rate in the other two sectors, W, is market determined. Since the two rural sectors are in close vicinity, labour is perfectly mobile between the agricultural and the nonfarm sectors; but there exists imperfection (owing to unionisation) in the urban manufacturing labour market. The capital stock of the economy includes both domestic and the foreign capital and they are perfectly substitutable to each other. Production functions exhibit constant returns to scale with diminishing marginal returns. The two wages are related by the Harris–Todaro (Harris and Todaro 1970) condition of migration equilibrium with $W < W^*$.[5] Agricultural exportable is chosen as numeraire, so its price is set equal to unity.

The following notation is used:

W = competitive rural wage rate for labour (L);
W^* = institutionally given wage rate in urban sector;
R = rate of return to land (denoted by T in this chapter);
r = rental rate return to capital (K);
a_{ji} = amount of the jth input used to produce 1 unit of the ith good;
I = output of sector I, $I = X, N, M$;
L_U = urban unemployment level;
P_N = domestic price of non-traded intermediate input;
P_M = international price of good 3;
t = ad-valorem rate of tariff;
θ_{ji} = cost share of jth input in the production of good i (for example, $\theta_{LN} = Wa_{LN}/P_N$);
λ_{ji} = share of sector i in the total employment of factor j (for example, $\lambda_{TX} = a_{TX}X/\overline{T}$);
$\wedge$ = proportional change.

The three zero-profit conditions are given by

[3]It rules out the possibility of substitution between the non-traded input and other factors of production in urban sector.

[4]This is a simplifying assumption. Assuming each urban sector firm has a separate labour union, the unionised wage function can be derived as a solution to a Nash bargaining game between the representative firm and the representative union. This function has been derived in Mukherjee (2016: 56, Appendix 2.3).

[5]See Bhagwati and Srinivasan (1974), Fields (1975), Corden and Findlay (1975), Calvo (1978), Bhatia (1979), Khan (1980, 1982), Batra and Naqvi (1987), Beladi and Naqvi (1988), Chaudhuri (1989), Grinols (1991), Chandra and Khan (1993), Gupta (1993, 1994, 1995), Chao and Yu (1995), Yabuuchi (1993, 1998) and Basu (2000); for implementations and extensions of the Harris–Todaro (HT) condition of rural-urban migration in general equilibrium models of production and trade. However, a significant omission in the HT model has been the absence of proper treatment of non-traded goods, which we have considered explicitly here in our settings.

$$Wa_{LX} + Ra_{TX} = 1 \tag{9.1}$$

$$Wa_{LN} + Ra_{TN} + ra_{KN} = P_N \tag{9.2}$$

$$W^* a_{LM} + ra_{KM} + P_2 a_{NM} = (1 + t)P_M \tag{9.3}$$

Factor Market Equilibrium conditions are given by

$$a_{LX}X + a_{LN}N + a_{LM}M + L_{\mathrm{U}} = L \tag{9.4}$$

By Harris–Todaro Migration Equilibrium condition,

$$(W^* a_{LM}M/(a_{LM}M + L_{\mathrm{U}})) = W \tag{9.5}$$

This equation tells that the average wage of all workers in a Harris–Todaro economy must be equal to the rural wage. This is termed as the 'envelope property' in a Harris–Todaro model.

Note that this HT equilibrium is 'Pareto-suboptimal' because

(a) The wages are not equalised across sectors so that rural–urban wage differential persists.
(b) There exists unemployment in migration equilibrium (this is essential to yield average wage over the labour force to be equal to rural wage).

Inserting $(a_{LM}M + L_{\mathrm{U}}) = (W^* a_{LM}M/W)$ in Eq. (9.4) we obtain

$$\left(\frac{W^*}{W}\right) a_{LX}X + a_{LN}N + a_{LM}M = L \tag{9.6}$$

$$a_{KN}N + a_{KM}M = K_{\mathrm{D}} + K_{\mathrm{F}} \tag{9.7}$$

$$a_{TX}X + a_{TN}N = \overline{T} \tag{9.8}$$

The left-hand sides of Eqs. (9.7) and (9.8) respectively represents the level of demand for capital and land. K_{D} is the stock of domestic capital in the economy, K_{F} is the economy's foreign capital endowment: both are parametrically given. Therefore, these two equations are the full-utilisation conditions for these two factors of production. The full-utilisation conditions for these two factors are ensured by the perfect flexibility in the prices of these factors.

The demand for the non-traded input must equal its supply. Therefore,

$$N^{\mathrm{D}} = N = a_{NM}M \tag{9.9}$$

$a_{23}X_3$ denotes the level of demand for the intermediate input. Perfect flexibility of the domestic price of the internationally non-traded input ensures this equality in equilibrium.

$$M = D_M(P_N, P_M, Y) \tag{9.10}$$

The economy's social welfare is measured by a strictly quasi-concave social welfare function[6]

$$U = U(D_X, D_M) \tag{9.11}$$

where

D_X = Domestic consumption of agricultural exportable X by the society.
D_M = Domestic consumption of the final manufacturing product M by the society.

(We implicitly assume that the non-tradable produced by advanced agricultural sector are not used for consumption purpose).

Balanced trade implies[7]

$$D_X + P_M D_M = X + P_M M$$

In terms of domestic prices,

$$\begin{aligned} D_X + P_M(1+t)D_M &= X + P_M(1+t)M + tP_M(D_M - M) \\ &= WL + R\overline{T} + rK_D + tP_M(D_M - M) = Y \end{aligned} \tag{9.12}$$

Y stands for national income at domestic prices. It is not a decomposable system since the factor prices cannot be solved from the three zero-profit conditions alone.

The working of our general equilibrium model is as follows:

We have eight endogenous variables in the system: W, R, r, P_N, X, N, M and L_U. L, T, K_D and P_M are the exogenous variables to the model; while the policy parameters are t, W^* and K_F. Our general equilibrium setting does not comprise a decomposable system. Regarding the determination of endogenous variables, given W^*, P_M, t; W, R and r are determined from our price-system given by Eqs. (9.1)–(9.3) as functions of P_N. Once factor prices are determined, factor coefficients are also determined as functions of P_N. Then from Eqs. (9.6)–(9.8) X, N and M are determined as functions of P_N. Finally, P_N is obtained from Eq. (9.9).

Quite realistically, we assume that sector X is relatively more land intensive than sector N with respect to labour in physical and value terms.

Now let us proceed to our comparative static exercises, namely (1) inflow of foreign capital, and (2) reduction in tariff (imposed on the importable commodity

[6]Assuming homogeneity in preferences of the individuals—a typical assumption in this literature. See Mukherjee (2012, 2014, 2017); Mukherjee and Zafar (2016); Mukherjee and Banerjee (2018) for details.

[7]In this class of static general equilibrium models, we are typically concerned about post-trade situations in a small, open economy under steady-state equilibrium. Hence, all the endogenous variables and policy-parameters are always adjusted to maintain steady-state equilibrium such that the trade is balanced.

M), on the competitive real wage rate, welfare (per-capita GDP) and urban unemployment.

9.3 Comparative Statics

9.3.1 Effect of Foreign Capital Inflow

Differentiating Eqs. (9.6)–(9.8), one may obtain the following expressions:

$$\widehat{N} = \left(1/|\lambda|\right)\left[\left(\lambda_{TX}\lambda_{KM}A_1 + \lambda_{LX}\lambda_{KM}A_2 + \widetilde{\lambda}_{LM}\lambda_{TX}A_3\right)\widehat{P}_N + \widetilde{\lambda}_{LM}\lambda_{TX}\widehat{K}_F\right] \tag{9.13}$$

$$\widehat{M} = \left(1/|\lambda|\right)\left[(|\lambda|A_3 - \lambda_{LX}\lambda_{KN}A_2 - \lambda_{TX}\lambda_{KN}A_1)\widehat{P}_N + (\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX})\widehat{K}_F\right] \tag{9.14}$$

where,

$$|\lambda| = (\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX}); A_1 < 0; A_2 < 0; A_3 < 0.$$

Total differentiation of Eq. (9.8) and using Eqs. (9.13) and (9.14) with some simplifications, we obtain,

$$\widehat{P}_N = -\left(\widehat{K}_F/\Delta\right)\left(\lambda_{LX}\lambda_{TN} - \lambda_{LM}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right) \tag{9.15}$$

where

$$\widetilde{\lambda}_{LM} = \left(\frac{W^*}{W}\right)\lambda_{LM}$$

and

$$\Delta = \left[A_3\left(\lambda_{LX}\lambda_{TN} - \lambda_{LM}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right) - \lambda_{L1}A_2 - \lambda_{N1}A_1\right] \tag{9.16}$$

After this, applying 'hat algebra' to the total differentiation of Eqs. (9.1)–(9.3); applying envelope conditions for the competitive producers[8] and then solving by Cramer's Rule, substituting Eq. (9.15) and collecting terms, it can be obtained

[8]See Mukherjee (2016: 55, Appendix 2.1) for details.

$$\widehat{W} = (\theta_{TX}/|\theta|)\left[(\theta_{KM} + \theta_{KN}\theta_{NM})\left(\widehat{K}_F/\Delta\right)\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right)\right] \quad (9.17)$$

$$\widehat{R} = (\theta_{LX}/|\theta|)\left[(\theta_{KM} + \theta_{KN}\theta_{NM})\left(\widehat{K}_F/\Delta\right)\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right)\right] \quad (9.18)$$

$$\widehat{r} = \theta_{NM}\theta_{KN}\left(\widehat{K}_F/\Delta\right)\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right) \quad (9.19)$$

where

$$|\theta| = \theta_{KM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN}) \quad (9.20)$$

Given our assumption of sector X's being relatively land intensive compared to sector N with respect to labour in *both* physical *and* value terms, $\lambda_{LX}\lambda_{TN} < \lambda_{LN}\lambda_{TX}$ and $\theta_{LX}\theta_{TN} < \theta_{TX}\theta_{LN}$; or, equivalently, both $|\lambda| < 0$ and $|\theta| < 0$. Owing to the inflow of foreign capital, return to capital, r, must fall. Hence, from (9.19), given that $\left(\widehat{r}/\widehat{K}_F\right) < 0$, we must have $\Delta > 0$. This can also be verified from the stability condition for equilibrium in the market for commodity 2.[9] Hence, Eq. (9.15) yields $\widehat{P}_N > 0$, whenever, $\widehat{K}_F > 0$. From (9.17) and (9.18) we find that $\widehat{W} > 0, \widehat{R} < 0$, whenever $\widehat{K}_F > 0$. This leads us to the following proposition.

Proposition 1 An inflow of foreign capital leads to:

(a) an increase in the rural wage rate;
(b) a decrease in the return to land;
(c) an increase in the price of the intermediate input produced by the nonfarm sector.

Intuitive Explanation Given the perfect substitutability between domestic and foreign capital, the capital stock of the economy rises. Therefore, both the capital-using sectors (sector N and sector M) expand. Given the expansionary effect of sector M, demand for the intermediate inputs produced by sector N rises (as the intermediate input cannot be substituted by other factors of production). As a result, real return to capital (r) falls, leading to a hike in P_N in order to satisfy the zero-profit condition for sector M.

Given the rise in P_N, by *Stolper-Samuelson effect in the Heckscher-Ohlin nugget* formed by sectors X and N, the competitive rural wage rate (W) increases and return to land (R) falls. With the consequent increase in the capital-labour ratios in both sectors N and M, producers of these two sectors are trying to substitute labour by capital. Therefore, in both sectors, capital-output ratio rises and labour-output ratio falls. This creates a relative shortage of capital in both these capital-using sectors and consequently, both the sectors would contract. If the primary effect (expansion of both capital-using sectors) dominates this secondary effect, both sectors N and M will expand.

[9] See Appendix 4 for the detailed derivation.

Since only the price of non-traded intermediate input is varying, we can measure the effect of foreign capital inflow on social welfare by variations in per-capita GDP at domestic prices alone. An inflow of foreign capital with full repatriation of its earnings produces two effects on the welfare in this model. First, the competitive rural wage increases, but both rental to land and rate of interest to domestic capital go down. So, the aggregate factor income rises (as the increase in aggregate wage income outweighs the decrease in the rental income to land and real capital earnings) and it produces a positive effect on welfare. Finally, an inflow of foreign capital leads to an increase in the domestic production of commodity M and therefore tends to lower the import demand. Thus, the cost of tariff protection of the supply side increases, working negatively on welfare. The net result of these two effects would be an increase in social welfare if the magnitude of the first positive effect would be stronger than the second effect. Therefore, the following proposition now can be established.

Proposition 2 *In an economy with rural nonfarm sector, providing intermediate inputs to the tariff-protected import-competing urban manufacturing industry, an inflow of foreign capital with full repatriation of its earnings may improve social welfare.*

Effect on Urban Unemployment

$$\widehat{L}_{\mathrm{U}}/\widehat{K}_{\mathrm{F}} = -[W^*/(W^* - W)|\theta|\Delta] \times \left[\{\theta_{TX}(\theta_{KM} + \theta_{KN}\theta_{NM})\} - \left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right)|\theta|\Delta\{(W^* - W)/W^*\}\right] \tag{9.21}$$

From (9.21), one can infer that $\widehat{L}_{\mathrm{U}} < 0$, when $\widehat{K}_{\mathrm{F}} > 0$, if and only if $\omega \leq 0$, where $\omega = \left[\{\theta_{TX}(\theta_{KM} + \theta_{NM}\theta_{KN})\}\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right) - \{(\quad W^* - W) \times |\theta|\Delta/W^*\}\right]$.

This leads to the final proposition of the model.

Proposition 4 FDI depresses the level of urban unemployment if and only if $\left[\{\theta_{TX}(\theta_{KM} + \theta_{NM}\theta_{KN})\}\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right) - \{(\quad {}^{W} - W)|\theta|\Delta/W^*\}\right] < 0$.

In fact, foreign capital inflows do not necessarily accentuate unemployment in a developing economy. It is quite possible that $\omega \cong 0$. If this is the case, the country will experience a 'jobless growth'. In fact, many of the developing countries, including India, will experience such type of growth during the liberalised regime.

9.3.2 Reduction in Protection in Import-competing Sector

In order to evaluate the impact of the liberalised trade policy (reduction in the *ad-valorem* rate of tariff protection), on the real wage, welfare and unemployment scenarios, we are going to implement 'hat algebra' for Eqs. (9.1)–(9.3) and apply envelope conditions, but this time we are taking into account the capital stock and land endowment as given/exogenous to the economy.

$$\widehat{W} = -\frac{\theta_{TX}}{|\theta|}\left[(\theta_{KM} + \theta_{NM}\theta_{KN})\widehat{P_N} - \theta_{KN}\widehat{T}\widehat{t}\right] \tag{9.22}$$

$$\widehat{R} = \frac{\theta_{LX}}{|\theta|}\left[(\theta_{KM} + \theta_{NM}\theta_{KN})\widehat{P_N} - \theta_{KN}\widehat{T}\widehat{t}\right] \tag{9.23}$$

$$\widehat{r} = \theta_{KM}\left(\left(\frac{t}{1+t}\right)\widehat{t} - \theta_{NM}\widehat{P_N}\right) \tag{9.24}$$

where

$$|\theta| = \theta_{KM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})$$

Similarly, totally differentiating Eqs. (9.6)–(9.8), substituting (9.21)–(9.23) and solving by Cramer's rule we get

$$\widehat{N} = \frac{1}{|\lambda|}\left[\left(\lambda_{TX}\lambda_{KM}B_1 + \lambda_{LX}\lambda_{KM}B_2 + \lambda_{TX}\widetilde{\lambda}_{LM}B_3\right)\widehat{P_N} - \left(\lambda_{LX}\lambda_{KM}B_4 + \lambda_{TX}\lambda_{KM}B_5 + \lambda_{TX}\widetilde{\lambda}_{LM}B_6\right)\widehat{t}\right] \tag{9.25}$$

$$\widehat{M} = \frac{1}{|\lambda|}\left[(\lambda_{LX}\lambda_{TN}B_3 - \lambda_{LX}\lambda_{KN}B_2 - \lambda_{LN}\lambda_{TX}B_3 - \lambda_{TX}\lambda_{KN}B_1)\widehat{P}_N - (\lambda_{LX}\lambda_{TN}B_6 - \lambda_{LX}\lambda_{KN}B_4 - \lambda_{LN}\lambda_{TX}B_6 - \lambda_{KN}\lambda_{TX}B_5)\widehat{t}\right] \tag{9.26}$$

Note that we have all of the $B_1, B_2, B_3, B_4, B_5 < 0$.[10] Under the condition $\widetilde{\lambda}_{LM}$ is negligible,[11] $B_6 < 0$. Since the output of sector N is relatively more labour-intensive

[10] See Appendix 3 for these expressions.

[11] This is a realistic assumption since for most of the low-income developing countries share of employment in the registered sector is likely to become negligible over time, as bulk of the workforce are engaged in informal jobs, including agriculture. For example, in India, more than 90% people are engaged in agriculture, rural nonfarm and other informal activities. The focus of this paper is on such LDCs. This assumption has also been used in Marjit (2003). The assumption is about share of employment in the registered sector. To assume share of employment in the registered sector is negligible compared to the other sectors of the economy does not rule out the existence of unemployment in sector *M*, nor reduce the importance of sector *M*. Empirically it only indicates that productivity has improved in sector *M*.

compared to land vis-à-vis sector X, we have $|\theta| = \theta_{KM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN}) < 0$ and $(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX}) < 0$. Therefore, $\Omega = \left[B_3\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \lambda_{TX}\widetilde{\lambda}_{LM}\right) - \lambda_{LX}B_2 - \lambda_{TX}B_1\right] > 0$. It can be shown that by the stability condition in the market for non-traded input $(\Omega/|\lambda|) < 0$. This implies $|\lambda| < 0$ as $\Omega > 0$.

Also, it is straightforward to obtain

$$\widehat{P_N} = \frac{\widehat{t}}{\Omega}\left[B_6\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \lambda_{TX}\widetilde{\lambda}_{LM}\right) - B_4\lambda_{LX} - B_5\lambda_{TX}\right] \tag{9.27}$$

So if (1) $\widetilde{\lambda}_{LM} \cong 0$, (2) $|\theta| = \theta_{KM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN}) < 0$ and $(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX}) < 0$, $\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX}) < 0$, then $\widehat{P_N} < 0$, $\widehat{N} > 0$ and $\widehat{M} < 0$.

Differentiating (9.11) and (9.12) we get

$$\frac{dU}{U_1} = dD_X + (1+t)P_M dD_M = J\left[(1-L_X)W\widehat{W} + tP_M\left(tP_M\widehat{St} - M\widehat{M}\right)\right]$$

where $U_1 = \frac{\partial U}{\partial D_X}$, $J = \frac{1+t}{\{1+(1-c)t\}}$, $S = \left(\frac{\partial D_M}{\partial P_M}\right) + \left(\frac{\partial D_M}{\partial Y}\right)D_M$ is the Slutsky's pure substitution term, and $c = (1+t)P_M\left(\frac{\partial D_M}{\partial Y}\right)$ is the marginal propensity to consume good M.

$$\frac{dU}{U_1\widehat{t}} = J\left[\left\{(1-L_X)W\frac{\widehat{W}}{\widehat{t}} - tP_M M\left(\frac{\widehat{M}}{\widehat{t}}\right)\right\} + (tP_M)^2 S\right] \tag{9.28}$$

represents the impact of tariff reduction on welfare.

Substituting $\widehat{P_N}$ from Eq. (9.27) into (9.22), we obtain

$$\widehat{W} = -\left(\frac{\theta_{TX}\widehat{t}}{|\theta|}\right) \times \left[\left\{\begin{array}{c} B_6\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{NX}\right) \\ -B_4\lambda_{LX} - B_5\lambda_{TX} \end{array}\right\}\left(\frac{\theta_{KM} + \theta_{NM}\theta_{KN}}{\Omega}\right) + \theta_{KN}\left(\frac{t}{1+t}\right)\right] \tag{9.29}$$

So $\widehat{W} < 0$ when $\widehat{t} < 0$, iff $|\theta| < 0$ and $(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX}) < 0$.

Now, From HT migration equilibrium we have,

$$L_U = \left[\left\{\left(\frac{W^*}{W}\right) - 1\right\}a_{LM}M\right]$$

Totally differentiating the migration equilibrium condition we otain

$$\widehat{L_U} = \frac{\lambda_{LM}}{\lambda_{LU}} \left[\underbrace{\left(\frac{W^*}{W} - 1 \right) \left(\widehat{a_{LM}} + \widehat{M} \right)}_{<0, \text{centripetal force}} + \left\{ \underbrace{-\left(\frac{W^*}{W} \right) \widehat{W}}_{>0, \text{centrifugal force}} \right\} \right] \tag{9.30}$$

These lead to the following proposition:

Proposition 3 *Tariff reduction may lead to stagnant employment situation in the urban manufacturing sector if* $\left|\widehat{M}\right| \cong \left|\widehat{W}\right|$ *provided* $\widetilde{\lambda}_{LM} \cong 0$ *and sector X is relatively land-capital intensive than sector N in physical and value terms.*

Proof It is evident from Eqs. (9.25), (9.26), (9.28) and (9.39) when $\widetilde{\lambda}_{L3}$ is negligible,$|\theta| < 0$ and $(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX}) < 0$; we have $B_6\langle 0 = \rangle \widehat{M} < 0$; $\widehat{P_N} < 0; \widehat{W} < 0$ when $\widehat{t} < 0$. Therefore, Eq. (9.29) indicates the possibility of zero net job creation in the urban sector during liberalised regime. The intuition is as follows:

A reduction in import tariff depresses the domestic price of M, leading to a contraction of this sector. The capital-intensive urban sector now demands less capital, which, in turn, depresses the return to capital (r). This contraction of sector M lessens both demand for and supply of the non-traded input produced by rural nonfarm sector; but with the urban manufacturing sector being accounted for significantly low share of total employment, the demand-effect dominates and P_N falls. Now in the '*Heckscher-Ohlin nugget*' formed by the rural agricultural and the rural nonfarm sectors (using two mobile factor: labour and land), the fall in P_N induces a Stolper-Samuelson effect, inducing W to fall but R (return to land) to go up under the assumption $|\theta| < 0$.

