Demography (2018) 55:2181–2203
https://doi.org/10.1007/s13524-018-0724-1

Patrilocal Residence and Female Labor Supply: Evidence From Kyrgyzstan

Andreas Landmann[1,2] · Helke Seitz[3,4] · Susan Steiner[2,4]

Published online: 22 October 2018

Abstract

Many people live in *patrilocal societies*, which prescribe that women move in with their husbands' parents, relieve their in-laws from housework, and care for them in old age. This arrangement is likely to have labor market consequences, in particular for women. We study the effect of coresidence on female labor supply in Kyrgyzstan, a strongly patrilocal setting. We account for the endogeneity of coresidence by exploiting the tradition that youngest sons usually live with their parents. In both OLS and IV estimations, the effect of coresidence on female labor supply is negative and insignificant. This finding is in contrast to previous studies, which found positive effects in less patrilocal settings. We go beyond earlier work by investigating effect channels. In Kyrgyzstan, coresiding women invest more time in elder care than women who do not coreside, and they do not receive parental support in housework.

Keywords Family structure · Coresidence · Labor supply · Patrilocality · Kyrgyzstan

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s13524-018-0724-1) contains supplementary material, which is available to authorized users.

✉ Andreas Landmann
andreas.landmann@uni-goettingen.de

Helke Seitz
hseitz@diw.de

Susan Steiner
steiner@c4ed.org

[1] Georg-August-Universität Göttingen, Platz der Göttinger Sieben 3, 37073 Göttingen, Germany

[2] Center for Evaluation and Development (C4ED), O7 3, 68161 Mannheim, Germany

[3] German Institute for Economic Research (DIW Berlin), Mohrenstraße 58, 10117 Berlin, Germany

[4] Leibniz Universität Hannover, Königsworther Platz 1, 30167 Hannover, Germany

Introduction

Postmarital residence rules determine where newly wed couples should reside. A large share of the world population lives in societies with a *patrilocal residence* rule,[1] which prescribes that women move in with their husbands' parents, or sometimes the husband's wider family, upon marriage. When joining the new household, women are usually expected to relieve their in-laws from housework and to care for them in old age (Ebenstein 2014; Grogan 2013). Such coresidence arrangements may have significant labor market consequences for the involved women. In this study, we investigate how intergenerational coresidence affects female labor supply in a patrilocal setting. We focus on Kyrgyzstan, where elderly parents traditionally reside with their youngest son and his wife.

A priori, the impact of intergenerational coresidence on women's labor supply is unclear because several channels can be at play and might counteract one another. The literature has elaborated on four channels through which the impact can principally work. First, coresiding parents or in-laws might contribute to household income or share housing and other assets (Maurer-Fazio et al. 2011). Any advantage in economic conditions (e.g., high nonlabor income) is likely to make women reduce their labor supply. Second, coresiding parents or in-laws might require care. Women are typically the caregivers in the household. This responsibility increases their value of nonmarket time (their reservation wage) and reduces their labor supply (Lilly et al. 2007). Third, coresiding parents or in-laws might take care of women's children or take over housekeeping tasks. The reservation wage is reduced for women, leading to an increase in labor supply (Compton and Pollak 2014; García-Morán and Kuehn 2017; Posadas and Vidal-Fernández 2013; Shen et al. 2016). Fourth, coresiding parents or in-laws might be better able to impose their preferences on a woman's labor market behavior than distant parents or in-laws (Chu et al. 2014). Depending on the type of preferences, parents or in-laws can induce either an increase or a reduction in female labor supply. These four channels are plausible in patrilocal societies in the same way as in other societies, with one exception: women who move in with their in-laws are assumed to take over housekeeping tasks from them rather than the in-laws taking care of housekeeping for the women (Grogan 2013). This distribution of tasks within the household should result in more adverse effects of coresidence on female labor supply in a patrilocal context than in a nonpatrilocal context.

A simple cross-country analysis illustrates that patrilocal countries are different from nonpatrilocal countries. Fig. 1 shows the correlation between female labor force participation and intergenerational coresidence rates separately for patrilocal and nonpatrilocal countries.[2] Although coresidence is positively related to female labor force participation in the latter, the correlation is negative in patrilocal countries. This pattern suggests that the effect of intergenerational coresidence is distinct, and potentially negative, in patrilocal countries. Yet, cross-country analyses can hardly provide causal insights. Instead, micro-level investigations are needed.

[1] Nearly three-quarters (74 %) of societies around the world were traditionally patrilocal (Murdock 1967, cited in Baker and Jacobsen 2007). Today, patrilocality is most common in the Caucasus, Central Asia, and South Asia. The share of elderly coresiding with a son and his wife is particularly high in these societies (Ebenstein 2014; Grogan 2013).