Note that there will be four different impacts on social welfare: total wage income decreases as W falls; rental income from land rises; return to mobile capital falls; and as M falls, the cost of tariff protection of the import-competing sector, $tP_M M$, falls. Therefore, the possibility to achieve an increase in the economy-wide social welfare arises: if the initial tariff rate is large enough so that the net effect of reduction in distortion costs of tariff becomes dominant.

Now let us explore Eq. (9.29) to understand the effect on urban unemployment: (1) sector M contracts. (2) Since (W^*/r) rises, labour-output ratio in sector M, a_{LM}, falls. Therefore, the number of jobs available in the urban sector, $a_{LM}M$, falls. This decreases the expected urban wage for every prospective rural migrant leading to a reverse migration from urban to rural sector. This is the '*centripetal force'* reducing the extent of urban unemployment. However, as competitive rural wage falls, that will induce the rural workers leaving the rural sectors and joining the urban unemployment pool. This is the '*centrifugal force'* worsening the problem. If the relative strengths of these two opposite forces approximate to each other, there may be no net job creation in the urban sector. Also, if the magnitude of the centrifugal force is larger, the economy might experience significant job losses in the urban sector even after adopting this policy of tariff reform.

However as pointed out before, the economy-wide social welfare may improve. This indicates the possibility of the economy to experience 'jobless growth'[12] in this liberalised regime.

The organised manufacturing sector accounts for a small share of total employment in most of the low-income developing countries and this extension adds insight into why for a developing country like India trade liberalisation can enhance growth prospects but at the risk of significant job losses or stagnation in urban employment.

9.4 Concluding Remarks

This chapter predicts about the structural change and employment outcomes of allowing for FDI and opening the import-competing sector of the economy to more foreign competition for a developing dual economy facing competitive world markets with imperfect labour mobility, rural–urban migration possibility and open urban unemployment. Such liberalisation policies have been interpreted in various contesting manner, especially in the context of South Asian emerging economies, for instance, India or Bangladesh. The key comparative static exercises considered in this chapter are the consequences of liberalised investment and trade policies. The contribution of this modelling structure, with respect to the earlier related works (namely, Hazari and Sgro 1991; Marjit 2003; Chaudhuri 2007) has been to incorporate partial capital mobility between rural (informal) and urban (formal) sectors,[13] albeit with existence of urban unemployment. The different theoretical models here try to show that economic reforms may lead to output expansion without a growth in productive employment in the organised sector. However, none of these policies can rule out the prediction of 'jobless growth' as implied from Proposition 2 and is explained in Proposition 3. Therefore, the theoretical analyses presented in this chapter point to the notion that trade reform measures have made India increasingly dependent on extremely volatile external economic events, as a result of which, markets for the products of registered manufacturing sector have been opened up for competition too rapidly that allowed employers to replace labour for capital, leading to lower share of employment in the registered sectors (which has been captured by the sufficient condition $\widetilde{\lambda}_{LM} \cong 0$ in our model). Therefore, it has been the case that the 'growth-effect' does not 'trickle down' to the job losers, leading to 'jobless growth' in the registered sectors. That is precisely why increasing productive employment becomes a real challenge for a developing economy like India during this liberalised regime (World Development Report 2013).

[12]However, because this is a static (steady-state equilibrium) model, 'growth' means sectoral expansion from initial equilibrium point to the final/resultant long-run steady-state equilibrium point, without considering the instantaneous dynamic adjustment between these two equilibrium points.

[13]In particular, capital is mobile between rural nonfarm sector and urban sector.

Appendix 1: The Tables Summarising Model Characteristics

Table 9.1 Model characteristics

No of sectors	Sector definitions		Input usage		Relative factor-intensity ranking
	Traded	Non-traded	Rural sectors (Sectors X & N)	Registered manufacturing sector (sector M)	
	• Sector X → Exportable producing agricultural sector within the rural area	• Sector N → Rural nonfarm sector, providing local intermediate inputs for sector M	• Labour market → Competitive labour market—Labourers are perfectly mobile between sectors X & N, since both are situated in close vicinity within the rural area	• Labour market → Unionised (imperfect) labour market, with workers receiving contractual wage	• Heckscher–Ohlin (HO) 'nugget' → Formed by the sectors X & N, using two common factors—Land and labour • In this HO-nugget, we assume sector X is relatively more land intensive than sector N
	• Sector M → Registered industrial sector within the urban area. Producing agro-based finished import-competing goods (for e.g. sugar)		• Land usage → Sectors X & N use land in production of agricultural products	• Capital usage → Sector M uses capital, on the top of using labour and intermediate input (provided by sector N) in its production	
			• Capital usage → Sector N uses capital, on the top of using land in its production		

Table 9.2 The General Equilibrium System

Variables			Key equations describing the model		
Endogenous	Exogenous	Policy parameters	Price subsystem (price = unit cost)	Quantity (output) subsystem (full employment/ utilisation of factors)	Simplifying assumption
$W, R, r, P_N, X, N, M, L_U$	$\overline{K_D}, L, T, P_M$	K_F, t, W^*	Equations (9.1)–(9.3)	Equations (9.6)–(9.10)	a_{NM} is constant

Appendix 2: Details of Some Algebraic Expressions

$$A_1 = (1/|\theta|)\begin{bmatrix}\theta_{KM}\left(\lambda_{LX}S^X_{LT} + \lambda_{LN}S^N_{LT}\right) - \theta_{TX}\theta_{KM}(1-\lambda_{LM}) - \\ \theta_{NM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\widetilde{\lambda}_{L3}S^M_{LK}\end{bmatrix} < 0 \tag{9.31}$$

$$A_2 = (1/|\theta|)\left[\theta_{KM}\left(\lambda_{TX}S^X_{TL} + \lambda_{TN}S^N_{TL}\right)\right] < 0 \tag{9.32}$$

$$A_3 = \left(S^M_{KL}/|\theta|\right)[\theta_{TX}(\theta_{KM} + \theta_{NM}\theta_{KN}) - (|\theta|.\theta_{NM}/\theta_{KM}) + \theta_{TX}\theta_{LN}] \tag{9.33}$$

where S^I_{jk} is the degree of substitution between factors j and k in the I$^{\text{th}}$ sector (j, $k = L, T, K$ and $I = X, N, M$). For example, $S^N_{KL} = (\partial a_{KN}/\partial W)(W/a_{KN})$. $S^I_{jk} > 0$ for $j \neq k$ and $S^I_{jj} < 0$. Note that since the production functions are linearly homogenous, the factor coefficients $a_{jI}s$ would also be homogenous of degree zero in factor prices. Therefore, the sum of these elasticities for any factor of production in any sector with respect to factor prices must be equal to zero. As an example, for labour in the agricultural exportable sector we have $\left(S^X_{LL} + S^X_{LT}\right) = 0$.

Appendix 3

$$B_1 = (1/|\theta|)\left[(\theta_{KM}+\theta_{NM}\theta_{KN})\left\{\overline{\lambda}_{LI}\overline{S}^H_{Lj} + \theta_{TX}(1-\lambda_{LM})\right\} - \theta_{NM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\left(\lambda_{LN}S^N_{LK} + \widetilde{\lambda}_{LM}S^M_{LK}\right)\right] \tag{9.34}$$

$$B_2 = (1/|\theta|)\left[(\theta_{KM} + \theta_{NM}\theta_{KN})\overline{\lambda}_{TI}\overline{S}^H_{Tj} - \theta_{NM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\lambda_{TN}S^N_{TK}\right] < 0 \tag{9.35}$$

$$\overline{\lambda}_{TI}\overline{S}^H_{Tj} = \left(\lambda_{TX}S^X_{TL} + \lambda_{TN}S^N_{TL} + \lambda_{TN}S^N_{TK}\theta_{LX}\right) > 0 \tag{9.36}$$

$$B_3 = \left(\frac{1}{|\theta|}\right)\left[(\theta_{KM} + \theta_{NM}\theta_{KN})\left(1 - S^N_{KK}\theta_{LX}\right)\lambda_{KN}\right.$$

$$\left. -\theta_{NM}(\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\lambda_{KN}\left(S^N_{KL} + S^N_{KT}\right)\right] < 0 \tag{9.37}$$

$$B_4 = \frac{t}{(1+t)|\theta|}\left[\overline{\lambda}_{TI}\overline{S}^H_{Tj}\theta_{KN} - (\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\lambda_{TN}S^N_{TK}\right] < 0 \tag{9.38}$$

$$B_5 = \frac{t}{(1+t)|\theta|}\Big[\theta_{KM}\bar{\lambda}_{LI}\bar{S}^H_{Lj} - (\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\Big(\lambda_{LN}S^N_{LK} + \widetilde{\lambda}_{LM}S^M_{LK}\Big)\theta_{KM}\bar{\lambda}_{LI}\bar{S}^H_{Lj} - (\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\Big(\lambda_{LN}S^N_{LK} + \widetilde{\lambda}_{LM}S^M_{LK}\Big)\Big] < 0 \tag{9.39}$$

$$B_6 = \frac{t}{(1+t)|\theta|} \times \Big[\theta_{KM}\widetilde{\lambda}_{LM}\big(\theta_{LX}S^N_{KK} - 1\big) - (\theta_{LX}\theta_{TN} - \theta_{TX}\theta_{LN})\lambda_{KN}\big(S^N_{KL} + S^N_{KT}\big)\Big] \tag{9.40}$$

Appendix 4: Stability Condition in Product Market for Nonfarm Sector

P_N, the price of non-traded intermediate input (produced by the rural nonfarm sector) must adjust to clear its domestic market. Therefore, the stability condition for equilibrium in this market needs

$$\big\{d\big(N^D - N\big)/dP_N\big\} < 0 \tag{9.41}$$

That means around equilibrium, initially, $N^D = N$. Therefore,

$$\Big\{\Big(\widehat{N^D}/\widehat{P_N}\Big) - \Big(\widehat{N}/\widehat{P_N}\Big)\Big\} < 0 \tag{9.42}$$

Now $N^D = a_{NM}M$ is the demand for non-traded input. Total differentiation gives, $\widehat{N^D} = \widehat{M}$. **For FDI**, using Eqs. (9.13) and (9.14), we respectively obtain

$$\left(\frac{\widehat{N}}{\widehat{P}_N}\right) = \left(\frac{1}{|\lambda|}\right)\Big(\lambda_{TX}\lambda_{KM}A_1 + \lambda_{LX}\lambda_{KM}A_2 + \widetilde{\lambda}_{LM}\lambda_{TX}A_3\Big) \tag{9.43}$$

$$\left(\frac{\widehat{N^D}}{\widehat{P}_N}\right) = \left(\frac{1}{|\lambda|}\right)(|\lambda|A_3 - \lambda_{LX}\lambda_{KN}A_2 - \lambda_{TX}\lambda_{KN}A_1) \tag{9.44}$$

Using Eqs. (9.43) and (9.44) we get the required stability condition

$$\big(\Delta/_{|\lambda|}\big) < 0 \tag{9.45}$$

where

$$\Delta = \left[A_3\left(\lambda_{LX}\lambda_{TN} - \lambda_{LM}\lambda_{TX} - \widetilde{\lambda}_{LM}\lambda_{TX}\right) - \lambda_{L1}A_2 - \lambda_{N1}A_1\right]$$

For tariff reduction in the import-competing sector, we equivalently obtain,

$$\left(\frac{N}{\widehat{P}_N}\right) = \left(\frac{1}{|\lambda|}\right)\left(\lambda_{TX}\lambda_{KM}B_1 + \lambda_{LX}\lambda_{KM}B_2 + \lambda_{TX}\widetilde{\lambda}_{LM}B_3\right) \tag{9.46}$$

$$\left(\frac{N^D}{\widehat{P}_N}\right) = \left(\frac{1}{|\lambda|}\right)(\lambda_{LX}\lambda_{TN}B_3 - \lambda_{LX}\lambda_{KN}B_2 - \lambda_{LN}\lambda_{TX}B_3 - \lambda_{TX}\lambda_{KN}B_1) \tag{9.47}$$

Using Eqs. (9.46) and (9.47) we get the required stability condition

$$(\Omega/\lambda) < 0 \tag{9.48}$$

where

$$\Omega = \left[B_3\left(\lambda_{LX}\lambda_{TN} - \lambda_{LN}\lambda_{TX} - \lambda_{TX}\widetilde{\lambda}_{LM}\right) - \lambda_{LX}B_2 - \lambda_{TX}B_1\right]$$

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Chapter 10
Convergence in Monthly Per Capita Expenditure and the Rural–Urban Dichotomy: Evidence from Major Indian States

Debashis Acharya, Badri Narayan Rath, and Tapas Kumar Parida

Contents

Abstract In this chapter we make an attempt to examine convergence in monthly per capita expenditure (MPCE) of Indian households utilising data obtained from the National Sample Survey Organisation(NSSO) over the period 1993–94 to 2011–12, for 17 major Indian states. In the process, a probable existence of the rural urban dichotomy in convergence is also being explored. The choice of time period is guided by consistsnt avaialbility of data coinciding with the post reform period and the PS panel club convergence test is employed to achieve the objectives set in the chapter. All the states taken together indicate a divergence in MPCE and the major 15 states of India do not follow a unique single transition path. The monthly per capita consumption across these states exhibit distinct transition paths. Further, there is existence of convergence at sub-group level except three states. The speed of

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covergence and the transition paths being different in rural areas from that of the urban also yield evidence on the rural urban dichotomy. Finally, we attempt to study the determinats underlying the convergence obatined from the empirical analysis carried out in the first stage.

Keywords Convergence · Club convergence · Monthly per capita expenditure · Fixed effect

10.1 Introduction

Inclusive growth has been one of the key objectives of policy makers in the post-reform India. But the higher growth observed in the last few decades seems to have come with a cost in terms of regional disparities among the states in India. The earlier studies with an interest in performance of Indian states analyze variation in growth performance in pre- and post-reform period (Ahluwalia 2000). A few other studies such as Debroy and Bhandari (2008), Radhakrishna (2015) examine issues relating to growth, ineqality and poverty reduction to compare performance of rich and poor states of India. Similarly, studies by Krishna (2004) and Chaudhuri (2004) discuss instability and volatility of growth and also throw some light on differences in Gross State Domestic Product (GSDP) deflators as measures of state level inflation. One also finds studies analyzing state level growth performance as a result of the economic reforms. For instance, Panagariya et al. (2014) argue on the positive effects of state level reforms. The authors are of the view that, "...when the national government loosened its stronghold on industry and services, state governments were able to shape the fortunes of their citizens through state level policy reforms. Because of this, every Indian state experienced accelerated growth, unlike China during the first two decades of its development when the eastern half flourished as the western half lagged. Every Indian state has grown faster in the last decade than any other decade in the post-independence era. In fact, some of the poorest states, notably Bihar and Orissa, have been growing the fastest."

Of late, the debate on subnational performance revolves around themes of regional imbalance, regional disparities, convergence and the growth-inequality trade off. The nature of this debate heavily depends on the results obtained by different authors due to the ideological premise, variables employed, methodology used and the time period of the study. A few major studies reviewed below use per capita income of the states, variables like population, investment, literacy, and night light data at state/district level to study convergence across Indian states. Thus, the focus of some of these studies has been on outputs like per capita income as well as inputs like population and investment to examine convergence. Another set of studies look at overall macroeconomic performance at subnational i.e., state level (Sahoo and Acharya 2012; Acharya and Sahoo 2017) using macroeconomic

variables and draw a comparative account of the states' performance. We review some major past studies on the themes discussed above in the Indian context.

Cashin and Sahay (1996) in their IMF study examine if "the initially poor economies of India grew faster than their initially rich counterparts over 1961–91?" The study considers the sectoral composition of 20 states for the period 1961–1991. The results suggest that each year during the study sample, about 1.5% of the real per capita income gap between rich and poor states used to get closed. Also, such result implies that, about 45 years of time is required to close half the gap between initial per capita income of any state and its common long-run level of per capita income. A widening of real per capita NDP dispersion is also observed for the studies in this paper. The results contrast the industrial countries' experience in this regard. The study also infers that "...the dispersion of states' real per capita disposable incomes was narrower than the dispersion of states' real per capita incomes, as relatively more grants were transferred to poor states than to their rich counterparts."

Trivedi (2002) uses a data set of 16 Indian states for the period 1960–1992 to examine regional convergence and catch up in level and growth of per capita income. Though there is no evidence of unconditional β-convergence, there is conditional β-convergence. The results indicate σ-divergence since state incomes mover away from each other as seen in dispersion of their incomes and cross state distribution's shape.

In another paper Chikte (2011) shows presence of sigma divergence in the per capita Net State Domestic Product (NSDP) of 15 Indian states over the pre-and post-reform time periods. There is dispersion of the per capita NSDP in periods before and after economic reforms/liberalization. Some variables like population and investment analyzed in the paper show divergence too. But literacy seems to have converged. In this light, the study calls for accelerated reforms in general and particularly in backward areas.

On convergence again, Bandyopadhyay (2012) finds two convergence clubs at 50% and 125% of national average income. Income disparities seem to have declined across Indian states in the 1960s, but increase between 1970s and 1990s. No evidence of a "neighbors' effect" explaining polarization is found here. Thus the spatial interactions typically found in developed countries seem to be absent in India, being a developing country, infers this study.

Ghosh et al. (2013) examine regional divergence in income across major Indian states. By employing panel data of per capita income for 15 major Indian states and the Phillips and Sul (2007) method, this study estimates convergence clubs. The results indicate divergence across states both in terms of aggregate per capita income and sectoral incomes. Departing from the earlier studies the results of this paper point towards large variations in number and composition of clubs across sectors. The authors attribute the divergence in incomes and different convergence clubs to a host a factors such as varying physical, economic, and social endowments, investment that went into the sates, human capital. Finally, the study calls for appropriate policies for balanced regional development.

Sanga and Shaban (2017) address the question of regional development by analyzing regional convergence across 15 major states in India. The results indicate divergence for the period 1970–1971 to 2013–2014. Overall, the findings do not support the neoclassical convergence hypothesis wherein poor regions/states are expected catch up with the relatively developed regions/states in the long run.

Among the studies on macro performance of states, Sahoo and Acharya (2012) examine macroeconomic performance of 22 Indian states by constructing an index using three macro indicators—GSDP growth, price stability, and fiscal deficit. The indices with fiscal deficit as an additional component change the ranking of states from that using GSDP growth and price stability alone. Further, Sahoo and Acharya (2012) examine the dynamic macroeconomic performance of 15 major Indian States. Three macro indicators namely growth of GSDP, price stability derived from gross state domestic product deflator and fiscal deficit as percentage of gross state domestic product are used to compute Macroeconomic Performance (MEP) index score of each state. The inclusion of fiscal deficit makes a difference in assessing the macro performance of the States via MEP index scores when compared with growth alone as the sole performance indicator of a state. The high-growth states like Gujarat and Maharashtra as classified in one of the World Bank studies appear to have low ranks in terms of dynamic macroeconomic performance scores. As regards the volatility in macroeconomic performance across states, there is a decline over the years 1994–1995 to 2001–2002 followed by an increase up to 2005–2006 and subsequently showing a decline.

The idea of convergence is also employed in studying a few other non-economic growth indicators like ICT, health expenditures, financial markets, tourism, etc. (Narayan 2007; Fung 2009; Narayan et al. 2011; Rath 2016). A study by Rath (2016), examines the convergence of information and communication technologies (ICT) among 47 developed and emerging countries for the period 2000 to 2012, using the annual data. The cross-country empirical analysis is based on the neoclassical notion of absolute and conditional convergence. With the principal component analysis, an ICT development index is constructed, and dynamic panel data model is estimated to check divergence in ICT development. The study identifies two factors that drive a country's digitalization divergence level: (1) the growth of per capita income and (2) the ratio of urban to rural population. The results indicate that countries that initially differ in ICT development tend to diverge to different steady states. The divergence of ICT development is found both in the absolute and conditional senses. Finally, from the policy perspective, the digital divide that exists around the world between advanced and emerging countries needs to be reduced by fostering ICT development in EMEs. The emerging countries also need to emphasize increasing fixed-broadband connections, providing internet facilities at an inexpensive rate and focusing on quality education.

Rath and Akram (2019) also revisit the total factor productivity (TFP) convergence by employing the latest Lagrange multiplier and residual augmented least squares Lagrange multiplier unit root tests. The study uses annual data for 44 developing and 29 developed countries covering the time period 1970–2014. The unit root tests support evidence of TFP convergence. The region-based results (Africa, Asia,

and Latin America and the Caribbean) also confirm TFP convergence. Further, results derived from the Phillips and Sul test support TFP convergence, although the speed of convergence varies by region. The highest speed is noted in the Asia region, whereas the lowest of speed productivity convergence is observed in the Africa region.

Similarly, a study by Akram and Rath (2019) examine the convergence analysis of public debt among Indian states using annual data from 1990–1991 to 2014–2015, using the hypothesis club convergence technique propounded by Phillips and Sul (2007). The results confirm the existence of debt divergence for Indian states. The existence of convergence is found for market loans and bank loans; however, the presence of divergence is found in case of loans and advances for overall states. Akram et al. (2019) investigate the per capita output club convergence in 120 countries for the period 1995–2015, in all the broad sectors such as agriculture, industry, and service. The convergence hypothesis is tested by following the Phillips and Sul panel club convergence technique. Their results indicate that output divergence for the full sample; and when countries are divided into different clubs, the results exhibit the sign of per capita output club convergence both for aggregate and three major sectors.

Bhattacharya et al. (2018), test the hypothesis of energy productivity convergence in a panel of contiguous states and territories (S&Ts) in India. In measuring energy productivity at the S&T level, they have used a unique firm level dataset for the period 1988 to 2016. The conclusion is that energy productivity across the S&Ts converges into two clubs with one divergent club. Higher initial energy productivity makes it more likely for states to be in the high-energy productivity club. Industry structure is also an important determinant. The club convergence of the S&Ts has implications for Indian energy policy.

Departing from the above ideas on convergence a recent study by Cahnda and Kabiraj (2020) use the nighyt light data to address the debate on unequal growth in India. The analysis of 520 districts over a 15-year-long period spanning 1960–2010 yield absolute convergence in contrast to previous studies using some income measure. A unique insight from this study is about the rural urban gap, which shows faster growth in rural areas. This goes against the vividly argued rural distress, post reforms in India by a few studies and the usual rhetoric seem from some quarters. The study also finds the disadvantaged districts in terms three geographical variables namely "distance to coast, agricultural land suitability, terrain ruggedness" have grown faster during 1992–2013. The study also infers that the convergence evidenced is irrespective of policy.

In view of the above background, this chapter is motivated to examine convergence in monthly per capita expenditure (MPCE) of Indian households utilizing data obtained from the National Sample Survey Organisation (NSSO) over the period 1993–1994 to 2011–2012. In the process, a probable existence of the rural urban dichotomy in convergence is also being explored. The choice of time period is guided by consistent availability of data and the time period also coincides with the post-reform India. An attempt is also made to study the determinants underlying the

convergence obtained from the empirical analysis that we carry out in the first step of our work.

The rest of this chapter is organized as follows. Section 10.2 begins with some justification for the present study, presents methodology and sources of data. Section 10.3 discusses the empirical results obtained. Finally, Sect. 10.4 offers some concluding remarks.

10.2 The Present Study, Methodology, and Data

From the standpoint of welfare analysis, a country's income can only be treated as the means while consumption expenditures are the ends. The per capita consumption expenditures imitate directly on inequality movement in the standard of living across geographical regions (Wan 2005). Therefore, it is imperative to examine the convergence of per capita consumption expenditure across Indian states and particularly by emphasizing the rural and urban consumption patterns. In the literature, a plethora of studies examine the convergence starting from income, output and productivity (see for instance, Baumol 1986; De Long 1988; Barro and Sala-i-Martin 1992; Bernard and Charles 1996; Apergis and Christou 2016; Maryam and Jehan 2018). These studies focus on "convergence hypothesis" in cases of various countries by employing distinctive datasets, different time periods and diverse methodologies. Although many studies examine this issue, still there has been considerable debate on the central notion of the meaning of "convergence" remains unsettled.

Three broad ideas of convergence are well documented in the literature: First, the notion of convergence developed in the neoclassical growth theory assumes a homogeneous rate of time preference along with identical production functions across regions. Under this assumption, convergence occurs when all regions follow a common steady state equilibrium path with respect to per capita income. In the later stage, Barro and Sala-i-Martin (1992) in their seminal work defined Sigma and Beta convergence. Sigma convergence occurs when cross-section standard deviation of income or output or consumption levels across regions decreases over time. Beta convergence define as a scenario when low income or consumption regions grow faster than high income or consumption regions. The literature also demonstrates that Beta convergence is a necessary condition for Sigma convergence but not sufficient condition mainly because level of income or output may also change over time across regions. Second, the distribution dynamics to study the convergence (Friedman 1992; Quah 1994, Quah 1996). Third, examining the convergence based on integrated property of a series. In this case, one can examine whether per capita income or consumption or expenditure as of a group of economies follow the common deterministic or (and) stochastic trend (Bernard and Durlauf 1995; Evans and Karras 1996; Lee et al. 1997).

The examination of convergence for per capita consumption in this study is closely related to the second and third ideas of convergence, mentioned earlier. But we employ a *state-of-the art* test due to Phillips and Sul (2007, hereafter, PS).

The PS panel club convergence test appears to be more suitable than the often-applied measures of Sigma (σ) and Beta (β) convergence. The PS test identifies multiple steady state as opposed to a single steady state equilibrium path as mentioned in the neoclassical theory of convergence hypothesis. The other advantage of PS test is that heterogeneity is accounted for, while dealing with a group of states. Further, we estimate the speed of convergence using PS test, which is another value addition to the existing literature on examination of consumption convergence.

The PS convergence is primarily based on the club clustering approach. The club clustering approach helps in removing both trend and cyclical components of each series in a panel dataset. By following this test, we can decompose the per capita consumption as:

$$\text{MPCE}_{it} = \text{X}_{it} + Y_{it} \tag{10.1}$$

where MPCE_{it} refers to Monthly Per capita Consumption Expenditures (MPCE) of Indian states; X_{it} is the "systematic" component and Y_{it} refers to "transitory" components. Equation (10.1) can be further expanded as:

$$\text{MPCE}_{it} = \left(\frac{X_{it} + Y_{it}}{u_t}\right) u_t = \delta_{it} u_t, \tag{10.2}$$

where δ_{it} indicates "idiosyncratic element" and u_t is a single "common steady state trend function" which captures stochastic as well deterministic trend behavior. The idiosyncratic element δ_{it} measures the distance between MPCE_{it} and the common trend component u_t. To obtain the results, this model imposes approximately restrictions on δ_{it} and u_t. As a result, PS removes the common factors as follows.

$$h_{it} = \frac{\text{MPCE}_{it}}{\frac{1}{N}\sum_{i=1}^{N} \text{MPCE}_{it}} = \frac{\delta_{it}}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}} \tag{10.3}$$

where, h_{it} is the relative transition coefficient, which measures the loading coefficient by taking an average of the panel at time "t." PS further develops a regression t-test for the null hypothesis of convergence$H_0 : \delta_i = \delta$, with $a \geq 0$, and $H_1 : \delta_i \neq \delta$, with $a < 0$. The final regression implemented by Phillips and Sul (2007, 2009)[1] is written as follows:

$$log\left(\frac{\delta_{h1}^2}{\delta_{ht}^2}\right) - 2\ log\left[log\,(t)\right] = \alpha + \beta log(t) + u_t \tag{10.4}$$

[1]The details of formation of clubs which is based on the four steps can be found in the original Phillips and Sul (2007, 2009) article.

For $t = [rT], [rT] + 1, \ldots\ldots, T$ with $r > 0$, where $\frac{\delta_{ht}^2}{\delta_{ht}^2}$ is the cross-sectional variance ratio.

Based on the Monte Carlo experiments, PS test suggests that $r \in (0.2, 0.3)$. Specifically, it is suggested to set $r = 0.3$ for the small or moderate ($T \leq 50$) sample and set $r = 0.2$ for the large $T \geq 100$) sample.

Further this study examines the determinants of state-wise per capita consumption expenditures using a panel data model. The rationale for using the panel data model is to capture the state specific individual heterogeneity in addition to obtain more robust results by increasing the number of observations.

The present study uses the Fixed Effect Model, which can be written as:

$$y_{it} = \alpha + x_{it}\beta' + \mu_i + \varepsilon_{it} \tag{10.5}$$

where, y_{it} is the MPCE of ith state in the year t. x_{it} is a set of explanatory variables those could possibly affect the MPCE. β is the slope coefficient vector associated with explanatory variables, μ_i is as usual unobserved state specific characteristics and ε_{it} is the white noise term, which is independently and identically distributed among states and over years. Thus, Eq. (10.5) can be further written by specifying all the explanatory variables as follows:

$$lnMPCE_{it} = \alpha + \beta_1 lnCE_{it} + \beta_2 lnHE_{it} + \beta_3 lnGENR_{it} + \mu_i + \varepsilon_{it} \tag{10.6}$$

where, $MPCE_{it}$ is the Monthly Per capita Consumption Expenditures of state i at time t, CE refers to Capital Expenditures of state, HE refers to Health Expenditures, and GENR is the Gross Enrolment Rate taken as a proxy for human capital. μ_i and ε_{it} are defined in Eq. (10.5). Further we run the Eq. (10.6) for thrice by assigning three models. Model I estimates the determinants of average state-wise Monthly Per capita Consumption Expenditures (AMPCE), Model II considers the state-wise Monthly Per capita Consumption in rural areas (RMPCE) as dependent variable, and Model III examines the determinants of state-wise Monthly Per capita Consumption in case of urban areas (UMPCE). All the variables in Eq. (10.6) are in logarithmic forms. Finally, we employed the Hausman (1978) test to choose between Fixed Effect (FE) and Random Effect (RE) model.

The data on consumption expenditure for India is one of the indicators of well-being and level of living standard of the households. The study on the magnitude and pattern of consumption expenditure has great value for evaluating the impact of various programmes launched in India to ameliorate the living conditions of the poor households. The only source, which provides comprehensive time-series information in terms of consumption expenditure and distribution of households/ population by Monthly Per Capita Expenditure (MPCE) is National Sample Survey (NSS), which conduct surveys on consumption expenditure in the form of rounds.

For the empirical analysis, we have collected data for 17 (17) major Indian states from secondary sources, which are available in the public domain. The state-wise MPCE has been collected from the NSSO 50th Round (July 1993 to June 1994) to

68th round (July 2011 to July 2012) for a period of 5 years (i.e., 1994, 2000, 2005, 2010 and 2012). The other variables including capital expenditure and health expenditure has been collected from State Budget Documents and from the Reserve Bank of India's (RBI) report on State Finances. The data on Gross Enrolment Rate (GER) has been collected from "Educational Statistics at a Glance," Ministry of Human Resources Development, Government of India.

The household consumption expenditure survey of NSSO has revealed several important economic indicators of households, which is used by researchers, policy makers and academicians for planning, policy formulation, support in decision-making, etc. The NSS survey on household consumption expenditure is usually conducted every 5 years starting from the 27th round (Oct 1972–Sep 1973). The latest one is the NSS 68th round survey carried out during July 2011–June 2012, which is the ninth quinquennial survey in the series. These reports provide us with the rural and urban averages of Monthly Per Capita Expenditure (MPCE) at State/UT and National level both in food and non-food items.

Average Monthly Per Capita Consumption Expenditure(All India)							
		Rural			Urban		
Round	Period	Food	Non-food	Total	Food	Non-food	Total
27th	Oct 1972–Sept 1973	32	12	**44**	41	22	**63**
32nd	July 1977–June 1978	44	25	**69**	58	38	**96**
38th	Jan 1983–Dec 1983	74	39	**112**	97	68	**166**
43rd	July 1987–June 1988	101	57	**158**	140	110	**250**
50th	July 1993–June 1994	178	104	**281**	250	208	**458**
55th	July 1999–June 2000	289	197	**486**	411	444	**855**
61st	July 2004–June 2005	308	251	**559**	447	605	**1052**
66th	July 2009–June 2010	600	453	**1054**	881	1104	**1984**
68th	July 2011–July 2012	756	673	**1430**	1121	1509	**2630**
Memo:							
68R over 55 R (× times in 12 year)		2.62	3.41	**2.94**	2.73	3.40	**3.08**
68R over 61 R (× times in 7 years)		2.46	2.68	**2.56**	2.51	2.49	**2.50**

Source: NSSO

The above table indicates that the MPCE has increased almost threefold in rural areas and more than threefold in urban areas since the 55th round in 1999–2000. However, since the 61st Round of survey 2004–2005, the average MPCE in urban areas increased less (22.50) compared to rural areas (2.56). Interestingly, the share of food expenditure both in urban and rural areas has been declining in the total expenditure over the period. If we look the state-wise MPCE data, more than 50% of the major states' expenditure is higher than the national average. It indicates prima facie, presence of inequality among the states considered here.

Table 10.1 Results of aggregate MPCEconvergence

Club	States	$\hat{t}_b$	log (t)	Decision
Aggregate	All states	−2.7967	−118.855	Divergence
Club 1	Haryana, Maharashtra	1.56[a]	4.30	Club convergence
Club 2	Andhra Pradesh, Karnataka, Punjab, Tamil Nadu	0.46[a]	2.53	Club convergence
Club 3	Assam, Rajasthan	2.19[a]	4.48	Club convergence
Club 4	Madhya Pradesh, Uttar Pradesh	3.77[a]	4.33	Club convergence
Club 5	Bihar, Odisha	1.57[a]	4.08	Club convergence
Group	Gujarat, Kerala, West Bengal	−3.29[b]	−49.24	Neither convergence nor divergence
Merge				
Club1 + 2		−1.00	−95.54	Not merge
Club2 + 3		−1.89	−176.21	Not merge
Club3 + 4		−1.87	−8.63	Not merge
Club 4 + 5		−1.16	−20.48	Not merge
Group		−3.00	−78.93	Not merge
Final Clubs				
Club 1	Haryana, Maharashtra	1.56[a]	4.30	Club convergence
Club 2	Andhra Pradesh, Karnataka, Punjab, Tamil Nadu	0.46[a]	2.53	Club convergence
Club 3	Assam, Rajasthan	2.19[a]	4.48	Club convergence
Club 4	Madhya Pradesh, Uttar Pradesh	3.77[a]	4.33	Club convergence
Club 5	Bihar, Odisha	1.57[a]	4.08	Club convergence
Group	Gujarat, Kerala, West Bengal	−3.29[b]	−49.24	Neither convergence nor divergence

Notes: The critical value is −1.65 at 5% level of significance level. Source: Author's own calculation based on Phillips and Sul (2007, 2009). The results show the evidence club convergence
[a]Indicates non-rejection of the null of convergence
[b]Denotes the neither convergence nor divergence

10.3 Empirical Results and Discussion

10.3.1 Results of Convergence

To examine the convergence of consumption, we apply the PS panel club convergence test and the results of average per capita consumption expenditures across 15 major states are presented in Table 10.1. The average per capita consumption expenditures for each state and for all the periods are derived by combining the per capita consumption of rural and urban areas and then taking an average. This average monthly per capita consumption expenditures (AMPCE) is treated as the overall per capita consumption for a state. The aim of this study is to examine convergence and check for possible presence of dichotomy between rural and urban consumption expenditures pattern. Hence, it is important to check the convergence by taking average in the first stage. The column one of Table 10.1 shows the number of clubs

that exist. The second column represents number of states belonging to each club. The third column indicates the coefficient ($\hat{t}_b$) and followed by $log(t)$ statistics in the fourth column. The fifth column shows the decision.

The result based on taking all states together indicates a divergence in case of per capita consumption. This is because we reject the null of convergence as $log(t)$ values (−118.85) is less than the critical value (−1.65) at 5% level. The finding clearly indicates that the major 15 states of India do not follow a unique single transition paths, rather, the monthly per capita consumption across these states exhibit distinct transition paths. As there is existence of different transition paths across states, it further motivates us to check for club convergence in consumption at sub-group level. If yes, the idea is to see states that form a group(s) together. To answer this question, we further look at the results. The results in Table 10.1 shows five clubs, which are converging in a group. Club 1 represents Haryana and Maharashtra and club 2 represents Andhra Pradesh, Karnataka, Punjab, and Tamil Nadu. Similarly, Assam and Rajasthan are in club 3, Madhya Pradesh and Uttar Pradesh belong to club 4. Finally, Bihar and Odisha together form club 5. The results show convergence of consumption expenditure for all five clubs, except three states Gujarat, Kerala, and West Bengal, which do not show any evidence of convergence though they represent in a group. To summarize, the per capita consumption expenditure at state level shows divergence, when we consider all 15 states together, but there is existence of convergence at subgroup level except three states. Club 1 reveals that Haryana and Maharashtra are sharing same transition path in terms of per capita expenditures, which further indicates that per capita consumption expenditure pattern of both the states are the same. In the next step, we attempt merging two clubs together, but these merging clubs do not show any evidence of convergence.

After discussing the per capita consumption expenditure convergence across Indian states, we divide the data into rural and urban per capita consumption and examine if there is any evidence of convergence between these two categories. The results presented in Table 10.2 imply the following. First, the monthly per capita consumption expenditures in rural (RMPCE) areas across major 15 states do not provide any evidence of convergence, rather there exist heterogeneity patterns in terms of consumption expenditures among states. Second, although there is divergence when all 15 states are considered together, we find convergence at subgroup level by forming four clubs. The formation of these four clubs indicates a common steady state equilibrium path among the states within each club but paths are different between the clubs. For example, five states such as Andhra Pradesh, Haryana, Maharashtra, Punjab and Tamil Nadu follow a single common transition path by forming club 1; Gujarat, Karnataka and Rajasthan follow another single common transition path by forming club 2. But their transition paths vary between these two clubs. Third, by merging these two clubs together, we do not see any merging happening, which clearly indicate the pooling states from both the clubs do not lead to convergence as they follow different steady state equilibrium paths with regard to their rural consumption expenditures. Fourth, Kerala, Madhya Pradesh and

Table 10.2 Results of rural MPCE

Club	States	$\hat{t_b}$	log (t)	Decision
Aggregate	All states	−2.3866	−173.517	Divergence
Club 1	Andhra Pradesh, Haryana, Maharashtra, Punjab, Tamil Nadu	0.01[a]	0.04	Club convergence
Club 2	Gujarat, Karnataka, Rajasthan	0.50[a]	3.22	Club convergence
Club 3	Assam, West Bengal	1.60[a]	4.24	Club convergence
Club 4	Bihar, Odisha	0.30[a]	1.57	Club convergence
Group	Kerala, Madhya Pradesh, Uttar Pradesh	−2.78[b]	−64.44	Neither convergence nor divergence
Merge				
Club1 + 2		−1.24	−361.39	Not merge
Club2 + 3		−0.98	−166.17	Not merge
Club3 + 4		−2.29	−52.36	Not merge
Group		−2.58	−83.34	Not merge
Final Clubs				
Club 1	Andhra Pradesh, Haryana, Maharashtra, Punjab, Tamil Nadu	0.01[a]	0.04	Club convergence
Club 2	Gujarat, Karnataka, Rajasthan	0.50[a]	3.22	Club convergence
Club 3	Assam, West Bengal	1.60[a]	4.24	Club convergence
Club 4	Bihar, Odisha	0.30[a]	1.57	Club convergence
Group	Kerala, Madhya Pradesh, Uttar Pradesh	−2.78[b]	−64.44	Neither convergence nor divergence

Notes: The critical value is −1.65 at 5% level of significance level. Source: Author's own calculation based on Phillips and Sul (2007, 2009). The results show the evidence club convergence
[a]Indicates non-rejection of the null of convergence
[b]Denotes neither convergence nor divergence

Uttar Pradesh as a group neither converge or diverge in terms of their rural consumption expenditures pattern. Fifth, by comparing the findings obtained in Table 10.2 with the results of Table 10.1, we notice that the clubs are not common except Bihar and Odisha, which follows same transition path for overall per capita consumption as well as rural per capita consumption.

Next, we move to analyze the convergence of per capita consumption by considering consumption expenditures in urban areas of 15 major states. The results are illustrated in Table 10.3. The findings are somewhat similar to the results of Tables 10.1 and 10.2. There is existence of divergence when we pool all the 15 states together, which implies that all the major states in India do not follow a common steady state equilibrium path in terms of urban monthly per capita consumption expenditures (UMPCE). Further, based on PS clustering algorithm, four clubs emerge at a subgroup level.

The club 1 is represented by Kerala and Maharashtra. The sates of Andhra Pradesh, Gujarat, Karnataka, Punjab, Tamil Nadu, and West Bengal are in club 2; club 3 comprises of Madhya Pradesh, Rajasthan and Uttar Pradesh, and finally club 4 consists of Bihar and Odisha, which maintain consistency throughout. Although

Table 10.3 Results of urban MPCE

Club	States	$\hat{t_b}$	log (t)	Decision
Aggregate	All states	−3.0121	−119.013	Divergence
Club 1	Kerala, Maharashtra	−1.85[a]	−0.37	Club convergence
Club 2	Andhra Pradesh, Gujarat, Karnataka, Punjab, Tamil Nadu, West Bengal	0.14[a]	0.46	Club convergence
Club 3	Madhya Pradesh, Rajasthan, Uttar Pradesh	0.92[a]	5.94	Club convergence
Club 4	Bihar, Odisha	3.06[a]	4.38	Club convergence
Group	Assam, Haryana	−2.34[b]	−61.14	Neither convergence nor divergence
Merge				
Club1 + 2		−3.40	−127.68	Not merge
Club2 + 3		−2.55	−273.91	Not merge
Club3 + 4		−1.99	−15.89	Not merge
Group		−2.84	−125.50	Not merge
Final Clubs				
Club 1	Kerala, Maharashtra	−1.85[a]	−0.37	Club convergence
Club 2	Andhra Pradesh, Gujarat, Karnataka, Punjab, Tamil Nadu, West Bengal	0.14[a]	0.46	Club convergence
Club 3	Madhya Pradesh, Rajasthan, Uttar Pradesh	0.92[a]	5.94	Club convergence
Club 4	Bihar, Odisha	3.06[a]	4.38	Club convergence
Group	Assam, Haryana	−2.34[b]	−61.14	Neither convergence nor divergence

Notes: The critical value is −1.65 at 5% level of significance level. Source: Author's own calculation based on Phillips and Sul (2007, 2009). The results show the evidence club convergence
[a]Indicates non-rejection of the null of convergence
[b]Denotes neither convergence nor divergence

Assam and Haryana form a group but they neither converge nor diverge. In summary, the results based on urban per capita consumption expenditure reveal that with higher urbanization Kerala and Maharashtra follow a common transition path. Similarly, states, Andhra Pradesh, Tamil Nadu, Gujarat, Karnataka, Punjab, and West Bengal under medium urbanization category also form another club. The similar logic applies for club 3 and club 4. Similar to results in Tables 10.1 and 10.2, we also do not find any evidence of convergene after merging two clubs for urban consumption expenditures pattern.