[2] The list of countries used for this analysis can be found in Table A1 in the online appendix.

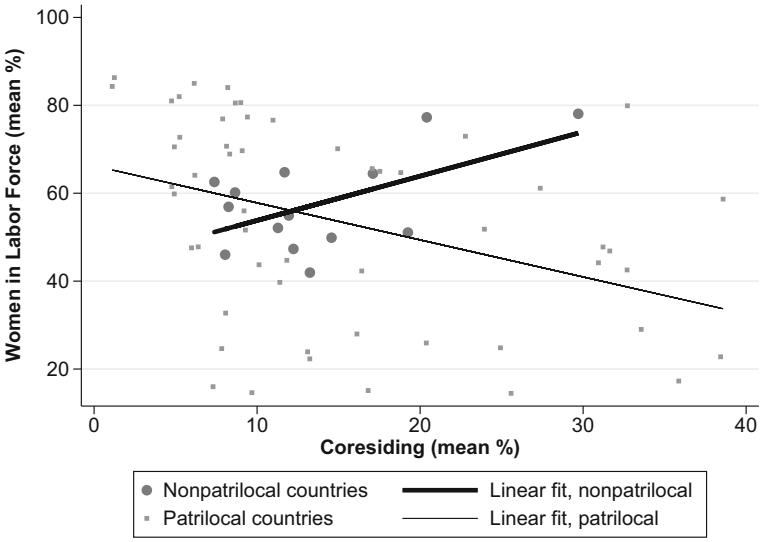

Fig. 1 Coresidence and female labor force participation across countries, 2000–2016. Patrilocal countries are those in which more couples live with the husband's than the wife's parents; nonpatrilocal countries are all others. The slope of the estimated lines is 1.01 ($N = 14$, p value = .036) for nonpatrilocal countries and –0.84 ($N = 54$, p value = .004) for patrilocal countries. *Source:* Data are from Global Data Lab (coresidence) and World Development Indicators (female labor force participation). The Global Data Lab provides data on 104 countries, of which 102 have coresidence measures between 1990 and 2016. For 101 countries, we can match female labor force participation. Our analysis focuses on 68 countries with a population greater than 5 million. Results hold when we include smaller countries

Few micro-level studies have explored labor supply effects of living with the parent generation (Kolodinsky and Shirey 2000; Maurer-Fazio et al. 2011; Oishi and Oshio 2006; Sasaki 2002; Shen et al. 2016).[3] All these studies found that coresidence increases female labor supply and claimed that this effect is due to parental assistance with childcare and housekeeping. Yet, most of the authors limited themselves to speculation; only Shen et al. (2016) explicitly tested and confirmed this claim for the case of housework. None of the other channels were analyzed.

In this study, we contribute to the literature by investigating all channels through which intergenerational coresidence can potentially affect women's supply of labor to the market. We analyze causal effects on women's time allocation. For parents' income and gender attitudes, we provide only suggestive evidence. We focus on Kyrgyzstan, a post-Soviet country in Central Asia with a population of 5.9 million and where patrilocality is common: 46 % of married females in the age group 15–30 live with at least one parent-in-law, and only 9 % live with at least one own parent (Grogan 2013). Young married women, who reportedly have the lowest status in their in-laws' household (Kuehnast 2004), are supposed to be obedient and fulfill the demands of their husbands and his parents. Married couples tend to live with the husband's parents

[3] Additionally, Compton (2015) evaluated the effect of proximity to parents on women's labor market outcomes. When controlling for the endogeneity of distance to the parents, Compton found that close proximity to parents increases the labor force participation of married women. This study, however, is not fully comparable with the other studies because it focused on proximity to parents rather than coresidence with parents.

until the husband's younger brothers get married. At that point, they often move out and form their own household. According to tradition, the youngest son and his wife never move out and are responsible for the well-being of the parents (Bauer et al. 1997; Kuehnast 2004; Rubinov 2014; Thieme 2014). As a way of compensation, the youngest son inherits the house and the land upon the death of his father.[4]

In contrast to the previous literature, we not only measure the impact of living with the parent generation on female labor supply but also shed light on the channels. With the help of time-use data, we can draw conclusions on how time spent on childcare, elder care, and housekeeping differs between women who coreside and women who do not. Furthermore, we have information on income contributions to the household by coresiding parents as well as their attitudes on gender roles. We correlate this information with female labor supply.