After examining the consumption convergence between rural and urban per capita consumption expenditures across India states, we look at the speed of convergence between the clubs in each category (i.e., overall, rural, and urban) and also between rural and urban consumption. The results are shown in Table 10.4. Since we do not find any convergence at aggregate level, we estimate the speed of convergence at club level and then take the average to compare the

Table 10.4 Speed of convergence

Variables	Club 1	Club 2	Club 3	Club 4	Club 5	Average
AMPCE	0.78	0.23	1.10	1.89	0.79	0.96
RMPCE	0.005	0.25	0.8	0.15	---	0.30
UMPCE	−0.925	0.07	0.46	1.53	---	0.28

Note: The average speed of convergence is calculated by taking average figures of all clubs

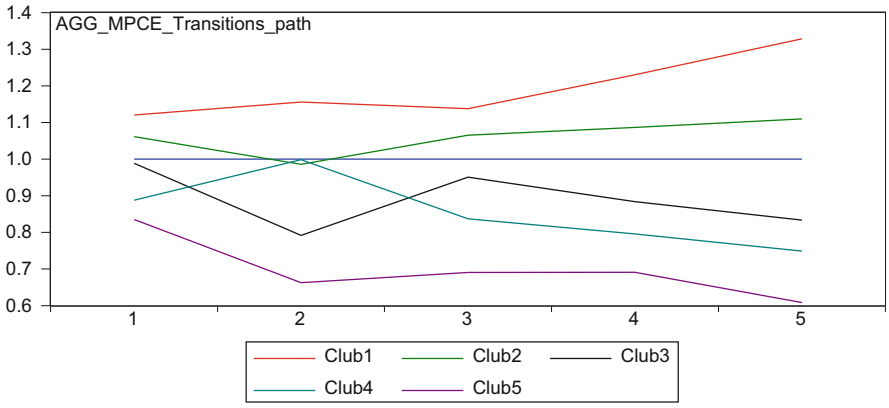

Fig. 10.1 Aggregate MPCE transitions path

speed between rural and urban consumption. The results in Table 10.4 offers the following insight. First, speed of convergence at club level is higher in case of average per capita consumption in comparison to rural and urban per capita consumption expenditures. Second, although it is not possible to compare the speed at club level between rural and urban consumption because each club except club 4 represents different states, it is possible to compare the speed by taking the average. The figures based on average speed indicate that the rural per capita consumption expenditures across states is converging at a slightly higher (0.30) speed than urban per capita consumption expenditures (0.28). But in case of Bihar and Odisha (club 4) the speed of convergence is higher in urban consumption (1.53) than rural consumption (0.15). Third, prevalence of dichotomy is found in terms of consumption convergence not only between rural and urban consumption expenditures but also between states within rural and urban consumption expenditures pattern.

This divergence at aggregate level and convergence at different club levels further motivate this study to examine the determinants of per capita consumption expenditures in the second part of this result in Sect. 10.3. After presenting the speed of convergence, next we discuss the transition paths of various clubs for average MPCE, rural MPCE and urban MPCE. Figure 10.1 shows the transition path of all the five clubs that are presented in Table 10.1.

Finally, we plot the transitions paths for aggregate, rural, and urban monthly per capita consumption expenditures in Figs. 10.1, 10.2, and 10.3, respectively. First, we calculate the relative transition coefficients at club level and for those five periods

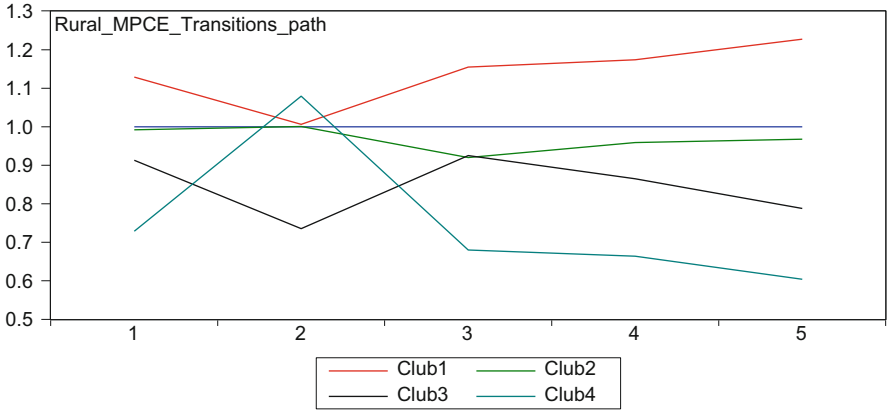

Fig. 10.2 Rural MPCE transitions path

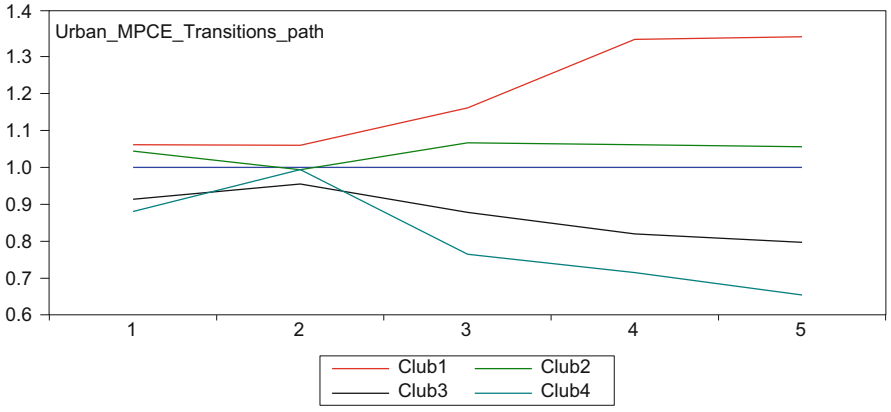

Fig. 10.3 Urban MPCE transitions path

(1993–1994, 1999–2000, 2004–2005, 2009–2010, and 2011–2012) using Eq. (10.3). Then we plot these scores against time. The figures clearly reveal that all clubs follow different transition paths.

10.3.2 Determinants of Consumption Expenditures

After examining the convergence of consumption across major Indian states by emphasizing on rural and urban monthly per capita consumption expenditure, in this section we attempt to explore possible factors that determine the consumption expenditures. By keeping data constraint in mind, the present study uses three variables such as capital expenditures, health expenditures and the gross enrolment

Table 10.5 Determinants of MPCE across Indian states

	Model I	Model II	Model III
C	4.67*** (0.86)	4.35*** (1.0)	4.90*** (0.85)
lnCE	0.0004 (0.02)	−0.024 (0.02)	0.02 (0.18)
lnHE	0.59*** (0.08)	0.67*** (0.99)	0.55*** (0.08)
lnGENR	−0.43** (0.17)	−0.46** (0.20)	−0.41** (0.17)
Overall R^2	0.23	0.13	0.29
F-stat	45.65 (<0.001)	32.44 (<0.001)	49.61 (<0.001)
Hausman statistic	69.9 (<0.001)	81.2 (<0.001)	42.75 (<0.001)
N	60	60	60
Choice model	FEM	FEM	FEM

Note: *CE* capital expenditures, *HE* health expenditures, *GENR* gross enrolment ratio, *** and ** indicate at 1% and 5% level of significance, respectively. The figures in parentheses are standard errors, but for *F*-stat and Hausman statistic rows, those are probability values. FEM stands for Fixed Effect Model

rate at state level as the determinants. The results are derived through panel fixed effect model using Eq. (10.6). The results are presented in Table 10.5.

Table 10.5 demonstrates the determinants of consumption expenditures of Indian states. Further results are presented based on three models. Model I refers to overall per capita consumption expenditures, Model II for rural consumption expenditures, and Model III for urban consumption expenditures. The results of Table 10.5 can be summarized as follows. First, capital expenditures (CE) made by state government does not significantly affect the monthly per capita consumption for all three models. The expenditures incurred by the various state governments for boosting the capital typically positively affect the per capita income or gross state GDP, but our finding indicate that it is not directly change the consumption patterns either upward or downward among the 15 major states. Second, the coefficient of health expenditures (HE) is positive and statistically significant at 1% level in all the models. This implies that, 1% increase by health expenditures on an average increase the monthly per capita consumption expenditures by 0.67% in rural areas and 0.55% in urban areas. The plausible reasons for higher impact on rural consumption expenditures in comparison to urban consumption expenditures could be due to the fact that state governments spend more on rural healthcare sector. Second, increase in health expenditures by the governments creates awareness among rural people. As a result, the allocation of health expenditure on overall budget of household consumption expenditures tends to increase. Finally, the coefficient of gross enrolment ratio (GENR) on per capita consumption expenditures is negative in all models. The GENR is treated as a proxy for human capital. Typically, increase in level of human capital increase GDP of a country or states and thereby increase the per capita income. But when it comes, to consumption expenditures, higher gross enrolment across Indian states increase the likelihood of obtaining a job either in private and government sectors. Typically, those white-collared employees either fully or partially receive benefits of health care facilities from the employer. This could be also a

probable reason for showing inverse relationship between human capital and consumption expenditures.

10.4 Conclusion

In this chapter, we have attempted to examine the issue of rural urban dichotomy by examining the convergence in MPCE of 17 major Indian states. The state-wise MPCE is collected from the NSSO 50th Round (July 1993 to June 1994) to 68th round (July 2011 to July 2012) for a period of 5 years (i.e., 1994, 2000, 2005, 2010 and 2012). The present study majorly departs from the earlier studies on convergence in the Indian context, where the convergence or divergence is examined employing per capita income as the variable of interest. We apply the PS panel club convergence test to convergence of MPCE across the sates considered here. All the states taken together indicate a divergence in MPCE and the major 15 states of India do not follow a unique single transition path. The monthly per capita consumption across these states exhibit distinct transition paths. Further, there is existence of convergence at subgroup level except three states. The rural MPCE across the 15 states do not show any convergence, rather there exists heterogeneity patterns in terms of consumption expenditures among the states. All the 15 states when pooled together do not yield a common steady state equilibrium path in terms of urban monthly per capita consumption expenditures (UMPCE). But the dochotomy lies in the results of clubs found in UMPCE and RMPCE where states in the clubs are different. The speed of convergence and the transition paths being different in rural areas from that of the urban also yield evidence on the rural urban dichotomy.

The results of the second exercise on determinants of MPCE do not yield capital expenditures (CE) made by state government, to be a significant determinant all the three models we have estimated. This contrasts with the usual intuition that the expenditures incurred by the various state governments for boosting the capital typically affect the per capita income or gross state GDP positively. But we do not see any effect on the consumption patterns here. Secondly, the coefficient of health expenditures (HE) is found positive and statistically significant at 1% level in all the models. One percent increase in health expenditures on an average increase the monthly per capita consumption expenditures by 0.67% in rural areas and 0.55% in urban areas. The coefficient of gross enrolment ratio (GENR) on per capita consumption expenditures, on the other hand, is negative in all the models. The GENR is treated as a proxy for human capital. Typically, increase in level of human capital increase GDP of a country or states and thereby increase the per capita income. The puzzling inverse relationship between human capital and consumption expenditures found in our case needs further investigation.

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Chapter 11
Growth and Determinants of the Middle Class in Rural and Urban India in the Post-Liberalisation Period

Abdul Shaban

Contents

Abstract A rapid economic growth during 1993–2015 has lifted millions of people out of poverty in India. This chapter shows that during the period, on an average, more than 1.4% of the population moved out of poverty to the middle class every year. But there are significant rural–urban and regional divides in the distribution of the middle class. A sizeable share of the middle class is located in the lower middle class category. The relative slowdown of the Indian economy since 2015–2016 and COVID-19 shock may significantly compromise the success story.

Keywords Middle class · Economic growth · Economic liberalisation · Rural–urban divide · Determinants of middle class

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11.1 Introduction

The economic liberalisation in 1991 has ushered a new economic growth regime in India. The country has moved out of the usual Hindu rate of economic growth from 1951 to the late 1980s when the annual growth of Gross Domestic Product (GDP) averaged around 3.5% and the per capita income around 1.3%. The liberalisation in 1991 was met with enormous resistance from the right-wing nationalist and the communists, however, of late it has been adopted and supported not only by the Indian National Congress, which initiated it but the right-wing nationalists, the socialists and the communists alike. The national consensus on 'economic growth' has evolved and strengthened and in fact, now has largely been 'depoliticised' as it is considered to be a common goal of all the political parties in the country. The higher economic growth for the last three decades and specifically during 2004–2015 has converted Indian masses into 'aspiring' masses. The economic growth has provided unforeseen economic mobility to them. A sizeable share of the same has now moved to the middle class from the level of chronic poverty. Their incomes have risen, and they are now major sinks of global consumer goods. However, this growth and prosperity have not been equally shared by all the social classes (Shaban and Sattar n.d.) and rural–urban areas. The classes and geographic areas which had the early advantage with better human capital, better infrastructure, etc., have improved their economic development much more than the disadvantaged classes and geographic areas. For instance, upper castes among Hindus, Jains, and Sikhs have benefited much more than other castes and religious groups; the south-western India has seen strengthening of its economic power, and urban areas have reinforced their economic status. The rural areas have also seen rise in the middle-class but it has relatively been slower than what has been experienced by the urban areas.

This chapter attempts to examine the differentials in the middle class formation in rural and urban areas in the post-liberalisation period of Indian economy with the following specific objectives, (a) to understand the rise of the middle class in rural and urban areas of the country as well as at the state level and disparity therein, and (b) to examine the determinants of the growth of the middle class with specific reference to rural and urban areas. The rest of this chapter is divided as follows. Section 11.2 reviews the literature on the measurement of the middle class and rural–urban divides in development, while Sect. 11.3 outlines the data and methods used in this chapter to understand the size and determinants of the middle class. A detailed discussion on the increase and size of the middle class in rural and urban areas in the post-liberalisation phase has been presented in Sect. 11.4. This section also deals with the regional patterns in the formation of the middle class in the country. The next Sect. 11.5 examines the determinants of the middle class using panel data models. The last section concludes the chapter.

11.2 Review of Earlier Studies

11.2.1 Rural–Urban Divides in Development

The classical understanding of the underdevelopment of the rural areas have been linked to (a) the lack of economic modernization, such as on economic activities directly dependent on the Nature wherein output can be increased only to a limited extent, (b) lack of sufficient accumulation of factors of production, and (c) lack of development of overhead capital from physical to social infrastructure. Gunnar Myrdal (1957), and A. O. Hirschman (1958) have argued that unequal relationships between the developed (cities) and underdeveloped (rural) areas may enhance the disparity through 'polarisation' and 'back-wash' effects, respectly, on factors of productions. The development experience documented so far shows the secondary position of rural areas to urban areas (Lipton 1977). The understanding of 'spatial' working of the economy has led to the recommendations of promoting the development of rural areas through introduction and planting cities in rural areas (Friedmann and Douglass 1978).

Many have argued that the inequalities between developed (read cities) and underdeveloped (read rural) regions is not caused as much as by economic factors as due to the historical experience of exploitation (Frank 1966) by organised urban elites who divert the resources and politics of development in their favour. In this regard, Lipton (1977) argues that (a) the allocation of financial, physical and human resources show urban bias rather than being based on equity and efficiency, (b) in national development planning, as in India, agriculture has been systematically neglected which has kept the rural populace in poverty and underdevelopment, and (c) the policies of development which focus on the raising the income in urban areas will further worsen the inequalities. Lipton (1977) does not argue against industrial development but urban and rural equity remains his main concern and goes on to say, 'A developed mass agriculture is normally needed before you can widespread successful development in other sectors' (p. 23). He further argues that without a revolution, rural areas cannot get enough resources and power. The urban bias in policy approach cannot be reduced peacefully, 'only revolution can substantially improve the access of the rural poor to income and power' (Lipton 1977: 329). However, Sinha (1978) argues that only by replacing the capitalism by communism will not eradicate the problem of the rural. 'It is now a common experience, with the possible exception of China and Cuba, at least for a time, that the communist regimes have adopted, with vengeance, the urban industrial ideology and the value system of their capitalist counterparts, and the rural areas suffer much the same kind of deprivation as in the urban-oriented societies of the West' (Sinha 1978:224). For Sinha (1978), Lipton's thinking provided the potent weapons in the hand of liberals as he argued (a) it is not the international system of colonial powers, monetary systems, trade and related organisations that have been responsible for poverty in developing countries but rather the elites and urban classes within those countries, and as such the underdevelopment was caused from within, (b) his argument suffers

from Malthusian syndrome—advocating policy measures because of ideological commitment rather than logical and empirical evidence. Here, Lipton arguing for socialistic principles ideologically despite knowing quite well that empirically it will create as much disparity between rural and urban as capitalism (see for details Sinha 1978: 244).

For the new economic geographers, the disparities between regions emerge because of the centripetal and centrifugal forces operating on factors of productions in economic space. The centrifugal forces (working toward dispersal of economic activities) coming from an increase in factor costs (wage increase, land rent increase, etc. in developed/urban areas) are often weaker to centripetal forces (lower transportation cost, inertia in factor mobility, knowledge pooling, etc.) which create agglomeration economies, urbanisation economies or scale economies in favour of urban centres (Krugman and Venables 1990; Krugman 1991).

Several studies in India have shown development disparities between rural and urban areas. The indicators for the assessment of inequalities ranged from education (Agrawal 2013), wages (Gabriella 1993), consumption expenditure, poverty (Hnatkovska and Lahiri 2013; Azam 2017; Deaton and Drèze 2002), health (Subramanian et al. 2008; Barik and Thorat 2015), etc. Many of these studies have pointed out sharp inequalities between rural and urban areas in these indicators of development but Hnatkovska and Lahiri (2013) specifically point out the emerging trends of convergence in wages, literacy rate, and occupations in rural and urban areas.[1]

11.2.2 The Size of the Middle Class and Its Determinants

Several studies have made attempts to measure the size of the middle class in India. In these studies, the middle class has been defined as an intermediate class between the poor and the rich. Several factors—income, expenditures, ownership of assets, education, lifestyle, etc., have been used to find out this intermediate layer of the society. These factors are often lumpy and move together. However, two important parameters used to measure the middle class in India have been consumption expenditure and household assets. Given the availability of National Sample Survey Organization (NSSO) data on regular intervals on consumption expenditure, daily or monthly per capita expenditure has often been used for estimation of the size of the middle class in most of the studies. However, a few studies have also used income or asset-based approach to estimate the middle class in India. Among the approaches,

[1]As the concept of urban is dynamic, based on geographic concentration of population and occupation (see Shaban et al. 2020), the difficulty emerges in interdecadal comparison as on 31 March of beginning of decade the Census recognises the new urban centres from rural areas. Many of the above studies, including the current one also suffers from this limitation. As such, a stricter comparison between rural-urban areas can be made only within the Census decade rather than inter-census periods.

the asset-based approach provides a better method of measurement as income and expenditures can vary within a shorter time than assets. The asset-based approach also provides the possibility to capture the lifestyle of the households, consumption patterns and social status associated with the same, core to the social and political conception of the middle class. Table 11.1 provides details of the parameters used for estimating the middle class in India by some of the studies.

Krishnan and Hatekar's (2017) estimate based on consumption expenditure shows that the size of middle class in rural areas was 20.3% (54.7% in urban areas, as per total urban population) of the total rural population in 1998–1999, which declined to 18.4% (increased to 56.1% in urban areas) in 2004–2005 but rose to 41.4% (72.3% in urban areas) of the total rural population in 2011–2012. Thus, the study shows extremely high inequality in the rural–urban distribution of the middle class. Further, the study shows that as opposed to urban areas, the bulk of the middle-class population in rural areas belongs to the lower middle class, i.e. $2–$4 consumption expenditure per capita per day. For instance, size of the lower middle class in 1999–2000 was 18.3% (39.5% in urban areas), 16.2% (38.6%) and 34.9% (42.8%) of the rural population in 2004–2005, and 2011–2012, respectively. Krishna and Bajpai (2015) used an asset-based approach to estimate the middle class in India. They used a motorcycle (lower middle class) + car (upper-middle class) as an indicator of the middle class. Their estimates show that in 2004–2005 about 31% (27.7% lower middle class and 3.2% upper-middle class) of the population in urban areas and 11.8% (11.0% lower middle class and 0.8% upper-middle class) of the population in rural areas was middle class.

There are many studies which have focussed on the determinants of the middle class, and the major ones identified are:

(a) *Inclusive growth* that is growth with redistribution (Birdsall 2007). Kharas and Gertz (2010) argue that economic growth with high-income inequality will not help in expanding the middle class as happened to Brazil where economic growth rate averaged 5.6% per annum from 1965–1980 leading to rise of per capita GDP to PPP $7600 in 1980 but had only 29% of the population as middle class. While South Korea's economy during 1965–1986 grew on an average 6.5% per year and reached to PPP $7700 but more inclusive growth made 53% of population middle class. Kharas and Gertz are of the view that India's relatively low-income inequality and a larger share of household income in GDP gives it an extra advantage concerning middle-class formation. The household consumption in India in the last two decades of the twentieth century have hovered around 60% of the GDP while that in China it has been below 40% of the GPD (Chakravarty 2019).

(b) *Employment and labour productivity growth* with better wages, stability, and security and not the casual employment, which often characterises the poor (Banerjee and Duflo 2008; ADB 2010). The labour productivity growth may result in the Keynesian benefit 'in terms of direct income increases for households with high expenditure propensities' (ADB 2010: 18).

Table 11.1 Parameters used to estimate the size of the middle class in India

Studies	Definition of middle class	Remark
Sengupta et al. (2008)	Daily per capita expenditure of Rs.37 to Rs.93 (PPP US$2 to $10.2) at 2004–2005 prices	Size of middle class: 209.8 million or 19.3% of the population of India
National Council of Applied Economic Research (NCAER) (as quoted in Alam 2015)	The household annual income between Rs 0.25 million and 1.25 million (US$6000 to US $30,000, at 2004–05 prices)	Size of the middle class: in 1995–96, 4.5 million households; in 2007–2008, 10.7 million households
National Council of Applied Economic Research (NCAER) (Shukla 2010: 100)	Annual income between '0.2 million and 1.0 million in 2001–02 prices (approximately equals $11 and $55 per capita per day, in 2005 PPP terms (Krishnan and Hatekar 2017: 41)	–
Kharas (2010)	Daily per capita incomes between $10 and $100 in purchasing power parity (PPP) terms (see Krishnan and Hatekar 2017)	For developing countries
Meyer and Birdsall (2012)	Daily per capita incomes $10–$50 per capita per day, measured in 2005 PPP	For measuring the middle class in India
ADB (2010)	$2–$20 per person per day, measured in 2005 PPP for developing Asia	The share of the population in India in 2004–2005 in the category of the PPP$2–4 and PPP $4–10 was 24.72% and 7.41% respectively, and as such formed 32.13% of the total population (see also Chun 2010)
Banerjee and Duflo (2008)	Spending between $2 and $10 per capita per day, valued at 1993 PPP; lower middle class $2 and $4; upper-middle class $6 and $10	For estimating the middle class in India
Krishnan and Hatekar (2017)	Adapted Banerjee and Duflo (2008) measures but converted it into Rs. and then divided it into three categories of middle classes. At 2011–2012 prices (Rs.) consumption per capita per day: middle class: Rs.39.5–197.3; lower-middle class: Rs.39.5–78.9; middle-middle class: Rs.78.9–118.4; upper-middle class: Rs.118.4–197.3	In 2011–2012, middle class size: all-India 50.3%; rural 41.4%; urban 72.4%; Muslim 45.1%; Hindus 49.9%; Scheduled Castes 40.4%; Scheduled Tribes 29.2%; Other Backward Classes 50.3%; Other Castes 63.7%
Krishna and Bajpai (2015)	Ownership of vehicles Lower middle class possess a	More stable measures, unlike income and expenses which

(continued)

Table 11.1 (continued)

Studies	Definition of middle class	Remark
	motorcycle or a scooter. The upper-middle class possesses a car and the rich possess both an air conditioner and a car	can change in a very short time. But they took into consideration only vehicles and air conditioners as measures

Note: *PPP* purchasing power parity
Source: Based on the abovementioned studies cited in the table

(c) *Higher and technical education*, especially post-secondary education (ADB 2010: 31). Bledstein (1976) highlights the role of universities in the rise of the middle class in America which created aspirations, skills, disciplines, competitions, and respect of merits—factors for economic success.
(d) *Ease of access to bank credit* and especially by micro, small, and medium businesses (Kharas and Gertz 2010).
(e) *Share of urban population* (ADB 2010) as urban areas are considered engines for economic growth and through agglomeration/urbanisation/scale economies they propel overall growth within the urban centres and their peripheries.
(f) *Share (%) of secondary and tertiary sector*s in GDP (ADB 2010) as these sectors represent modern sectors of the economy and have possibilities of higher growth, not constrained by natural factors as happens in case of agriculture and allied sectors.
(g) *Ethnic diversity* (ADB 2010) can add to the social diversity leading to diversity of occupation and ways of doing things. These in turn can add to higher innovativeness in the economy. In economies dominated by informal and household sectors, like that of India, innovations may not be visible in the forms of patents or copyrights.

11.3 Data and Methods

11.3.1 Estimating the Middle Class

The present study uses the District Household Survey (DHS) data (USAID n.d.) on household asset ownership for the years 1992–1993, 1998–1999, 2005–2006, and 2015–2016 for estimation of the middle class in rural and urban areas at the national and state levels. The following assets have been used to identify the middle class of different categories (Table 11.2). *Lower middle class*: with possession of *pucca* (concrete) house and television (TV); *pucca* (concrete) house shows that household income is relatively better, and possession TV indicates that household also can afford some luxuries and means of entrainment/enjoyment/information which a middle class at the lower level may aspire for. The strata middle-middle class has been identified as those with the possession of assets mentioned for lower middle

Table 11.2 Assets used to identify the middle class

Year	Lower-middle class	Middle-middle class	Upper-middle class	Rich class
1992–1993	Pucca house + TV	Pucca house + TV + refrigerator or motorcycle	Pucca house + TV + refrigerator or motorcycle + VCR/VCP	Upper-middle class +car/tractor
1998–1999	Pucca house + TV	Pucca house + TV + refrigerator or motorcycle	Pucca house + TV + refrigerator or motorcycle + wired telephone	Upper-middle class +car/tractor
2005–2006	Pucca house + TV	Pucca house + TV + refrigerator or motorcycle	Pucca house + TV + refrigerator or motorcycle + wired telephone	Upper-middle class +car/tractor
2015–2016	Pucca house + TV	Pucca house + TV + refrigerator or motorcycle	Assets of middle-middle class + car or tractor	Upper-middle class +AC + Washing Machine

Source: Author

class + possession of refrigerator or motorcycle. Motorcycle is a higher level of consumpter good. It not only requires more expenses but is also an aspirational goods for households for transport in rural and urban areas. Refrigerator is a social status good besides being mainly used for the preservation of foods, a practice that represents a different lifestyle. In urban areas because of the better development of public transport and higher possibilities of motorcycle accidents, some of the households located in the middle-middle class category may be averse to the possession of the motorcycle. Therefore, the possession of a refrigerator and/or motorcycle captures the middle layer of the middle class.

Till 2004–2005, cars and tractors were still highly priced and were generally out of the reach of the middle class. But there were assets like VCR/VCPs and wired telephones which were considered to represent higher social and economic status. Therefore, I have considered additional possession of VCR/VCPs over the middle-middle class assets as an indicator of the higher middle class in 1992–1993. But by the late 2000s with technological development, the VCR/VCPs were replaced by CDP/CDRs installed in desktop computers or as standalone players/recorders. The cost of the CDP/CDRs were much lower than VCR/VCPs. However, the wired telephone was a status symbol, and mobile phones were still confined to a few rich and upper-middle classes. Wired phone in that period and till mid-2010s were considered to be a status symbol and acquiring them by lower and middle-middle was even not easy given the lack of supporting infrastructure and the response rate of companies like Bharat Sanchar Nigam Ltd. (BSNL) and Mahanagar Nigam Ltd. (MTNL) having monopolies in supplying wired telephone connections. Therefore, we have taken the telephone as an indicator of the upper-middle class for the years 1998–1999 and 2004–2005 replacing the VCR/VCPs. Further, by the late 2010s with the rise of household income and also technological development leading to drop in price, cars, and tractors which were once considered as indicators of the rich class became affordable for the middle class, while the wired telephone were largely

replaced by cheaper mobile phones. Massification of mobile phones led to much loss of its association with the social and economic status of households. Therefore, I have included car and/or tractors as indicators of upper-middle class in 2015–2016 to identity upper-middle class in addition to the asset possessions mentioned for middle-middle class.

11.3.2 Determinants of Middle Class

The availability of data for four abovementioned reference years across the states provides us the possibility to employ a panel data method to find out the determinants of the middle class in India. The number of states over 1992–1993 to 2015–2016 has not been static. Three new states of Chhattisgarh, Jharkhand, and Uttarakhand were carved out from Madhya Pradesh, Bihar and Uttar Pradesh in 2000. While Telangana was created dividing Andhra Pradesh in 2014. The clubbing of the sampled households to the original states is difficult as there are sample weights which have been created for estimations of the households and therefore I have backcasted the figures for Chattisgarh, Jharkhand, and Bihar and their parent states based on figures from 2005–2006 and 2015–2016 for these states for 1998–1999. This helps in retaining the six states and not losing the number of observations. I did not deep backcasted till 1993–1994 as many inaccuracies may have emerged in the estimate, and therefore used only data for 1999–1998, 2015–2016, and 2015–2016 in the regression estimates. Further, dropped Telangana for which the data was only available for 2015–2016, and forecasted the figure of undivided Andhra Pradesh. I have also dropped the states and Union Territories (UTs) for which I had data only for one reference year that is 2015–2016 (see Table 11.4 for such states/UTs). Thus, I have used the data for 28 states/UTs as a balanced panel in the estimation.

As discussed above, there may be various factors behind the growth of the middle class in a society. The major factors are the growth of the economy, wages of the workers, human capital accumulation, urbanisation rate, etc. I have attempted to estimate the impact of these factors deploying the panel regression models. The average wages, urban population, and percentage of graduate & above population were estimated for these years using the data for relevant years from NSSO's employment and unemployment surveys (NSSO 1999–2000; NSSO 2004–2005) and Central Statistical Office (2019); Census of India (1991, 2001, 2011, for graduate & above population, and percentage of urban population). The data for sectoral Net State Domestic Products (NSDP) of the states and per capita income was obtained from EPW Research Foundation (EPWRF n.d.). The nominal NSDP, per capita income and wages, were converted to 2011–2012 prices before using in the regression equations. I have used both the fixed and random effect models and then used the Hausman test to select the best model from these models.

The fixed effect (FE) model framework used in this chapter is as follows:

$$y_{it} = \pi_i + X_{it}\beta + \varepsilon_{it} \tag{11.1}$$
$$\varepsilon_{it} \tilde{N}\left(0, \sigma_\varepsilon^2\right)$$

where, y_{it} vector of the dependent variable for i state/UTs and t year (percentage of middleclass population), X_{it} is the explanatory variables matrix, π_i is the state/UT specific effects, β is the vector of regression coefficients, and ε_{it} is error term with the usual assumption of normal distribution.

We can also write the Eq. (11.1) with detailing out the dummy variables as follows,

$$y_{it} = \sum_{j=1}^{N} \pi_i s_{ij} + X_{it}\beta + \varepsilon_{it} \tag{11.2}$$

where, if $i = j$, $s_{ij} = 1$, otherwise, $s_{ij} = 0$.

The random effect (RE) model framework used is as follows,

$$y_{it} = \alpha + X_{it}\beta + \pi_i + \varepsilon_{it} \tag{11.3}$$
$$\varepsilon_{it} \tilde{N}\left(0, \sigma_\varepsilon^2\right)$$

where α shows intercept term, error term contains π_i, the state/UT specific effect, and ε_{it} is usual error term, and $E(\pi_i | x_{it}) = 0$.

11.4 Size of the Middle Class and Rural–Urban Divide

11.4.1 Size of the Middle Class at the National Level

Based on data presented in Table 11.3, the following observations can be made regarding the rise of the middle class in rural and urban areas. First, at the all-India level, there has been a significant growth of the share of the middle class both in rural and urban areas. Where during 1993–1994 to 2015–2016, the share of the middle class in urban areas with higher base (40% of the urban population in 1993–1994) increased by about 1.7 times (to 69.4% in 2015–2016), the share of middle class in rural areas, with a very low base, rose almost 8 times (40% to 31.5%). Over 22 years, the middle-class population rose almost 31% points, which means, India, despite of increasing absolute number of populations, added about 1.4% of the population in the middle class every year during the period. Approximately, a similar rate of addition has occurred in the case of urban areas and marginally lower in the case of rural areas.

Second, there is a considerable disparity in the percentage of the middle class population between rural and urban areas. The rural–urban gap has widened over the

Table 11.3 Percentage distribution of middle class by rural and urban areas in India

Sector	Type	1992–1993	1998–1999	2005–2006	2015–2016
Urban	Lower	17.4	22.2	26.1	17.3
	Middle	19.2	14.5	17.0	48.2
	Upper	3.4	12.7	17.0	3.8
	Total	**40.0**	**49.4**	**60.1**	**69.4**
Rural	Lower	2.2	5.4	9.1	11.4
	Middle	1.6	2.5	3.8	17.5
	Upper	0.1	1.0	3.1	2.5
	Total	**4.0**	**8.9**	**16.0**	**31.5**
Total	Lower	6.4	10.0	14.6	13.5
	Middle	6.5	5.8	8.1	28.2
	Upper	1.0	4.2	7.7	3.0
	Total	**13.9**	**20.1**	**30.4**	**44.7**

Source: computed using data from USAID (n.d.)

years. The rural-urban differences in the percentage of the middle class population was 36% point in 1992–1993, about 40% point in 1998–1999, about 44% point in 2005–2006, but came down to 38% point in 2015–2016. This shows that rural–urban inequalities in development have persisted over the decades.

Third, the higher economic growth in India has to an extent had a distributive effect. This also shows that the income of the households has risen and that has enabled those with non-patrimonial capital to create household assets. This is well reflected from the progressive increase of lower and middle-middle classes both in rural and urban areas. The share of upper-middle-class shrank in 2015–2016 because of the inclusion of car or tractor as an indicator of upper-middle especially in urban areas, but in rural areas it does not make much difference showing that a significant number of household in rural upper-middle class had acquired car or tractor by 2015–2016.

This rise of the middle class has led to a significant reduction in the percentage of the population living in poverty. The percentage of population below the poverty line decreased to 25.7% in 2011–2012 (the latest data available) from 50.1% in 1993–1994 in rural areas 13.7% from 31.8% in urban areas during the same period (Table 11.4).

11.4.2 The State-Wise Growth

India has significant regional inequalities in the distribution of the middle class. As one can observe from Tables 11.5 and 11.6 though in all the states the share of the middle class has risen during 1992–1993 to 2015–2016, the increase has been significantly higher in Southern States [Kerala, Tamil Nadu, Andhra Pradesh (including Telangana) and Karnataka], followed by the Western States (Goa,

Table 11.4 Poverty headcount ratio (%) in India, 1993–1994 to 2011–2012

Years	Rural (%)	Urban (%)
1993–94	50.1	31.8
2004–05	41.8	25.7
2009–10	33.8	20.9
2011–12	25.7	13.7

Source: ILO (2018)

Maharashtra, and Gujarat) and North-Western states (Punjab, Haryana, Himachal Pradesh, and Jammu and Kashmir). Though most of these states had a relatively higher share of middle class in 1992–1993, even those with low bases like Andhra Pradesh and Karnataka (which had an almost similar size of the middle class as Uttar Pradesh and Madhya Pradesh—the states in Central region) and West Bengal (from Eastern Region), have experienced rapid growth in the size of the middle class. For instance, the size of the middle class in Andhra Pradesh rose from 14.4% in 1992–1993 to 70.0% in 2015–2016, but in Uttar Pradesh and West Bengal, this could rise from 11.7% and 13.2% to 22.2% and 38.4%, respectively. Table 11.5 shows that the states of Central and Eastern regions missed the opportunity to enhance the size of their middle class. These are the states which still have a sizeable share of population below the poverty line. Uttar Pradesh had 40.85% of the population below the poverty line in 1993–1994 and 31.15% in 2011–2012, while West Bengal (35.66% in 1993–1994 and 27.02% in 2011–2012) and Bihar (54.96% and 42.60% in the respective reference years) also experienced a lower decline of the share of population below poverty line (Reserve Bank of India 2017). Like Central and Eastern States, the North-Eastern States (Sikkim, Assam, Mizoram, Meghalaya, Manipur, and Nagaland) grew from a low base of the middle class and in general, had middle class below 50% of the population in 2015–2016. Among the Indian states, Kerala and Tamil Nadu topped in terms of an increase in the share of the middle-class population during the period.

11.4.3 The Rural–Urban Divide Among States

The success of the Southern, Western, and North-Western States of India in changing the fortune of their population lies in the effective transformation of rural areas, where still a bulk of the population lives (Table 11.6). Among the states in India, Kerala is the only state which has a greater share of the middle class population in rural areas (76.7%) than that in urban areas (74.8%). People-centred and rural-centred development policies in the states have brought this transformation and therefore in terms of Human Development Index, the state pars with countries in middle to higher income groups. Tamil Nadu is another state which had achieved significant success in this regard both in rural and urban areas. However, in rest of the states, the disparities in the size of the middle class in rural and urban areas have been significantly higher—be it Western States (Gujarat, Maharashtra, and Goa),

Table 11.5 Size and growth of middle class in India

States/UTs	Total (Rural+Urban)			
States	1992–1993	1998–1999	2005–2006	2015–2016
A & N Islands	–	–	–	61.1
Andhra Pradesh	14.4	22.7	35.8	70.2
Arunachal Pradesh	1.0	11.1	14.8	21.0
Assam	1.9	7.8	14.7	21.4
Bihar	8.0	8.3	10.7	14.5
Chandigarh	–	–	–	57.1
Chhattisgarh	–	–	16.2	29.5
D & N Haveli	–	–	–	36.2
Daman & Diu	–	–	–	66.8
Goa	37.7	36.3	50.0	69.5
Gujarat	18.0	30.0	43.5	60.4
Haryana	27.3	34.6	42.5	56.4
Himachal Pradesh	13.6	22.6	40.9	61.0
Jammu & Kashmir	24.2	26.5	36.3	51.6
Jharkhand	–	–	19.4	26.0
Karnataka	11.4	25.7	36.6	55.1
Kerala	10.3	33.4	56.1	75.8
Lakshadweep	–	–	–	71.2
Madhya Pradesh	10.2	14.0	17.9	28.1
Maharashtra	21.1	21.8	44.1	59.4
Manipur	3.9	4.3	7.6	15.6
Meghalaya	2.7	7.5	22.2	34.1
Mizoram	3.0	7.6	14.5	49.6
Nagaland	2.5	9.7	13.3	23.7
Delhi	62.8	68.9	67.3	66.4
Odisha	5.4	7.8	18.5	32.7
Puducherry	–	–	–	74.7
Punjab	38.9	40.3	49.1	56.2
Rajasthan	14.6	20.3	27.3	43.5
Sikkim	–	30.5	37.8	66.8
Tamil Nadu	12.0	17.4	43.4	73.5
Tripura	2.2	6.9	10.0	23.6
Uttar Pradesh	11.7	16.1	19.6	22.2
Uttarakhand	–	–	38.1	50.8
West Bengal	13.2	20.8	26.6	38.4
Telangana	–	–	–	61.7
Total	13.9	20.1	30.4	44.7

Source: Computed using data from USAID (n.d.)

North-Western States (Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir, and Rajasthan), or other states. In fact, the rural–urban gaps in the size of the middle class in Central, Eastern, and North-Eastern Region states are acute. Political corruption,

Table 11.6 Percentage distribution of middle class in rural–urban areas in India

States/UTs	Urban				Rural			
	1992–1993	1998–1999	2005–2006	2015–2016	1992–1993	1998–1999	2005–2006	2015–2016
A & N Islands	–	–	–	83.1	–	–	–	44.3
Andhra Pradesh	43.9	52.2	59.6	84.1	4.1	12.9	24.7	64.1
Arunachal Pradesh	3.5	25.9	28.9	47.1	0.6	8.4	9.5	11.7
Assam	10.6	31.4	37.8	56.0	0.6	5.2	8.8	15.0
Bihar	43.4	40.2	44.9	50.1	1.7	4.2	4.2	9.2
Chandigarh	–	–	–	56.7	–	–	–	71.4
Chhattisgarh	–	–	52.4	63.0	–	–	6.1	18.8
D & N Haveli	–	–	–	57.8	–	–	–	13.7
Daman & Diu	–	–	–	64.9	–	–	–	73.6
Goa	54.3	47.3	57.5	75.3	21.7	28.4	40.3	59.2
Gujarat	39.0	55.2	67.7	76.9	6.7	10.9	25.9	46.9
Haryana	63.5	65.2	68.0	64.3	12.6	20.5	30.9	50.8
Himachal Pradesh	53.8	53.9	66.3	79.3	8.7	18.9	37.2	58.7
Jammu & Kashmir	66.7	52.9	60.5	66.4	14.8	18.5	25.4	44.5
Jharkhand	–	–	60.8	62.7	–	–	5.2	13.2
Karnataka	30.8	52.1	61.7	73.5	1.5	10.7	19.5	40.8
Kerala	18.1	52.6	62.7	74.8	7.3	27.3	52.7	76.7
Lakshadweep	–	–	–	73.9	–	–	–	61.2
Madhya Pradesh	37.2	40.9	49.2	58.6	1.7	4.9	5.6	14.8
Maharashtra	43.9	41.5	69.5	77.2	3.8	6.6	20.4	42.2
Manipur	9.5	9.1	14.3	26.8	1.2	2.1	4.4	8.3
Meghalaya	10.9	20.1	41.2	60.4	0.6	4.5	15.6	26.6
Mizoram	5.7	12.8	23.8	67.4	0.2	1.6	3.7	26.0
Nagaland	6.1	26.6	29.8	43.4	1.4	5.1	7.1	13.3
Delhi	63.9	70.3	67.6	66.5	50.7	52.2	64.0	55.2
Odisha	24.2	30.7	50.4	63.3	1.8	5.0	12.0	26.5
Puducherry	–	–	–	80.0	–	–	–	62.7
Punjab	70.7	70.1	67.5	62.2	25.9	26.7	37.1	52.1
Rajasthan	48.2	52.8	60.8	66.8	5.1	9.3	13.6	35.5
Sikkim	–	71.3	69.9	83.1	–	23.4	29.6	58.7
Tamil Nadu	27.5	35.5	58.0	78.6	4.1	8.0	30.9	68.3
Tripura	10.0	24.3	30.2	50.1	0.2	1.8	5.6	12.1
Uttar Pradesh	44.3	55.7	55.5	52.8	2.2	5.4	7.5	11.2
Uttarakhand	–	–	66.1	70.6	–	–	27.0	39.6
West Bengal	32.4	56.6	61.1	68.0	4.1	7.8	10.3	24.0

(continued)

Table 11.6 (continued)

States/UTs	Urban				Rural			
	1992–1993	1998–1999	2005–2006	2015–2016	1992–1993	1998–1999	2005–2006	2015–2016
Telangana	–	–	–	77.6	–	–	–	48.4
Total	40.0	49.4	60.1	69.4	4.0	8.9	16.0	31.5

Source: computed using data from USAID (n.d.)

entrenched caste, and religious/ethnic politics undermined the economic progress of the population in these states.