Empirical analysis is not straightforward because coresidence is not exogenous. Even in patrilocal societies such as Kyrgyzstan, there is selection into coresidence. Couples that are expected to coreside with the husband's parents do not always do so, and couples that are not necessarily expected to coreside sometimes decide to live with the older generation. The reason for this selection into coresidence is that coresidency and labor supply decisions are often made jointly (Sasaki 2002). For example, young women with low ambition for working outside the home or with conservative attitudes on gender roles may be inclined to coreside with their in-laws. Additionally, parents are likely to move in with their adult children when they need to be taken care of or when the adult children need them as caregivers for their own children, especially if formal care is not easily available or is too costly. In a family with several siblings, the coresidence decision could be the result of a bargaining process. The sibling with the lowest (highest) opportunity costs may be the one who coresides with parents if elder (child) care is required (Ettner 1996; Ma and Wen 2016). Because of this endogeneity of coresidence, simple comparisons of coresiding and noncoresiding women are most likely subject to bias.

To address the endogeneity of coresidence, we make use of the tradition that youngest sons are expected to live with their parents in Kyrgyzstan. This tradition stems from the nomadic lifestyle that has been historically prevalent in much of Central Asia, attributable to space restrictions in *yurts* (portable tents) but with no economic relevance today. Our data show that all ethnic groups residing in the country, even those without nomadic roots, follow the same tradition today.[5] The tradition generates exogenous variation in the coresidence of women with the parent generation, driven by the birth order of husbands. We use being married to the youngest son to construct an instrument for women's intergenerational coresidence. We show that wives of

[4] All children traditionally acquire a share of the parents' wealth, although in different forms and at different times in their life cycle (Giovarelli et al. 2001).

[5] According to information obtained in expert interviews, it was the parents' duty in Turkic and Mongolian nomadic cultures to allocate a certain number of livestock to their older sons when they got married and to separate them by giving them a *yurt*. Keeping the sons and their wives in the parents' *yurt* would have been impossible given space restrictions. When parents died, it was the youngest son's duty to bury the parents. In return, he inherited the parents' *yurt* and their remaining livestock. This tradition has been adapted in modern-day Kyrgyzstan: married older sons form their own households (possibly after living with their parents for a certain period), and youngest sons stay with the parents and take care of them in old age. It is an open question why we see the tradition being practiced even in ethnic groups that do not have nomadic roots, such as Tajiks or Russians.

youngest sons are significantly and substantially more likely to coreside than otherwise comparable wives of older sons. Several tests suggest plausibility of the instrument: youngest sons do not seem to differ from older sons with regard to premarriage characteristics and divorce rates, and the same holds for their wives.

We find that the patrilocal setting in Kyrgyzstan is different from the settings investigated in the previous literature, as reflected in the deviating overall effect of coresidence on female labor supply. In Kyrgyzstan, coresidence does not significantly affect the labor market outcomes of married females. Effects are negative and insignificant both when using ordinary least squares (OLS) with a large set of control variables and when using an instrumental variables (IV) strategy. Our channel analysis suggests that coresiding women spend significantly more time on elder care than women who do not coreside. This increase in elder care seems to coincide with a reduction in leisure. However, coresidence does not change time spent on either childcare or housekeeping. Income contributed by coresiding parents and their gender attitudes also do not seem to be related with women's labor market outcomes.

Background: Female Labor Supply in Kyrgyzstan

Despite the political objective of the Soviet government to achieve gender equality on the labor market, the labor force participation rate of females (aged 15–64 years) always remained lower than that of males in what is today Kyrgyzstan. Just before the dissolution of the Soviet Union, female labor force participation was 58 % in 1990, compared with 74 % for males (Fig. 2). Since then, the distance between females and

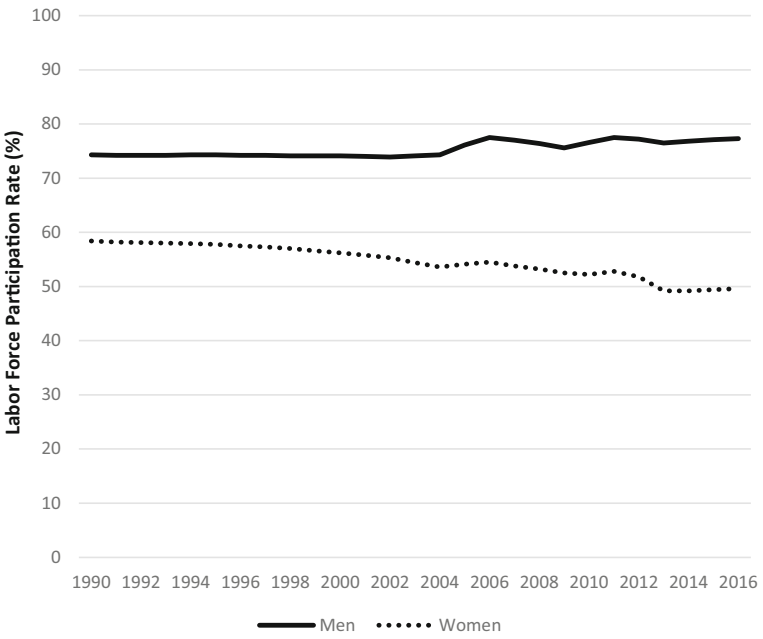

Fig. 2 Labor force participation in Kyrgyzstan, 1990–2016. *Source:* World Development Indicators, World Bank

males has increased: labor force participation rates in 2016 were 50 % for females and 77 % for males.

The provision of institutionalized care for children and the elderly remains low, which potentially keeps women from participating in the labor market. The enrollment rate in formal childcare for children aged 3–6 years was as low as 31 % in 1990, further decreased to 9 % in 1998 (Giddings et al. 2007), and then increased again to 22 % in 2013/2014 (UNICEF 2017). The Ministry of Labour and Social Development (2017) reported a total of six care homes for the elderly, with 750 residents and an additional 10,000 people receiving care from these homes in their own houses. Compared with approximately 550,000 pensioners in the country, these numbers are very low. Kyrgyzstani women have been and still are the main providers of care for the household (Akiner 1997; Paci 2002).

Women tend to be employed in sectors with relatively low pay. The share of females is highest in health care and social services, education, and hotels and restaurant services. The higher-paid transportation and communication sector as well as public administration are male-dominated (Ibraeva et al. 2011; Schwegler-Rohmeis et al. 2013). A sizable gender earnings gap is the consequence. In 2013, men earned approximately 26 % more per month than women, although they also worked 6 % more hours. The average hourly earnings gap was 25 % (Anderson et al. 2015).

Data

We use data from the Life in Kyrgyzstan (LIK) survey, which is a nationally representative panel, conducted annually between 2010 and 2013 and again in 2016.[6] The LIK provides a wide range of individual- and household-level information on sociodemographic characteristics, employment, and many other topics. In contrast to household panels in which only one member of the household is interviewed, the LIK is an individual panel in which all adult individuals living in the originally sampled households are interviewed and tracked over time. The first wave of the survey included 8,160 adults living in 3,000 households.

In our empirical analysis, we use data from the 2011 wave of the LIK and restrict the estimation sample to married women in the age range 20–50. There are 2,043 such women. We further restrict the sample to those women with at least one living parent-in-law because women without any living parent-in-law do not have the opportunity to coreside. Unfortunately, the core LIK questionnaire does not collect information about whether an individual's parents are still alive. The LIK data also lack other crucial information required for our empirical analysis (namely, parents' age, if still alive; an individual's birth order; and the number of brothers). We thus collected supplementary data from all women and their husbands in our target sample. The supplementary data collection took place in 2014, but we collected retrospective information referring to the year 2011. This approach allows us to merge the supplementary data with the 2011 LIK wave. At the same time, this approach makes the use of additional LIK waves

[6] The first three waves were collected by the German Institute of Economic Research; the fourth wave, by the Stockholm International Peace Research Institute; and the fifth wave, by the Leibniz Institute of Vegetable and Ornamental Crops. For detailed information on the survey, see Brück et al. (2014).

problematic: for later years, we do not have up-to-date information about whether the husband's parents or any of his brothers had died since 2011.[7]

In 2014, 1,583 women and their husbands were successfully reinterviewed.[8] Our final sample is further reduced to 1,048 observations for the following reasons: both parents of the husband are deceased (479 observations), the birth order of the husband could not clearly be identified (1 observation), and there are missing values on the variables used in the empirical analysis (55 observations).

Outcome Variables

We measure women's labor market outcomes in two ways: (1) the probability of engaging in the labor market, or labor force participation (extensive margin), and (2) the number of weekly working hours (intensive margin). Women participate in the labor force if they actively engage in the labor market by working or they are unemployed and seeking work. In contrast, women do not participate in the labor force if they do not work and do not seek work. In the LIK, engaging in the labor market is measured by (1) working for someone who is not a household member; (2) working for a farm or business owned or rented by the respondent or another household member; (3) engaging in farming, fishing, or gathering fruits or other products; or (4) being absent from a job to which one will return.[9] Women are identified as unemployed if they do not fall under any of these four categories but report that they look for work. For all working women, we observe the number of working hours. We use the total number of working hours per week in our analysis, which may be spent in up to two occupations.[10] Unemployed women and women who do not participate in the labor force are assumed to have zero working hours. Panel A of Table 1 illustrates that close to one-half of the sample participates in the labor force. Of 1,048 women, 500 (48 %) participate in the labor force, and 548 (52 %) do not. Among those participating, 483 are employed, and 17 are unemployed. Employed women work an average of 36 hours weekly.