In all the major states of India and in both the rural and urban areas, the size of the lower middle class has been significant, showing the economic mobility of the population from poverty to the middle class because of economic growth. The size of the lower middle class especially is higher in the states experiencing rapid growth of the middle class over the years (see Appendix Tables 11.11, 11.12 and 11.13).

11.4.4 Reliability of Estimates of Middle Class

But how do these estimates relate to other estimates, and are there significant divergence among the estimates? It needs to be noted that the asset-based approach is more conservative estimates of the middle class and as such more reliable. The middle class as a concept is not only a middle layer spending or earning a certain amount, but also relates to a lifestyle of intermediate luxury or conspicuous goods. Many of such goods may not be used as a factor of production but they provide social status—such as TV, car, phone, house, refrigerator, etc. Also, some goods and services which are luxury and symbol of social status at one point of time may lose that status with increasing affordability and availability or due to change in a social situation. The consumption expenditure of households because of prices may be higher and especially when we observe an enormous difference in the cost of living in different cities and states how much can we rely on the same—that the consumption expenses present a uniform and a very reliable measure of the middle class? Above this, we often use the national or state price deflators rather than district or city level price deflators for getting reliable estimates of cost of living. The cost of living in Mumbai is higher than that in Nagpur or Pune, where it is higher than those in rural areas. The same can be said for Mumbai and Kolkata or Kolkata and Lucknow. In some of the district and spaces where the cost of living is higher may overestimate the size of the middle class and especially in urban areas where the numbers of family with higher consumption expenditures are much more. Therefore, the asset-based approach may be more reliable. The consumption expenditure or income data suffering from the above constraints can mislead us—overestimating the middle class.

Table 11.7 Correlation coefficients between estimates of the percentage of the middle class by Krishnan and Hatekar (2017) and by the current chapter

Year	Middle class (%) in rural areas	Middle class (%) in urban areas	Total size of middle class
1998–1999[a]/ 1999–2000[b]	0.582 (0.002)	0.170 (0.935)	0.482 (0.015)
2005–2006[a]/ 2004–2005[b]	0.512 (0.005)	0.027 (0.892)	0.508 (0.006)
2015–2016[a]/ 2011–2012[b]	0.772 (0.000)	0.490 (0.003)	0.765 (0.000)

Source: Computed using data from Krishnan and Hatekar (2017) and the computations by the author presented in Tables 11.5 and 11.6

[a]DHS data years

[b]NSSO data years used by Krishnan and Hatekar (2017); Figures in parenthesis are two-tailed *p* values

The estimation of the middle class in rural and urban areas with a consumption expenditure-based approach by Krishnan and Hatekar (2017) is by far more detailed for India and recent. When the estimate done in this chapter is compared with Krishnan and Hatekar's estimates, significant differences are found with regards to rural areas. The percentage or size of the middle class in India estimated by Krishnan and Hatekar for the year 1999–2000 was 28.9% (20.3% in rural areas and 54.7% in urban areas) but my estimates for 1998–1999 show the size of the middle class as 20.1% (8.9% in rural areas and 49.4% in urban areas). The differences by both the estimates of the size is narrow for 2005–2006. Krishnan and Hatekar (2017) estimate shows 27.9% (18.4% in rural areas and 56.1% in urban areas) of the population in India in 2004–2005 as middle class, a decline in the size than that of 1999–2000) which is unlikely, while my estimate shows that in 2005–2006 the size of the middle class was 20.1% (16.0% in rural areas and 60.1% in urban areas). For the last reference years 2015–2016, the estimates are less comparable as Krishnan and Hatekar's estimate belongs to the year 2011–2012. However, for the year 2011–2012, Krishnan and Hatekar (2017) find middle class size in India as 50.3% (41.4% in rural areas and 72.4% in urban areas) but the estimate in this chapter for 2015–2016 show the share of middle class as 44.7% (31.5% in rural areas and 69.4% in urban areas). We understand that lack of availability of electricity supply in large part of rural areas may have compromised the asset base of households like TV, refrigerator, VCR/VCP despite their economic abilities but the observed trend in the rural areas even during those days was to run TVs on batteries where the electricity supply was not available. We assume that the large share of such households' conscious of their social status may have tried to use the batteries and other methods for operating TVs and VCR/VCPs. Correlation coefficients between the estimates in this chapter for states and those by Krishnan and Hatekar (2017) are presented in Table 11.7. The coefficient values show the middle class estimates in urban areas for states by the two studies are quite different, though the size of the middle class estimated are higher in both the studies. The rural and total estimates of the middle class by both the studies for states are better related to each other.

11.5 Determinant of Middle Class

The results of the FE and RE panel data regressions using different explanatory variables for rural, urban, and total (rural+urban) is presented in Tables 11.8, 11.9 and 11.10. It is very obvious from the Tables that it is the changes in the per capita income/total NSDP of the states and the human capital [% of the population (15 years and above) with the educational level of graduation & above] have played major roles in the growth of middle class in India. For the rural areas, the primary and secondary sector of the economy do not show any impact but tertiary sector income (may be through rural–urban linkages), the aggregate NSDP, and per capita income do show significant impacts. The best regression model for the rural areas is found to be FE model (column 5 Table 11.8) with higher R-squared values (0.849) (see also the Hausman test) and it shows that with 1% point rise of the population with graduate & above level of education in rural areas, the middle class rises by about 4.5% point, which is a great impact indeed. Similarly, growth in per capita income also has a significantly higher impact on the growth of the middle class in rural areas.

In urban areas as well the growth of NSDP/per capita income plays a major role (see the column 3 and 5 of Table 11.9 as R-squared values are almost same of FE models and Hausman test also significant). It is interesting to note that in rural areas where human capital plays an especially important role, in urban context its impacts are statistically insignificant instead there is a statistically significant impact of wages of salaried workers.

At the aggregate (rural+urban) level, RE estimation shows the best results (column 6 Table 11.10). The model again shows that these are the growth of human capital and growth of per capita income that plays a crucial role in the change of the fortunes of households and their mobilities into the middle class.

The results show that India needs to emphasise on economic growth. Given that India has significantly higher non-wage sector (self-employed workers) and share of the household sector in the GDP is relatively higher (about 60%), the growth of economy does translate into the rise of household income and their economic mobility.

11.6 Conclusions

This chapter attempted to examine the growth of the rural and urban middle class in India and their determinants. There have been many studies on the middle class using the consumption expenditure-based approach, but the present study attempted to estimate the size of the middle class using the asset-based approach to find out whether the consumption expenditure has translated into raising the household asset base. The consumption expenditure can be higher and may not translate into asset formation because of several reasons—such as due to higher spending on food products, higher prices in certain areas (especially cities and remote geographic

Table 11.8 Determinants of rural middle class in India

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	FE	RE	FE	RE	FE	RE
Ln Primary sector NSDP (Rs. '00000')	4.775	−2.253				
	(3.492)	(2.682)				
Ln Secondary sector NSDP (Rs. '00000')	−1.281	3.118				
	(2.875)	(2.361)				
Ln Tertiary sector NSDP (Rs. '00000')	7.976**	1.125				
	(3.764)	(2.786)				
Avg. daily rural wages of salaried class (Rs.)	−0.000548	−0.0327*	−0.00330	−0.0311*	**−0.00245**	−0.0322**
	(0.0183)	(0.0169)	(0.0180)	(0.0164)	**(0.0166)**	(0.0144)
Avg. daily rural wages of causal workers in non-public works (Rs.)	−0.0452	0.0748***	−0.0396	0.0670***	**−0.0504**	0.0229
	(0.0392)	(0.0250)	(0.0390)	(0.0246)	**(0.0352)**	(0.0250)
% of population graduate in rural areas (16 years & above)	4.937***	4.015***	4.901***	4.631***	**4.499*** **	3.265***
	(0.981)	(0.843)	(0.893)	(0.743)	**(0.860)**	(0.698)
% of urban population	0.529**	0.182	0.357*	0.207*	**0.285**	0.0215
	(0.223)	(0.115)	(0.207)	(0.116)	**(0.199)**	(0.104)
Ln NSDP (Rs. '00000')			11.00***	2.461**		
			(4.061)	(1.220)		
Ln Per capita income (Rs.)					**18.20*** **	17.60***
					(4.962)	(3.351)
Intercept	−178.2***	−29.20	−177.4***	−41.81**	**−193.7*** **	−175.4***
	(58.75)	(17.76)	(61.35)	(19.34)	**(49.87)**	(33.13)
R-squared (within)	0.838		0.833		**0.849**	
Hausman Test (Chi-squared)	75.56***		26.68***		17.10***	

Note: Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11.9 Determinants of urban middle class in India

Variables	(1) FE	(2) RE	(3) FE	(4) RE	(5) FE Robust	(6) RE Robust
Ln Primary sector NSDP (Rs. '00000')	6.391	−3.388				
	(3.916)	(3.011)				
Ln Secondary sector NSDP (Rs. '00000')	−1.644	6.475**				
	(3.618)	(2.747)				
Ln Tertiary sector NSDP (Rs. '00000')	15.39***	1.857				
	(5.318)	(3.440)				
Avg, daily urban wages of salaried class (Rs.)	0.0252	0.00545	**0.0320***	0.00704	0.0393**	0.0198
	(0.0197)	(0.0179)	**(0.0183)**	(0.0171)	(0.0189)	(0.0175)
Avg. daily urban wages of causal employee in non-public work (Rs.)	−0.0662*	0.0215	**−0.0651***	0.0139	−0.0786*	−0.0568
	(0.0375)	(0.0300)	**(0.0381)**	(0.0302)	(0.0400)	(0.0347)
% of population graduate in urban areas (15 years and above)	−0.119	0.727	**0.223**	1.018**	0.302	0.568
	(0.671)	(0.458)	**(0.618)**	(0.417)	(0.608)	(0.431)
% of urban population	0.217	0.0721	**0.00871**	0.175	−0.0472	−0.0751
	(0.236)	(0.132)	**(0.243)**	(0.125)	(0.253)	(0.138)
Ln NSDP (Rs. '00000')			**17.77*****	5.561***		
			(4.792)	(1.484)		
Ln Per capita income (Rs.)					23.78***	21.11***
					(6.485)	(4.558)
Intercept	−250.5***	−37.36**	**−235.3*****	−60.56***	−209.2***	−179.3***
	(60.83)	(18.94)	**(65.77)**	(21.62)	(59.43)	(43.02)
R-squared (within)	0.670		**0.635**		0.634	
Hausman test (chi-squared)	33.77***		22.06***		14.07***	

Note: Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11.10 Determinants of the middle class (rural +urban) in India

Variables	(1) FE	(2) RE	(3) FE	(4) RE	(5) FE Robust	(6) RE Robust
Ln Primary sector NSDP (Rs. '00000')	2.360	−3.041				
	(3.445)	(2.769)				
Ln Secondary sector NSDP (Rs. '00000')	0.768	5.228**				
	(3.029)	(2.446)				
Ln Tertiary sector NSDP (Rs. '00000')	4.446	0.946				
	(4.085)	(3.057)				
% of population graduate (16 years & above)	2.727***	2.939***	2.806***	3.294***	2.420***	**1.319****
	(0.859)	(0.616)	(0.798)	(0.485)	(0.780)	**(0.548)**
% of urban population	0.308	0.112	0.251	0.155	0.184	**0.0762**
	(0.215)	(0.137)	(0.209)	(0.141)	(0.207)	**(0.118)**
Ln NSDP (Rs. '00000')			6.934*	3.679***		
			(3.753)	(1.339)		
Ln Per capita income (Rs.)					12.19**	**19.03*****
					(4.859)	**(3.025)**
Intercept	−110.7**	−39.67**	−107.8**	−56.55***	−124.2***	**−186.6*****
	(48.74)	(17.20)	(53.45)	(19.83)	(45.93)	**(29.58)**
R-squared (within)	0.797		0.792		0.802	
Hausman test (chi-squared)	–		29.52***		5.46	

Note: Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

areas) and if it is not accounted for by the price deflators, etc. The asset-based approach presents a stable and more reliable method of estimation of the middle class. The chapter shows some interesting results. First, the rural areas are largely deprived in the country as the rural–urban divide in the size of the middle class is very high. Second, Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, West Bengal, Orissa, Jharkhand, Chhattisgarh, and the North-Eastern States, which have large shares of the population dependent on agriculture and have a lower share of human capital (graduate & above) have experienced lower growth of middle class during 1993–1994 to 2015–2016. These are also the states where per capita income is also low in comparison to other states. Third, these are the Southern States of India (Kerala, Tamil Nadu, Karnataka, Andhra Pradesh including Telangana) which have reaped the benefits of liberalised economy, in terms of increasing size of the middle class, and are followed by Western States (Maharashtra, Gujarat, and Goa), and North-Western States (Punjab, Haryana, Delhi, Himachal Pradesh, Jammu & Kashmir, Uttarakhand). Relatively higher human capita and lower inequalities of per capita income in the Sothern States may have helped them in enhancing the

economic mobility of the households. Fourth, the growth of total NSDP/ per capita income and human capital have been the major factors determining the growth of the middle class in India. Overall, relatively higher growth of the economy during 1993–2015–2016 has enabled India to transfer a sizeable share of the poor households to the category of middle class. This has reduced the share of population living below the poverty line by more than one-half in rural areas and about two-thirds in urban areas. However, the lack of effective management of the economy since 2015 and the impact of the COVID-19 outbreak in 2021 may devastate this historical economic achievement and may again push millions of people back into poverty. It is worth noting that as a sizeable share of the middle class of India is a neo-middle class or is in the category of the lower middle class, has a higher risk of rolling back into poverty due to any adverse policy or economic shock.

Appendix

Table 11.11 Percentage distribution of lower, middle and upper-middle classes in 1992–1993

	Urban			Rural			Total		
States	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class
Andhra Pradesh	26.9	14.0	11.3	9.9	2.5	0.5	14.1	5.4	3.2
Arunachal Pradesh	15.5	3.4	6.9	5.2	1.6	1.6	6.8	1.9	2.4
Assam	14.9	9.9	6.6	3.0	1.9	0.4	4.1	2.6	1.0
Bihar	21.5	12.8	5.8	2.7	1.2	0.3	4.8	2.5	1.0
Goa	11.6	17.8	17.9	5.4	12.8	10.2	8.0	14.9	13.4
Gujarat	21.2	21.5	12.6	5.0	4.9	1.0	12.0	12.0	6.0
Haryana	18.3	26.4	20.5	12.1	7.0	1.4	14.1	13.1	7.4
Himachal Pradesh	17.8	14.2	21.9	9.8	4.9	4.2	10.7	5.9	6.1
Jammu & Kashmir	23.8	19.9	9.2	12.4	5.8	0.3	15.0	9.1	2.4
Karnataka	23.6	12.0	16.4	7.3	1.8	1.6	13.2	5.5	7.0
Kerala	25.9	11.6	15.0	14.2	5.0	8.2	17.0	6.6	9.8
Madhya Pradesh	16.5	15.8	8.6	2.7	1.7	0.5	6.2	5.3	2.6
Maharashtra	18.2	10.8	12.5	4.0	1.6	0.9	10.2	5.6	5.9
Manipur	2.8	4.5	1.7	0.9	0.8	0.4	1.5	2.0	0.8
Meghalaya	15.1	2.7	2.3	3.7	0.8	0.0	5.9	1.2	0.5
Mizoram	3.9	2.9	5.9	0.6	0.3	0.6	2.4	1.7	3.5
Nagaland	18.9	4.4	3.2	3.7	0.9	0.5	6.9	1.6	1.1
Delhi	20.1	22.8	27.4	28.2	16.1	8.0	20.8	22.2	25.9

(continued)

Table 11.11 (continued)

States	Urban			Rural			Total		
	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class
Orissa	11.2	10.4	9.1	2.9	1.7	0.3	3.9	2.7	1.3
Punjab	14.6	30.1	25.3	8.3	16.1	2.3	10.3	20.5	9.5
Rajasthan	26.3	14.6	11.9	5.9	2.7	0.7	11.1	5.7	3.5
Sikkim	54.9	2.4	14.0	19.5	1.1	2.8	24.7	1.3	4.5
Tamil Nadu	18.2	8.4	8.8	4.5	2.3	1.2	9.2	4.4	3.8
Tripura	10.7	1.6	11.9	1.1	0.2	0.6	3.2	0.5	3.1
Uttar Pradesh	27.4	17.3	11.0	3.6	1.6	0.2	8.6	4.9	2.5
West Bengal	33.2	10.7	12.7	5.8	1.6	0.3	13.1	4.1	3.6
All-India	22.2	14.5	12.7	5.4	2.5	1.0	10.0	5.8	4.2

Source: computed using data from USAID (n.d.)

Table 11.12 Percentage distribution of lower, middle, and upper-middle classes in 2005–2006

States/UTs	Urban			Rural			Total		
	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class
Andhra Pradesh	31.5	14.1	14.1	17.8	3.0	3.9	22.2	6.5	7.1
Arunachal Pradesh	15.9	4.4	8.6	5.5	2.0	2.0	8.4	2.7	3.8
Assam	16.7	9.2	12.0	4.8	1.8	2.2	7.2	3.3	4.2
Bihar	23.9	12.1	8.9	2.2	1.6	0.4	5.7	3.3	1.8
Chhattisgarh	17.7	20.9	13.8	3.1	2.5	0.5	6.3	6.5	3.4
Delhi	19.4	24.9	23.3	22.9	27.1	14.0	19.6	25.0	22.7
Goa	10.4	20.8	26.4	7.6	11.5	21.2	9.2	16.7	24.1
Gujarat	27.8	22.4	17.5	12.2	6.8	6.8	18.8	13.4	11.3
Haryana	18.3	26.7	23.1	12.5	11.7	6.7	14.3	16.4	11.8
Himachal Pradesh	19.1	22.5	24.7	14.2	8.1	14.9	14.9	9.9	16.1
Jammu & Kashmir	21.9	17.8	20.8	13.4	9.2	2.7	16.1	11.9	8.3
Jharkhand	25.9	22.9	12.1	2.3	2.5	0.4	8.3	7.7	3.4
Karnataka	30.7	15.5	15.4	13.2	4.2	2.1	20.3	8.8	7.5
Kerala	26.5	9.3	26.9	26.9	3.4	22.4	26.8	5.4	23.9
Madhya Pradesh	21.3	14.9	13.0	2.7	1.9	1.0	8.0	5.6	4.4
Maharashtra	28.6	19.0	21.9	11.7	4.1	4.5	19.9	11.3	12.9
Manipur	3.1	6.2	4.9	1.3	1.8	1.3	1.9	3.2	2.5
Meghalaya	26.8	7.1	7.3	12.4	1.5	1.7	16.2	2.9	3.1

(continued)

Table 11.12 (continued)

States/UTs	Urban			Rural			Total		
	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class
Mizoram	5.5	6.4	11.9	1.2	1.4	1.1	3.5	4.1	6.9
Nagaland	17.2	5.7	6.9	4.1	1.3	1.7	7.7	2.5	3.1
Orissa	16.6	16.4	17.4	6.9	3.1	2.0	8.5	5.4	4.6
Punjab	17.3	26.7	23.6	9.5	16.9	10.7	12.6	20.8	15.8
Rajasthan	23.6	15.6	21.6	7.6	4.2	1.8	12.2	7.5	7.6
Sikkim	41.3	15.9	12.7	20.6	4.7	4.3	24.8	7.0	6.0
Tamil Nadu	29.6	13.7	14.7	20.5	6.2	4.2	24.7	9.7	9.0
Tripura	10.6	7.2	12.4	2.4	1.3	1.9	3.9	2.4	3.7
Uttar Pradesh	23.1	20.7	11.7	4.0	2.8	0.8	8.8	7.3	3.5
Uttaranchal	17.8	20.5	27.9	12.8	7.9	6.3	14.2	11.4	12.4
West Bengal	31.6	11.5	18.1	7.0	2.0	1.3	14.9	5.0	6.7
All-India	26.1	17.0	17.0	9.1	3.8	3.1	14.6	8.1	7.7

Source: computed using data from USAID (n.d.)