Coresidence and Youngest Son

Our main explanatory variable is coresidence, which we define as a married woman—and her husband and children (if any)—living in one household with at least one parent.

[7] Adding the 2010 wave to the analysis would be comparably easier because if someone was alive in 2011, she or he must also have been alive in 2010. Yet, this wave was the first wave of the LIK and suffered from some problems during data collection, which were later removed. Importantly for us, the relationship to the household head was wrongly reported in a nonnegligible number of cases.

[8] The supplementary data collection in 2014 was implemented by the same survey firm that also implements the data collection of all regular LIK waves. Failure to reinterview was higher in urban than in rural areas. The main reason for attrition is migration of the husband or wife outside Kyrgyzstan (approximately 40 % of cases), followed by failure to meet an interviewee at home, migration within Kyrgyzstan, refusal to be interviewed, death of one of the partners, and end of marriage. As a consequence, our results are essentially restricted to nonmigrants.

[9] Categories (1), (2), and (4) are defined in accordance with the Integrated Sample Household Budget and Labour Survey of the National Statistics Committee of the Kyrgyz Republic. Category (3) was added in the LIK because the other three categories missed an important part of self-employment activities. The resulting definition of labor force participation conforms to that of the International Labour Organization.

[10] Among the women in our estimation sample, 1.7 % have two occupations, which corresponds to 3.7 % of all those with positive working hours.

Table 1 Summary statistics on female labor supply, instrument and explanatory variables

	All		Coresidence			
	(n = 1,048)		Yes (n = 501)		No (n = 547)	
	Mean (1)	SD (2)	Mean (3)	SD (4)	Mean (5)	SD (6)
A. Female Labor Supply and Instrument						
Labor force participation	0.48	0.50	0.39	0.49	0.56	0.50
Working hours[a,c]	35.97	14.30	35.32	14.42	36.38	14.24
Married to youngest son	0.35	0.48	0.50	0.50	0.21	0.41
B. Explanatory Variables						
Conditioning variables						
Age (husband)[c]	36.46	8.50	40.83	7.26	31.67	7.07
Number of brothers (husband)[c]	2.09	1.40	2.32	1.47	1.83	1.29
Age of oldest living parent (husband)[c]	65.85	10.28	69.00	9.26	62.41	10.23
Wife characteristics						
Age[c]	32.83	8.49	37.31	7.34	27.95	6.81
Low education[b]	0.10	0.34	0.10	0.29	0.10	0.31
Medium education[b]	0.58	0.49	0.56	0.50	0.60	0.49
High education[b]	0.32	0.47	0.34	0.47	0.30	0.46
Kyrgyz	0.70	0.46	0.72	0.45	0.67	0.47
Uzbek	0.16	0.37	0.16	0.36	0.17	0.38
Dungan	0.04	0.20	0.03	0.17	0.06	0.23
Russian	0.03	0.18	0.04	0.19	0.03	0.17
Other ethnicity	0.06	0.25	0.06	0.23	0.07	0.26
Residence characteristics						
Chui	0.16	0.36	0.16	0.36	0.16	0.37
Issyk Kul	0.09	0.28	0.11	0.31	0.07	0.26
Jalal Abad	0.18	0.38	0.19	0.40	0.16	0.36
Naryn	0.04	0.21	0.03	0.17	0.06	0.24
Batken	0.08	0.27	0.08	0.27	0.09	0.28
Osh	0.27	0.44	0.20	0.40	0.34	0.48
Talas	0.05	0.21	0.06	0.23	0.03	0.18
Osh (City)	0.04	0.20	0.03	0.17	0.05	0.22
Bishkek (City)	0.10	0.29	0.15	0.35	0.04	0.20
Community in urban area	0.27	0.45	0.32	0.47	0.22	0.42
Kindergarten in community	0.61	0.49	0.63	0.48	0.60	0.49
Husband characteristics						
Low education[b]	0.09	0.28	0.08	0.27	0.10	0.30
Medium education[b]	0.58	0.49	0.57	0.50	0.60	0.49
High education[b]	0.29	0.45	0.33	0.47	0.24	0.43

Source: Life in Kyrgyzstan (LIK) Survey, 2011 wave, authors' own calculations.

[a] Working hours are calculated based on the sample of employed women.

[b] Education is defined based on the highest certificate/diploma/degree obtained so far. The categories are low education (illiterate, primary, or basic), medium education (secondary general or primary technical), and high education (secondary technical or university).

[c] Continuous variable.

In principle, the parent can be a parent of the wife or the husband. Of 1,048 women, 547 (52 %) live in nuclear families, and 501 (48 %) coreside with parents or parents-in-law. Among the coresiding women, 490 (98 %) live with at least one of the husband's parents, and 11 (2 %) live with at least one own parent.[11] These numbers illustrate the extent of patrilocality in Kyrgyzstan. Panel A of Table 1 shows that women who coreside tend to supply less labor to the market. Labor force participation rates are 39 % for coresiding women and 56 % for noncoresiding women. Among employed women, coresiding women work 35 hours per week, and noncoresiding women work 36 hours (an insignificant difference).

Coresidence is likely endogenous. We create an indicator variable for whether a woman's husband is the youngest son in his family and use this as our instrument for coresidence. Among the women in our sample, 35 % are married to a youngest son. Coresidence and marriage with a youngest son are strongly associated: among the coresiding women, 50 % are married to a youngest son; among the noncoresiding women, only 21 % are married to a youngest son (Table 1, panel A).

Other Covariates

In addition to coresidence, several other factors potentially drive women's labor market outcomes. Here we describe the variables that we use as controls in our analysis (descriptive statistics are reported in panel B of Table 1). To avoid problems of endogenous controls, we restrict ourselves to variables that are plausibly unaffected by individual coresidence decisions.

Our first set of variables characterizes the woman. Following Mincer (1958), we include her educational attainment (dummy variables for different stages of education: low, medium, and high) and age (as a proxy for experience). We assume that education is exogenous to coresidence because most women complete their education before marriage. However, our results are stable to controlling only for basic education, which is definitely determined at premarriage age.[12] Kyrgyzstan is a multiethnic society with ethnicity-specific gender norms related to the labor market (Anderson et al. 2015; Fletcher and Sergeyev 2002). We thus control for the ethnicity of the women. We account for the four main ethnic groups in our sample (Kyrgyz, Uzbek, Dungan, and Russian) and summarize the remaining groups as "other ethnicity."[13] Our second set of variables relates to the residence of the women and helps us account for geographic heterogeneity. Economic conditions—and with them, labor markets—vary largely within the country. The North is historically more economically developed than the South, and urban areas are more developed than rural areas (Anderson and Pomfret 2002; Fletcher and Sergeyev 2002). We thus include dummy variables for provinces as

[11] Among women who coreside with in-laws, 34 % live with only the mother-in-law, 8 % live with only the father-in-law, and 58 % live with both the mother-in-law and the father-in-law. Among the few women who coreside with own parents, 55 % live with their mother and 45 % live with both parents.

[12] Basic education consists of four years of primary school and the first five years of secondary school. After basic education, women can continue with two more years of secondary school, potentially followed by tertiary education, or with technical school.

[13] "Other ethnicity" mainly comprises Uigurs, Tajiks, and Kazakhs but contains a number of other small ethnic groups as well.

well as urban areas.[14] We also have information on the local availability of childcare facilities. Because such facilities ease women's integration in the labor market, we control for whether the community in which a woman lives has a kindergarten. Finally, a third set of variables relates to the husband. We control for the husband's educational attainment because determinants of the husband's income might affect a woman's decision to work. Husband's education might furthermore capture attitudes on gender roles relevant for the woman's labor market participation.

Empirical Strategy and Results

Instrument and Identifying Assumptions

Earlier studies on the effect of intergenerational coresidence on female labor market outcomes used a variety of instrumental variables to control for the endogeneity of coresidence. Sasaki (2002) used sibling characteristics (number of siblings and birth order of husband and wife) and housing information (house owned or rented, detached house or apartment, house size) as instruments. Oishi and Oshio (2006) enriched this set of instruments with information on, for example, the husband's age and educational attainment. The instruments in the Maurer-Fazio et al. (2011) study were the percentage of households in the prefecture that have coresident parents, husband's age, wife's age, and provincial dummy variables. Shen et al. (2016) exploited a tradition about coresidence via sibling structures, using the number of surviving brothers and sisters of a woman as well as her birth order as instruments for coresiding with the woman's parents. This identification strategy is the most similar to ours.