Table 11.13 Percentage distribution of lower, middle, and upper-middle classes in 2015–2016

States/UTs	Urban			Rural			Total		
	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class
A & N Islands	14.9	58.1	10.1	9.7	29.2	5.5	11.9	41.7	7.5
Andhra Pradesh	29.0	53.5	1.6	35.7	27.3	1.0	33.6	35.4	1.2
Arunachal Pradesh	13.4	19.6	14.0	4.1	4.1	3.5	6.6	8.2	6.2
Assam	16.6	29.1	10.3	5.3	7.1	2.6	7.1	10.5	3.8
Bihar	21.6	26.8	1.7	4.0	4.3	0.9	6.3	7.2	1.0
Chandigarh	7.8	48.0	0.9	14.3	52.4	4.8	8.0	48.1	1.0
Chhattisgarh	15.4	45.2	2.4	5.5	11.6	1.7	7.9	19.7	1.9
D & N Haveli	12.7	39.8	5.3	6.2	6.1	1.3	9.6	23.3	3.4
Daman and Diu	21.8	38.4	4.7	20.3	48.0	5.4	21.4	40.5	4.8
Goa	8.8	48.4	18.1	6.4	37.2	15.6	7.9	44.4	17.2
Gujarat	13.2	56.1	7.6	12.3	28.0	6.5	12.7	40.7	7.0
Haryana	13.8	49.9	0.7	9.6	39.1	2.1	11.3	43.6	1.5
Himachal Pradesh	13.3	42.5	23.5	11.6	37.3	9.7	11.8	37.9	11.3
Jammu & Kashmir	13.7	41.9	10.8	17.1	22.3	5.1	16.0	28.7	6.9
Jharkhand	19.3	40.5	2.9	4.8	7.9	0.6	8.5	16.3	1.2

(continued)

Table 11.13 (continued)

States/UTs	Urban			Rural			Total		
	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class	Lower-middle class	Middle-middle class	Upper-middle class
Karnataka	19.2	47.2	7.1	18.5	19.5	2.8	18.8	31.6	4.7
Kerala	9.3	50.2	15.3	14.7	47.6	14.4	12.2	48.8	14.8
Lakshadweep	5.0	67.0	1.9	2.8	56.8	1.7	4.6	64.9	1.8
Madhya Pradesh	13.8	42.4	2.4	4.2	8.0	2.7	7.1	18.4	2.6
Maharashtra	21.0	52.4	3.8	15.1	23.7	3.3	18.0	37.8	3.6
Manipur	4.8	13.6	8.4	1.9	3.6	2.8	3.0	7.6	5.0
Meghalaya	29.3	15.0	16.1	16.9	5.8	3.9	19.7	7.8	6.6
Mizoram	6.4	46.6	14.4	5.8	17.5	2.7	6.1	34.1	9.4
Nagaland	14.7	15.2	13.5	5.6	4.3	3.4	8.7	8.1	6.9
Delhi	14.6	51.3	0.6	13.9	41.0	0.3	14.6	51.2	0.6
Odisha	18.4	42.8	2.1	12.2	13.7	0.7	13.2	18.6	0.9
Puducherry	11.3	62.8	5.9	11.8	49.1	1.9	11.4	58.6	4.7
Punjab	5.6	55.7	1.0	3.1	45.9	3.1	4.1	49.9	2.2
Rajasthan	11.9	52.2	2.8	9.3	22.0	4.2	10.0	29.7	3.8
Sikkim	46.5	25.5	11.0	45.2	9.2	4.4	45.6	14.6	6.6
Tamil Nadu	18.5	57.4	2.6	24.9	41.2	2.2	21.7	49.5	2.4
Tripura	12.9	32.3	5.0	5.3	6.1	0.7	7.6	14.0	2.0
Uttar Pradesh	10.8	40.9	1.1	2.9	6.9	1.4	5.0	15.8	1.3
Uttarakhand	15.6	51.7	3.3	14.8	22.2	2.6	15.1	32.8	2.9
West Bengal	25.6	40.3	2.1	12.6	10.5	0.9	16.8	20.3	1.3
Telangana	22.9	51.4	3.3	27.0	20.0	1.4	25.1	34.3	2.3
Total	17.3	48.2	3.8	11.4	17.5	2.5	13.5	28.2	3.0

Source: computed using data from USAID (n.d.)

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Chapter 12
Geographies of Power: Implementing Community Driven Development in Urban Dili, Timor-Leste

James Scambary and Joana de Mesquita Lima

Contents

Abstract Dili, Timor-Leste's capital city, has undergone a series of profound transformations in the last 40 years. Major population movements during the war against Indonesian occupation between 1975 and 1999 and again after independence have turned a small colonial outpost into a thriving cosmopolitan city. Constant circular and cyclical rural–urban migration and urban sprawl negates standard dichotomies between rural and urban, core and periphery. Yet Dili still retains a colonial era system of administrative boundaries and hierarchies of local leadership and these continue to be relied on by the State and development agencies to define and mobilise communities in the interests of governance and development projects. This reliance not only risks endorsing colonial, class and traditional hierarchies but also mitigates against effective governance and service delivery. Drawing on the experience of the implementation of the National Suku Development Program in Dili, we argue that more innovative and intuitive notions of community are required to reflect the highly fluid and complex socio-spatial configurations of urban Dili.

James Scambary was deceased at the time of publication.

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12.1 Introduction

In 2012, the Government of Timor-Leste (GoTL) commenced its ambitious *Programa Nasional Dezenvolvimento Suku* (National Suku Development Program [PNDS]), the latest in a series of decentralised development programs implemented since independence from Indonesian occupation in 1999. Between 2012 and 2017, the program was progressively rolled out across all of Timor-Leste's 442 *sukus* (villages). The PNDS approach is based on a community driven development (CDD) model. Communities choose what kind of development project they want, elect a project team and receive training in running and building the project. Those who perform the labour receive a small daily stipend.

There are many challenges to development in Timor-Leste, not least of which are mountainous terrain and poor roads, making the transport of heavy construction material and equipment a sometimes heroic endeavour. Low literacy and numeracy skills in rural areas can present a formidable barrier to training community members in basic project management skills like book-keeping or report writing. A still deeply traditional society with strong hierarchical and patriarchal forms of authority further complicates attempts at gender inclusive development. That will not change overnight. Despite these challenges, according to one unpublished national review of the PNDS project carried out in 2017, the program was highly popular with the Timorese and participants learned valuable vocational skills. In a context of faltering service delivery, it also delivered much needed local level development and achieved very real change (The Asia Foundation 2017).

The PNDS' reliance on local authorities and *suku* and *aldeia* (sub-village) boundaries worked relatively well in rural areas, although not without challenges; mass resettlement and dislocation under Indonesian occupation between 1975 and 1999 created pockets of displaced communities evident even today, resulting in numerous long-running land disputes (Fitzpatrick et al. 2012). Nonetheless, *suku* and *aldeia* territories still broadly reflect descent groups or family territories, and the *chefes de suku* (village chiefs) and *chefes de* aldeia (sub-village chiefs) to a large extent still possess the requisite authority or at least demographic and local knowledge to mobilise their communities. The fluid and cosmopolitan socio-spatial logic of the urban capital Dili, like many Asian urban centres, operates on very different principles, and it was here that the PNDS first encountered real difficulties. Such an outcome is not entirely unpredictable, given that the current PNDS Program Operating Manual (Democratic Republic of Timor-Leste 2013c) was designed for rural districts. Yet no manual can really capture the complexity of contemporary Asian urban contexts.

Dili has undergone a number of externally and internally driven shocks and transformations. Under the Portuguese colonial regime, up until 1974, Dili was little more than a trading outpost (Ranck 1977). The Indonesians, after their 1975

invasion which sent thousands of Dili inhabitants up into surrounding hills, then built numerous housing complexes for its security forces and civil service. As the war of resistance continued and the Indonesians tried to consolidate their grip, waves of inward migration of people fleeing ongoing conflict in the countryside further changed the demographic profile. A massive influx into Dili at the end of the war in 1999 almost doubled its size and created crowded informal settlements out of these complexes. With no real urban planning or controls, Dili's growth has continued exponentially to this day.

The spatial, social and demographic composition of Dili today therefore presents numerous challenges to project implementation. Dili is not only a mixture of old and new, large and small settlements, stable and transitory populations, but also multiple permutations of each of these factors within each *suku*. Village leaders are therefore not as reliable a means of mobilising a community as they are in rural areas. Constant and often substantial rural–urban circular and cyclical migration also renders such notions as a rural–urban divide as largely meaningless in more than a strictly geographic sense. People also possess many different group-based identities, a product of Timor's complex history including kinship, faith-based, clandestine-resistance group and almost tribal political party identities. Village boundaries, then, are evidently not the ideal organisational units or basis for project planning and community engagement strategies. Yet the experience of trying to implement PNDS in Dili is not just about appropriate project design and community engagement strategy; it raises broader questions about how we understand, define and represent urban spaces and notions of community.

The city is clearly not the 'bounded, traversible space with a defined limit and surrounded by countryside' (Vigar et al. 2005: 1394) it is thought to be. Internationally, standard and idealised dichotomies such as centre and periphery, urban fringe, rural and urban are increasingly at odds with the multi-centric and fluid landscapes of most contemporary urban areas (Vigar et al. 2005: 1393).

Spatiality is also mediated by power dynamics; the study of spatiality therefore necessitates an analysis of the contextual power relations expressed through 'situated and embedded accounts and practices' and their spatial consequences (Hossain and Hackenbroch 2019: 170). Dili's administrative boundaries and hierarchies of local leadership are steeped in a legacy of centuries of Portuguese colonisation and over two decades of Indonesian occupation; as systems of control, economic extraction, racial and class segregation.

This article summarises the findings of research commissioned by The Asia Foundation conducted between April to May 2015, comprised of seven focus groups conducted in Dili urban *sukus* and a 1 day workshop with 22 PNDS staff. A further national research project was conducted May to June 2017 in Dili and rural districts which used a mixture of both quantitative and qualitative methods. Survey questions were developed in collaboration with the PNDS Secretariat and the CARDNO

Emerging Markets[1] PNDS support team. A team from the local research NGO, the Matadalan Institute, were contracted to do the phone interviews, which were conducted over 3 days. This project sample consisted of phone survey responses from 587 *chefes de suku* and *chefe de aldeias*, seven focus group discussions and 14 key informant interviews across eight *sukus* in four municipalities. The chapter also includes PhD research at the Arquivo Histórico Ultramarino, in Lisbon, and is informed by fieldwork conducted in Dili between June and August 2019.

In this chapter we engage with Gupta et al.'s (2015) notion of 'geographies of urban governance' that cities take their shape through multiple configurations of and interactions between local social, cultural, political and economic conditions and their interactions with those at other levels such as local and regional governance. In turn, these shape differences in place, space, scale and human-environment interactions (Gupta et al. 2015: 4). As we argue here, Dili's urban administration and existing formal territorial boundaries fail to capture the realities of a series of fundamental demographic and socio-spatial changes over the last three decades—particularly since independence in 1999. In turn, this continued reliance on colonial era boundaries both reproduces colonial power relations and systems of control and preserves a colonial class divide. To be effective and ensure that local development and resources are delivered equitably across all sectors of society, more flexible and intuitive notions of community are required so that they may take into account the multiple and fundamental changes to Dili's socio-spatial configurations since independence. In doing so, 'a new mode of planning, informed by a relational understanding of place and space' (Walsh 2014: 308) could be formulated to improve the effectiveness of governance, service provision, and development of infrastructure projects at the local level.

This chapter is divided into three main sections. The first section examines colonial spatial constructions of Timor-Leste's administrative boundaries and social categories, and the dynamics of contemporary configurations through such phenomena as rural–urban migration. The second section describes the key principles behind PNDS and the challenges it faced in its urban implementation phase, before moving to an analysis of these challenges and their implications for future development.

12.2 Colonial Spatial Constructions and Dynamics

12.2.1 Territorial Structure

Timor-Leste's administrative and territorial boundaries are indelibly imbued with power relations and modes of control, beginning with Portuguese colonisation.

[1]CARDNO Emerging Markets is part of CARDNO, an international development and infrastructure contracting company.

When the Portuguese arrived in Timor in the sixteenth century,[2] the territory was divided into small kingdoms (*reinos*) led by local kings (*liurais*). These kingdoms were intricately connected to each other, albeit with changing boundaries reflecting their gain and loss of independence through wars, marriages and successions (de Castro 1867). In his account of the history of Portuguese possessions in Oceania, Governor Affonso de Castro (de Castro 1867) refers to this as a lack of civilisation of the indigenous population, noting its difference from European standards and systems. Castro was also struck by the difference in administrative structures between Java and Timor, noting how in Java there were strong hierarchies of social structure associated with units of production and in-kind crop payment while in Timor this was closely linked to family lineage and their alliances (de Castro 1867).

It was only in the mid-nineteenth century that the Portuguese began to build a colonial state in Timor and thus define a new administrative structure (Kammen 2010). The strategy adopted by colonial governors was to establish an administrative grid of districts above the kingdom and to impose village units below where none had previously existed. In effect, this imposed a territorial based administrative system over a genealogically based system (Traube 2007: 20). There was an increasing focus for influence at a more local level to gain greater control. Thus, 'as the locus of colonial extraction shifted downward from the kingdoms to the *suco*,[3] conceptions of territoriality, power, and statutes were altered in ways that have critical implications for the Timor-Leste today' (Kammen 2017: 132). These lower levels of administrative units have remained as localised centres for power and influence even today.

In 1893, Governor Silva came to Timor with a desire to finally gain profit for the crown. To this end, he dismantled the smaller kingdoms, particularly those who were proving difficult and disloyal, removing absolute power from the local kings. He wanted to introduce a new form of direct head of household tax (often referred to as the 'head tax'), for which implementation depended on loyalty to the crown and effective collection. To implement direct taxation, a census was carried out. Governor Eduardo Augusto Marques, who succeeded Governor Silva, was thus able to implement the payment of head tax based on census information. To collect data and tax, the coordination level of the *aldeias* (smaller administrative units) were considered as the new *sukus*. Subsequently, the colony awarded military recognition to the headmen, awarding them an equivalent military rank—captain or major, and in special cases lieutenant-colonel—second line military position (Kammen 2017). The headmen thus became formal elements of the colonial chain of command,

[2]As Kammen observes, while Portuguese colonisation is commonly believed to have begun 400 years ago, they had little physical presence until much later. The first Portuguese governor based in Timor was not appointed until 1702; the capital of Portuguese Timor was only moved from Oecusse in Dutch Timor to Dili in 1769 and the Portuguese had little control over the territory of what now constitutes the nation of Timor-Leste until the early twentieth century (Kammen 2003: 71).

[3]Suco is the Portuguese word; the Tetum version *suku* became the commonly accepted spelling after independence and will be used throughout the text except for direct quotes.

aligning with the colonial power. Greater control over the 'natives' was thus made possible through cultural manipulation of their social structures (da Cunha 2012).

In 1910, the Republican movement overthrew the monarchy in Portugal. In Timor-Leste, ruling *liurai* families were monarchist sympathisers now being ruled by the Republicans. Although not stripped of their titles, *liurais* nonetheless suffered a loss of power, subsequently taking on roles that served the state in controlling the population under them through new subdistricts named *postos*. *Chefes de suku* quickly multiplied, now tasked with tax-collection duties. Under colonial rule, the structure changed again after the Japanese occupation in 1942, with districts expanding once again and *sukus* falling in number depending on different jurisdictions, which once again allowed for shifting power between groups (Kammen 2017).

After a declaration of independence from Portugal in 1975, the *Frente Revolucionária do Timor-Leste Independente* (FRETILIN), which had become the dominant political force after a brief civil war, then reverted to the division of *postos* first imposed by the Portuguese colonial powers. The hope was that this step back into the old kingdoms could be an effective way to mobilise the population and resources. This experience of independence, however, was short-lived, and after invading Timor-Leste in 1975, Indonesia consolidated its subsequent 24-year violent occupation through the establishment of three greater zones of military operation: west, centre and east. Later, for management of the territory, the Indonesians returned to the *sukus*, and even the Timorese resistance structured itself with a coordinator in each *suku*.

12.2.2 Urban Planning and Colonial Impact on the Urban Space

The Japanese invasion during WWII led to widespread destruction of the territory. However, the development focus of the Portuguese colonial authorities continued to rest on agriculture, with the urban realm continuing to be neglected, despite the development of urban planning tools and plans. The 1951 urban plan, developed amidst the post-Japanese invasion recovery effort, intended an organisation of the city for all its population. It aimed to include all members of the city, Europeans, mestizos, Chinese, Arabs and Timorese, noting that the customs of all should be respected. Living quarters should be independent and should cater to the needs of each community. However, it also stipulated that they should be separated because of hygiene and appearance, whereby there should be no mix of architectural types due to the concerns around hygiene in the urban areas. In addition, it is noted that zones designated for the Timorese were not located in the urban nuclei, despite needing to be near Dili for work (Plano Geral de Urbanização de Díli, 1951—Aguiar 1951).

A 1968 detailed study in preparation of the following plan denotes that rural to urban migration was the main element for the growth of the city. However, it

maintains its stance with regards to the local population and their entering of the city. Despite the document presenting a space to stipulate the number of Timorese allowed in the city, this was left blank (Urbanização de Díli e Arredores, 1968—Direcção Geral dos Serviços de Urbanismo e Habitação). The establishment of a central housing unit for Timorese reflected the need to house those who worked in the city and depended on the city economically, yet it remained separate. Proposals referred to European references of individual housing of adequate size, yet with a back garden so that agricultural produce could be grown (Direcção Geral dos Serviços de Urbanismo e Habitação 1968).

The last plan, developed in 1972 by Fernando Schiappa de Campos, refers to rural–urban movement of the population as the main source for city growth, characterising the 'natives' as working across different sectors, namely in commercial enterprises and in the public service, but also with 'private economy' through agriculture in land nearby. He noted that the majority of the people, given the lack of access to land, were unable to live in the city and were thus found on the outskirts of the city. The housing proposals in this document referred to different styles of housing for rural–urban migrants, where there appeared to be a mid-way adaptation of housing situations for new arrivals occupying land that was not adequate or with adequate infrastructure. These were designated as areas that were to be destroyed when formal urbanisation took shape (Boavida 2011; Campos 1972).

The development of plans for the colonial city was a clear mirroring of what was being done in Europe at the time, with commercial enterprises and development at the heart of strategic development (Mendes 2010). The colonial city was populated and developed by European trained engineer architects without much knowledge of the context they were operating in nor of the city dynamics. Yet, what they proposed as the structure of the city, imitating Europe in style and materials, was a way of imposing and demonstrating power (Njoh 2009). This included the clear zonal separation between the indigenous population and the Europeans, with Timorese located outside to serve the purposes of the Europeans living inside the city.

This spatial division was also intended as a reflection of racial and social superiority, whereby those who were more distant from the idealised European way of life and 'civilisation' should be also physically further away. Indeed, in a manual written on housing for the indigenous population of the Portuguese colonies by one of the main architect-urbanists of the Portuguese colonial powers, João Aguiar, who was also the author of the 1951 Urban Plan for Dili, it is noted that the indigenous population should be housed nearby the city, as it has a role to play in the functioning of the city. Yet, as he wrote, they should not be mixed with the Europeans as they are not quite as civilised (da Silva 2018).

Njoh (2009) also refers to one of the forms of colonisation impacting upon spatial planning through construction of colonial edifices on elevated areas overlooking the city and the colonised people. Although this was not the declared intent, the Portuguese plans do place the European community, as well as key services and government buildings, on these elevated areas. It is here noted that this was due to the need to provide better living conditions for the Europeans who were unable to withstand much of the natural conditions of heat and reduced breeze in the city.

However, it is noteworthy that the proposed plans indicate that as natives, the Timorese were able to withstand these conditions leaving them in the lower areas of the city, where they could establish themselves and where swamps and floods persisted, despite infrastructure interventions; these are also noted as areas where further expansion of the city would take place (Boavida 2011; Campos 1972).

12.3 Post-Colonial Administrative Boundaries

After the re-establishment of independence through a popular referendum in 1999, subdistrict divisions reverted to those of the kingdoms of the eighteenth and nineteenth centuries, yet the foreign established *sukus* remained. Today, it is the most used unit of analysis across the board at the subnational level—it is the only one where direct elections take place and where statistical data may be found.

In 2004, 442 *sukus* and 2228 *aldeias* were formally recognised and, although looked upon as being heavily politicised, elections for village heads were called. In 2005, just ahead of the new elections of the *chefes de suku*, and in the context of the GERTiL[4] Dili urban master plan,[5] interviews were conducted with the then district and subdistrict administrators and the nominated *chefes de suku* ruling at that time. Discussions on the new structures had many of the interviewees note that the power of the elected *chefes de suku* would not be complete, and that this formal governance would have to coexist with customary practices and that certain traditional issues would require responses from traditional leaders. It became clear that, as Cummins notes (Cummins 2012), the model of governance would have to include customary forms of governance and the relevance and importance of its integration.

Suku councils' legal status, roles, responsibilities and competencies were further set out in Law No 3/2009. They are mandated to mediate in disputes and act as a conduit between the government and their communities, facilitating government programs and projects at the *suku* level. While their scope of competencies and responsibilities is broad, *suku* councils are still defined as community organisations under Law No 3/2009 (The Asia Foundation 2014).

The *suku* is therefore an administrative unit that has served the purpose of coordinating smaller units (*aldeias*) and as control points for the population. The *aldeias* changed too, to incorporate new lineages in each *aldeia*, which Kammen (2017) suggests may be a form of organising the population within formal administrative boundaries. The origins of the *suku* can thus be read as a legacy of the ruling families that were loyal to the colonial power; those who had a strong connection to

[4]GERTiL—Research Group for the Reconstruction of Timor-Leste—established at the Faculty of Architecture of the Technical University of Lisbon.

[5]In 2005, GERTiL, through a bilateral cooperation project funded by the Portuguese Government, was contracted to carry out the Urban Masterplans for Díli and Baucau. The project looked at infrastructure, socio-economic conditions, access to basic services and environmental conditions.

the Portuguese, and whose power did not depend on traditional alliances or on social networks to gain allegiance from other lineage houses to strengthen their power. Cummins (2012) does however note that outside urban areas, there may be a coexistence between traditional and formal governance, whereby the candidate for the *chefes de suku* position may either be connected to the *uma lisan*[6] or have received a blessing to take on that role.