All the instruments used in the previous literature are relevant and explain the coresidence decision well. However, some of them may not be valid instruments. For example, housing conditions, husband's educational attainment, living in a particular province, and the number of siblings are unlikely to affect female labor supply only through coresidence. Housing conditions as well as the number of siblings reflect the wealth of a family, husband's education is a proxy for spousal income, and provincial dummy variables capture labor market differences across provinces; all these factors may influence female labor supply. Thus, we consider it possible that the exclusion restriction is not fulfilled. Sasaki (2002), Oishi and Oshio (2006), Maurer-Fazio et al. (2011), and Shen et al. (2016) did not provide evidence to refute this possibility.

We argue that the instrument that we use in our study is both relevant and plausibly valid. It is derived from a Central Asian tradition, according to which the youngest son of a family is supposed to stay with his parents and to ensure their well-being (Bauer et al. 1997; Rubinov 2014; Thieme 2014). Any woman who is married to a youngest son is thus substantially more likely to coreside with parents-in-law than a woman who is married to an older sibling. This could already be seen from our descriptive statistics in panel A of Table 1, and our first-stage estimation results (upcoming) provide further support. A dummy variable that indicates whether a woman's husband is the youngest son thus provides a relevant instrument for coresidence. Different ethnic groups

[14] Issyk-Kul, Naryn, Talas, Chui, and the capital Bishkek are provinces in the North, and Jalal-Abad, Batken, Osh, and the city Osh are in the South.

residing in Kyrgyzstan are likely to differ from each other with regard to coresidence decisions. In our data, the tendency of the youngest son to stay with his parents is prevalent among all ethnic groups (although in some groups, to a lesser extent than among Kyrgyz). We therefore decided to keep all ethnic groups in the sample. Restricting attention to only the Kyrgyz population does not substantially change our results.

In all our estimations, we control for the age of the husband, the number of brothers of the husband, and the age of the oldest living parent of the husband. We refer to these variables as conditioning variables. They are included because they are, by construction, correlated with being the youngest son. Those listed as youngest sons are, on average, younger than those listed as older sons; the probability of being the youngest son decreases with the number of brothers; and conditional on son's age, parents of youngest sons tend to be older than parents of older sons. Given these relationships, being married to the youngest son may influence female labor supply through channels other than coresidence. For example, those listed as youngest sons who are of the same age as older sons tend to have older parents. Older parents, in turn, are likely to require more care, which potentially reduces female labor supply. Controlling for the conditioning variables blocks such channels, which may otherwise violate the exclusion restriction. In contrast to Sasaki (2002), Oishi and Oshio (2006), and Shen et al. (2016), we control for the number of siblings of the husband (the number of brothers, to be precise) rather than using it as a separate instrument.

Several threats to the crucial exclusion restriction remain. First, we need to assure that there is no selection on the marriage market in the sense that women with certain characteristics marry youngest sons. One could think of anticipation effects: women who are willing to care for a parent-in-law and are less prone to participate in the labor force might be more likely to marry a youngest son because this would result in coresidence with in-laws. Second, we need to rule out that youngest sons have low career ambitions or have a preference for partners with low career ambitions. Youngest sons are likely aware of the responsibility for their parents and could look for a wife willing to share this responsibility. Third, we assume that being married to the youngest son has no effect on marital stability. If, for example, the wives of youngest sons are more likely to divorce (possibly because of the responsibility for parents-in-law), they might be more active in the labor market in anticipation of divorce.

In contrast to prior studies with an IV strategy—which all face these challenges—we explicitly test the plausibility of the exclusion restriction. This test cannot provide a final answer regarding the validity of the instrument, which is inherently untestable, but it could reveal clear violations. To address the first two assumptions, we compare premarriage characteristics between (1) women married to youngest sons and women married to older sons, and (2) men who are the youngest son and men who are an older son. Panel A of Table 2 reports the results for women. We regress a number of premarriage characteristics on a dummy variable indicating whether a woman is married to a youngest son, controlling for our conditioning variables. The premarriage characteristics are sociodemographic characteristics (age at marriage, ethnicity, and number of siblings), proxy variables for labor market affinity (years of education, an indicator for having more than 11 years of education, and employment status one and two years prior to the marriage), and how the marriage was formed. With regard to marriage formation, we distinguish between love marriage, arranged marriage, and