It is also important to note the importance of the status of land ownership. Soon after independence, legislation was passed that all land that had belonged to the Portuguese state in 1975, and that had been both claimed and used by the Indonesian administration in the period from 1975 to 1999, now became the property of the State (Stead 2015). Consolidating a legacy of not just state dominance and dispossession, but also colonial era landholdings of colonial era Timorese elites. Their landholdings, granted to them for loyalty to the Portuguese authorities, were often the result of dispossession of poor farmers and subsistence communal landholdings. Some of these seizures are still bitterly contested today.

12.4 Post-Independence Demographic Changes

It is therefore clear that new administrative realities have imposed further changes to the role and nature of authority of *chefes de suku and chefes de aldeia*. The evolving nature of their role and authority must also be understood in the constantly evolving urban context. At the time of the Indonesian invasion in 1975, Dili was largely composed of a couple of small commercial areas, a port facility, residential areas for Portuguese colonial officials and wealthy Timorese mestizos, and a number of scattered clusters of *aldeia*s on its urban periphery (Fig. 12.1). Its preinvasion population was estimated at less than 30,000 (Ranck 1977: 93). Forced resettlement and displacement under the Indonesian occupation and post-independence in-migration from rural districts boosted Dili's population to more than eight times its 1974 pre-Indonesian invasion size. While conflict during the Indonesian occupation prompted waves of in-migration, most of this growth has been since independence.

Circular migration also considerably swells and reduces the population of Dili in regular annual cycles. There are five to six significant cyclical and circular population movements per year related to school registration for example, public holidays and various ceremonial obligations which are usually performed in rural villages of origin during the extended dry season. There are many other seasonal movements too, such as people coming in to Dili to sell agricultural produce, which many do on a daily basis. Increasingly common national elections virtually empty the city as people return to their rural villages of origin to vote.

[6] *Lisan* refers to ancestral traditions and beliefs that families and groups follow, and the *uma lisan* refers to the house and those who guide and protect the *lisan* of the group.

Fig. 12.1 Dili in 1974 (Ranck 1977)

These population movements in turn have implications for Dili's settlement patterns and spatial and demographic dynamics. As described by Ranck (1977), a common pattern in rural–urban migration is for one rural family to establish a base and then 'sponsor' others from the extended family and home *aldeia*, helping them find housing and even employment. This means that enclaves of the rural *aldeia* of origin and extended family are established alongside enclaves of other migrant groups, creating a patchwork of different descent groups. In rural areas, an *aldeia* is essentially a family unit, but this principle largely holds true for established urban *aldeia*s (although there is considerable variation), with one larger family dominating but with a number of smaller enclaves of other descent groups from other *suku*s or districts.

When rural migrants and others returning to Dili after escaping post-referendum violence rushed to occupy vacant Indonesian civil service and military housing, suburbs were thus created almost overnight. The cross-hatched areas below in Fig. 12.2 denote these former Indonesian *perumahan dinas* (civil service housing) complexes. The crowded, cosmopolitan nature of these *aldeia*s gives them a very different socio-spatial dynamic to the more clan centric traditional *aldeia*s of the rural hinterland, or the still somewhat heterogeneous but older, more established *aldeia*s in Dili.

Urban sprawl has also complicated Dili's demographic and socio-spatial dynamics, further blurring the rural–urban distinction. Over time, from the Indonesian

Fig. 12.2 Map of Dili (Democratic Republic of Timor-Leste 2007)

occupation onwards, communities have expanded into the foothills of surrounding rural farmland and also into coastal forest and mangrove lowlands, leading to 'a new fusion of space that is not rural but not yet urban' (Ros-Tonen et al. 2015).

The diverse nature of Dili's socioeconomic makeup also poses challenges for some of PNDS' key pillars of poverty reduction and social inclusion. The widespread communal violence of what is popularly referred to as the 2006 Crisis and recent martial arts group violence has entrenched a popular image of Dili as a site of youth alienation, whereby a burgeoning population of unemployed itinerant youth become prey to gangs and delinquency. Such assumptions are grounded in a much older discourse of urban decay and de-industrialisation, such as in the work of the Chicago School (Park et al. 1925), and its heirs such as 'strain theory' (Agnew and White 1992) and 'social disorganisation theory' (see, for example, Kubrin and Weitzer 2003). This discourse is grounded in industrialised urban centres of the US, and subsequently widely applied to violence prone cities of Latin America and other developing countries (see, for example, Hagedorn 2008). A key assumption in this literature is that poverty, cultural heterogeneity, residential mobility and attendant unstable social structures mitigate against social cohesion, breeding crime and social conflict. So a dominant liberal developmental discourse has thus become entrenched portraying Dili as a site of widespread urban youth unemployment—the 'youth bulge' (Urdal 2004) and consequent youth alienation. Therefore, based on this assumption, they will be even more eager than their rural counterparts to seize much needed employment opportunities such as those created by the PNDS project. As this research found, the picture is far more complex, with, for example, a vibrant but largely hidden informal economy absorbing a significant proportion of unemployed youth, and communities coalescing across descent lines and ethnolinguistic identities. Some of the most conflict prone *aldeias* were the most cohesive and some of the most settled were the most difficult to work with.

Indeed, there are many affluent parts of Dili where there is little need, or interest in implementing community driven development. Dili's socio-spatial layout still largely reflects colonial patterns whereby favoured wealthy mestizo *assimilados* (those who belonged to families of those who had assimilated with the colonial powers) lived in close proximity to colonial officers and their families. In 1975, when the Portuguese abandoned the country and the city was left for the Indonesian occupation, these assimilated communities escaped to the mountains, or fled over the border to Atambua in West Timor or to Australia. These neighbourhoods were then taken over by Indonesians, but there was also an influx of poor Timorese from the hills; as Silva describes, 'Thus, under Indonesian rule, Dili became an even more plural, complex and ambiguous space, housing power and social modernisation projects of various sorts, while turning more indigenised than ever' (Silva 2011:149). The 1999 Referendum brought a return to Portuguese colonial patterns of occupation, with those who had left the city returning, alongside those who had been living in exile in Portugal, Indonesia and Australia—many of which were the privileged *mestizo assimilados*. As a consequence, Dili's inner city area still closely resembles colonial zones of class delineated inclusion and exclusion.

12.5 PNDS Implementation in Dili

The PNDS is based on a community driven development approach that promotes community control over planning decisions and investment of resources (Wong and Guggenheim 2018). The PNDS operating principle is derived from a CDD concept first implemented in Indonesia—the *Kecamatan* Development Program—and trialled in a number of countries around the world, with an emphasis on countries undergoing major political transformations like Myanmar or in post-conflict or disaster contexts (Wong and Guggenheim 2018). Established in Timor-Leste under a 2013 decree-law (Democratic Republic of Timor-Leste 2013a), each *suku* was set to receive on average US$50,000 per year for small-scale infrastructure projects. Financed from Timor-Leste's state budget, PNDS also received assistance and support from Australia's Department of Foreign Affairs (DFAT). The development contractor Cardno Emerging Markets was selected to implement the program on behalf of DFAT for an initial period of 4 years in collaboration with Timor-Leste's Ministry of State Administration (Cardno 2017). *Chefes de suku*, in line with their legally mandated role, are the key administrative agents and contact points.

There are 12 stages in the PNDS project cycle. Broadly speaking, they comprise a socialisation phase, followed by elections for the different *suku* and *aldeia* project teams who then receive training in the different roles including project management and basic accounting. Then there is a planning and consultative phase where the community decides what their development priorities are, such as water supply systems or community centres. This is followed by the construction phase where community members employed to work on the projects also receive vocational training in such skills as cement mixing and painting, followed by an evaluation stage (Democratic Republic of Timor-Leste 2013b).

Following a pilot phase, the program was rolled out over three subsequent phases to cover each of Timor-Leste's 442 sukus, culminating in its implementation in Dili. Observing some of the physical obstacles in rural districts first-hand, it is difficult to believe that the urban phase would be the most challenging. Despite a decade of intensive road construction, the still poor state of Timor-Leste's roads means that even relatively short distances of 50 km require up to a 3-h drive. That convoys of heavy trucks laden with construction materials repeatedly made it up to often remote mountain villages on roads that were sometimes little more than goat tracks is testament to the determination and commitment of both the communities and the program teams. However, even as some leading advocates of CDD concede, CDD projects are premised on the notion of a homogenous community with cohesive institutions, structures and cultural legitimacy to negotiate priorities for investment. As Wong and Guggenheim contend, community boundaries and associated forms of social control should be instead viewed as 'subsets of spatial and social hierarchies that cut across territorial boundaries' (Wong and Guggenheim 2018: 26). As it proved in Dili, it was these socio-spatial factors that proved more salient than geographic and physical barriers.

As part of the process to identify some of the reasons for its slow progress in Dili, a day-long workshop was held in Dili on May 18, 2015, with 22 PNDS Dili District facilitators.[7] Staff members were asked to reflect on their experience of working with communities—which of the communities presented the most and the least difficulties in project implementation and community participation, and why. Participants engaged in a series of exercises that progressively drilled down into more and more localised scales. In the first exercise, staff members were asked to rank *sukus* on a scale of cooperative to non-cooperative. In the second exercise, they were then asked to break down the *suku*s into *aldeia*s in terms of which communities were easiest to work with. In the third exercise, participants were asked to identify the key enabling and constraining factors for effective program implementation.

A much more complex picture emerged with this final exercise, and the results were sometimes surprising in a number of respects. As this session identified, each *suku* had its own unique demographic configuration and attendant complexities, but above all, that 'communities' were certainly not bounded by geographic or administrative markers. PNDS staff constructed a typology of different *sukus* and *aldeias* which was a highly illustrative exercise in itself, and also indicative of the very intimate and extensive knowledge staff members had of Dili demographics and social composition. A number of interesting dichotomies emerged.

One key dichotomy they observed was of rural and urban *aldeias* within the same *sukus.* As they reported, levels of community participation and cooperation varied with the geographic location of *aldeia*s. Rural *aldeia*s progressed well, with the communities happy with the level of incentives on offer,[8] but with low participation and interest from the urban-based *aldeia*s. This dichotomy was quite stark in one *suku*; participation was strong in the four rural *aldeia*s, but poor in the nine urban *aldeia*s. There are, of course, many variations within each of these categories, such as semi-urban *aldeia*s on the fringes of the city and inner-urban *aldeia*s. Inner-urban *aldeia*s may be more affluent, with a high proportion of the community employed in the formal economy, with the reverse being true of peri-urban *aldeias*.

Given, as described, its history of colonisation and restrictions on in-migration under the Portuguese, and subsequent population movements under the Indonesian occupation and their construction of housing complexes, clusters of old and new *aldeias* now sit side by side. Older *aldeias* tend to have sparser settlement patterns with more established family networks, while the new settlements with their much higher housing density have an attendant much higher population density. Given the ad hoc and somewhat free for all nature of the post-independence influx to claim this vacant housing (ostensibly the property of the state), they are also far more diverse in socioeconomic, family and ethnolinguistic origin.

[7]One of the authors of this chapter, James Scambary, facilitated this workshop as part of a consultancy for the Asia Foundation.

[8]Community members employed on the project construction receive a small daily fee, while project coordination team members receive a small stipend to cover costs such as phone credit and petrol.

In addition to *aldeias* and *sukus*, staff also described '*bairros*' or clusters of settlements within each *aldeia* within their sample *suku*. This phenomenon could partly be attributed to terrain, with some sukus consisting of both vibrant commercial areas and farmland or empty hills, but also by family settlement following chain migration patterns. One of these, for example, was centred on the *chefe de suku*'s residence, comprising almost half of all the settlements in that *aldeia*, while others were situated in a line along the main road. These bairros also sometimes consisted of a number of different communities within different *aldeia*s including political, clandestine and religious groupings. Each of these groupings will have leaders who constitute alternatives to formal authority and structures such as *xefe suku*s or *suku* councils. In one cluster of *aldeias*, community management team members—mostly women—identified themselves as members of the former clandestine-resistance group *Sagrada Familia*. This was at that time one of the most consistently conflict prone areas of Dili. Members of this team and participating community were drawn from all around this suku rather than in designated *aldeias*, which didn't strictly conform to guidelines. PNDS staff members maintained that clandestine networks were integral to maintaining the close-knit nature of this community and thus the success of project coordination too.

Some *aldeias* could also be defined by profession. One *aldeia* was almost entirely occupied by students who were only resident there until they finished their courses, so it was essentially a dormitory suburb. As largely transient residents they were predictably disinterested in participating in PNDS activities. Some inner city *sukus* were largely inhabited by civil servants or other professionals employed in the formal economy, with peri-urban *sukus* being mainly inhabited by workers in the informal economy. Another *suku* (seen by PNDS staff as being difficult), comprised of only three *aldeias*, mainly consisted of shopkeepers; many of whom are apparently foreigners including Chinese, Indians and Indonesians. Predictably, given that few of them actually lived in the *aldeia*, they also had little interest in participating.

A number of *suku*s had one or more *aldeia*s almost entirely composed of transient populations. In one *suku* along the coastal belt characterised by businesses catering to tourists and expatriates, a high proportion of the community comes from outside the *suku*, working in restaurants and hotels. Staff also identified certain clusters of *aldeias* as being comprised almost entirely of market traders—many of whom actually lived in rural areas and only came to town on weekends or selected market days. This did not necessarily stand in the way of PNDS implementation. In one such cluster, there was a woman *chefe de suku* whom interview and focus group participants clearly identified as owing her position to her effectiveness in PNDS implementation (The Asia Foundation 2017). In a community largely defined by profession, her election was based on merit rather than ethnolinguistic or family lineage—or gender—as is usually the case, with the *chefe de suku* position still dominated by men.

Then there are squatter communities—as many as half of Dili residents live in ex-civil servant housing ostensibly owned by the state. Even though many have now purchased their houses (although they often change hands privately with dubious and insecure title), residency can still be precarious. A number of settlements have

been designated for eviction to make way for government buildings or projects of often questionable utility, with some already cleared; most notably, 115 households of about 1142 people were evicted in Dili's west in 2010 to make way for a national library and museum that was never built (Rede Ba Rai 2010). In a further irony, the eviction notice was served in Portuguese; until relatively recently, despite Government attempts (albeit poorly resourced) to ensure Portuguese is taught in school, very few people speak Portuguese as only the elites were educated under colonial rule. In addition, many of the residents in these zones come from rural districts, so they had little connection or line of communication with the *chefe de suku*.

Some *suku*s were difficult to coordinate because of their sheer size, among other issues. Comoro, for example, with 31 *aldeia*s, is a very diverse and complex *suku* with a large transient population. Bairro Pite, with over 34 *aldeia*s, presented similar challenges. Many of the community there come from other *suku*s, either in Dili or from the districts, so *suku* leaders had difficulty in in keeping a record of all the people moving into the *suku*, either temporarily or permanently. As a consequence, many community members, especially those who had only recently moved to the *suku*, did not receive any information, making it difficult for them to participate.

Some *suku*s were more affluent than others, with the majority of the community employed as civil servants or government functionaries. One suku, for example, in central Dili, is a high-income area where many national political leaders reside, and many international NGO offices are located here. This *suku* is therefore well provided for in terms of services and facilities, so there is little need for or interest in PNDS projects there. Nonetheless, PNDS staff identified that the PNDS process was progressing well in two *aldeias* within this *suku*, so these factors do not necessarily in themselves present barriers.

Although staff were asked at the workshop to see how they could apply lessons from successful implementation in some *aldeia*s to others, it was clear that given the variety of different communities, the degree of success or difficulty was more related to particular conditions in the communities themselves, rather than any particular approach on the part of PNDS staff, whose methodology is largely stipulated in the PNDS program operating manual.

Given the variety of demographic and socioeconomic profiles, it was difficult to make generalisations. It was more the case of a combination of different factors. Overall, however, PNDS staff reported that it was easiest to work in older *suku*s or *aldeia*s with strong sense of community, and most difficult to work in large *suku*s with high population mobility. In many cases, local formal leadership was actually the problem—not the community. Lack of legitimacy and poor relations with the community, due to factors such as politicisation of *suku* leaders, or *suku* leaders who did not live in the *suku* or *aldeia* created considerable barriers to participation.

The urban economy is also substantially different to rural economies, comprised of a mix of formal and informal employment. As described, some neighbourhoods may contain enclaves of transient trader communities, while substantial sections of some communities may not be engaged in economic activity at all, such as students. Therefore the current incentives for labouring work on PNDS projects are insufficient to attract people away from their regular (or irregular as the case may be) forms

of income or non-economic pursuits as in the case of students. What is a lot of money in rural areas is not much money in the city. As PNDS staff noted, it was very difficult to get people to work for the US three dollar a day PNDS fee when they could get five dollars working in a restaurant or construction site, throwing into dispute stereotypes of large pools of unemployed disaffected youth as described earlier. As a number of community members identified in focus group discussions, the PNDS project cycle is also long and complicated, requiring constant meetings. Due to work or family commitments, many community members in the city are too busy to commit to this time-consuming process.

12.6 Defining Community

It is interesting to note the experience in Afghanistan of the CDD project the National Solidarity Programme (NSP), which also had its antecedents in the Indonesian model. Like Timor-Leste, this project displayed a similar reliance on formal administrative boundaries and static definitions of community. Mielke and Schetter (2007) observed its implementation in Kunduz Province in Northeast Afghanistan. Like the colonial authorities and the Indonesians after them in Timor-Leste, the Kunduz Province state administration and the police force there have a keen interest in binding each citizen to the smallest fixed territorial unit possible in order to identify and localise him/her whenever it feels this is necessary to control them (Mielke and Schetter 2007: 72). As they observe, this standardised developmental and state enforced understanding of 'village' is different to local perceptions. Different categories and various names may exist for the same settlement which do not usually coincide with official district administration village lists. Such categories and names identify a social space, communal identity such as language, religion or spatial belonging rather than a territorial unit (Mielke and Schetter 2007: 76).

In Timor-Leste, this standardised approach to village boundaries and leadership in urban areas has found its way into a variety of development projects such as peacebuilding. Until recently, the *de rigeur* approach to conflict resolution had been to gather *chefe de sukus* and perform traditional mediation ceremonies—in spite of the fact that sometimes these leaders came from regions where these rites were not practiced, or were not actually in conflict with each other, given that most conflict occurs at an *aldeia* level. These peace agreements seldom lasted more than a few weeks, or even days in some cases (Belun and The Asia Foundation 2013). As one conflict resolution project found, after a 3-month long pre-project baseline study of 22 sub-villages in Dili, it was often the official community leaders themselves that were the key source of community friction (Catholic Relief Services 2010). This project found success through mobilising a range of different community groups and forms of authority such as faith-based communities, former clandestine-resistance networks, youth groups and even women's micro-credit cooperatives.

Rather than reinforce colonial boundaries and standardised notions of village boundaries, then, more flexible notions of community need to be applied that take more account of how communities define themselves. As with the Catholic Relief Services project, more thorough pre-project preparation is required to map these socio-spatial configurations and diverse communities. For the purposes of implementing CDD projects for example, the concept of *bairro*, for example, could be explored as a more flexible socio-spatial category that takes account of diverse types of communities such as market traders, shopkeepers, students, faith-based groups based around a particular Church, or clandestine-resistance networks as in the example earlier. The Catholic Relief Service conflict resolution project also adopted a PNDS style community consultation whereby the community decided on a small infrastructure projects. As they found, identifying informal leaders such as martial arts group leaders or former resistance leaders was integral to the success of their project. Like the groups they represent, the authority of these types of informal leaders also transcends formal boundaries and territories and incorporate a range of salient communal identities such as linguistic, regional or family identities. Government and development practitioners thus need to move beyond static notions of leadership to embrace informal sources of power and authority that transcend formal boundaries or risk reinforcing or reifying colonial and traditional power hierarchies.

As some focus group participants also observed, the PNDS emphasis on physical bricks and mortar structures was not always a community priority in urban areas which are often well served by community centres, bridges, schools and clinics. As described, Dili has a vibrant but largely undocumented informal economy, and there are communities of market traders, peddlers, itinerant fishmongers and many others. As one participant, a *tiga roda* (three-wheel vendor cart) trader commented, they needed a place to keep their wagons safe at night but this was not on the list of available options. As focus group participants observed in one market trader dominated *aldeia,* more intangible resources are also required such as micro-finance training for informal traders to help them manage money, plan cash flow and know their entitlements.

12.7 Conclusion

It is evident that due to the wide variations in *suku* and *aldeia* size, demographic and socioeconomic composition, purely administrative *suku* and *aldeia* boundaries are not an ideal operational basis for planning and organising PNDS implementation in urban Dili *suku*s, or for urban governance. It is more useful to view Dili neighbourhoods not as a set of built structures or administrative boundaries, but more flexibly as a changing and diverse set of informal social relations and economic practices. Project planning built on the assumption of large pools of available labour, for example, eager for a few extra dollars to get by is highly questionable in the urban context of Dili. Even if that were the case, they may be distributed across many *sukus* in Dili, although more prevalent in some areas than others. Equally, population

movements and settlement patterns in Timor-Leste do not permit an easy classification and organisation along the rigid administrative boundaries and raise questions about the efficacy of utilising local leadership to mobilise communities.

Future development, and urban planning initiatives, thus require a greater 'multilayered, relational view of cityness' (Vigar et al. 2005:1396) to reflect the highly cosmopolitan, fluid and dynamic nature of Dili's urban spaces, as well as a greater understanding of the power dynamics that produce and reinforce contemporary urban boundaries and conceptual frameworks. Thus, alternative units of organisation need to be identified, recognising and valuing socioeconomic, geographic and demographic factors, that transcend static territorially bound notions of communities and their leadership, to better reflect what is happening in the city and so promote greater inclusion of communities in shaping urban Dili.

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