Table 2 Differences in premarriage characteristics

	Coefficient/Marginal Effect (1)	SE (2)	z or t Statistic (3)
A. Wife			
Age at marriage[a]	0.47	0.24	1.93
Kyrgyz	–0.01	0.04	–0.14
Uzbek	–0.03	0.03	–1.01
Dungan	0.01	0.02	0.66
Russian	0.02	0.01	1.36
Other ethnicity	–0.03	0.02	–1.34
Total number of siblings[a]	–0.07	0.16	–0.47
Years of education[a]	0.24	0.18	1.33
More than 11 years of education	0.05	0.04	1.28
Worked $t-1$ if t = year of marriage	0.01	0.04	0.34
Worked $t-2$ if t = year of marriage	0.02	0.03	0.61
Love marriage	0.02	0.04	0.43
Arranged marriage	0.004	0.03	0.12
Bride capture	–0.02	0.02	–0.76
B. Husband			
Age at marriage[a]	0.52	0.31	1.69
Kyrgyz	–0.01	0.04	–0.32
Uzbek	–0.04	0.03	–1.28
Dungan	0.01	0.02	0.46
Russian	0.02	0.01	1.31
Other ethnicity	–0.01	0.02	–0.38
Total number of siblings[a]	0.07	0.11	0.60
Years of education[a]	–0.03	0.18	–0.18
More than 11 years of education	–0.002	0.04	–0.07
Worked $t-1$ if t = year of marriage	0.04	0.04	0.93
Worked $t-2$ if t = year of marriage	0.01	0.04	0.33

Notes: Panel A shows the effect of being married to the youngest son of a family on the wife's premarriage characteristics. Panel B shows the effect of being a youngest son in a family on the husband's premarriage characteristics. Results are based on logit estimations for binary outcome variables and OLS estimations for continuous outcomes. Column 1 reports the logit marginal effect or OLS coefficient of the variable *youngest son*, controlling for husband's number of brothers, husband's age, and age of the husband's oldest living parent (and for ethnicity, but only if the type of marriage is the outcome variable). Column 2 reports the corresponding standard errors, and column 3 shows the values of z statistic (for logit estimations) or t statistic (for OLS estimations). Critical values of t distribution: $t_{\infty,0.95} = 1.645$, $t_{\infty,0.975} = 1.96$, $t_{\infty,0.995} = 2.576$.

Source: Life in Kyrgyzstan (LIK) Survey, 2011 wave, authors' own calculations.

[a] Continuous variable.

bride capture, with the latter two representing traditional values (Becker et al. 2017; Nedoluzhko and Agadjanian 2015), which have potential implications for women's labor market outcomes.[15]

[15] Because of ethnicity-specific marriage practices (Becker et al. 2017; Nedoluzhko and Agadjanian 2015), we also control for ethnicity when the outcome variable refers to how the marriage was formed.

We estimate a logit model if the premarriage characteristic is binary and estimate an OLS model if it is continuous. Column 1 of Table 2 presents the coefficient for being married to the youngest son; column 2, the standard error; and column 3, the *t* statistic/*z* statistic. As shown in the last column, we do not find differences at the 5 % significance level. Panel B of Table 2 compares premarriage characteristics for youngest sons and older sons, and we find no differences in these characteristics at the 5 % significance level. We conclude that couples involving a youngest son do not seem to self-select in terms of labor market characteristics at the time of marriage.[16] Possible negative aspects of marrying a youngest son (such as running the household or providing elder care for parents-in-law) and positive aspects (such as the prospect of receiving and inheriting resources) might cancel one another out.

Last, we want to rule out any effect of being married to a youngest son on marriage stability. More precisely, we explore whether divorced women are significantly more likely to have been married to youngest sons compared with older sons.[17] We cannot test this assumption with our sample because all women in the sample are married. We instead use information on all brothers of the husband, including information of the husband himself, and all brothers of the women in our sample.[18] Their marital status and birth order are known. We compare the likelihood of being divorced between male siblings who are the youngest son and those who are not the youngest son. We estimate a logit model for the probability of divorce. Divorce is estimated as a function of the son's birth order and the conditioning variables. Based on a sample of 5,679 male siblings, the marginal effect of being the youngest son is –0.002, with a corresponding *z* statistic of –0.75. We conclude that couples involving a youngest son do not differ with respect to marriage stability from other couples.[19]

Estimation Results

We estimate the effect of coresidence with parents or in-laws on women's labor market outcomes using a two-stage least squares estimation.[20] For the effect on labor force participation, the estimation equations for the two stages are as follows:

$$Coresidence_i = \alpha_1 + \alpha_2 Youngest\ Son_i + \mathbf{X}_i^{'}\alpha_3 + \epsilon_i \tag{1}$$

and

$$LFP_i = \beta_1 + \beta_2 \widehat{Coresidence}_i + \mathbf{X}_i^{'}\beta_3 + v_i, \tag{2}$$

[16] In addition, we use a nonparametric matching method in order to test for differences in premarriage characteristics. We also do not find significant differences (see Table A2 in the online appendix).

[17] Divorce is rare in Kyrgyzstan. The divorce rate, according to the 2011 LIK, is 4 %.

[18] The list of siblings of all wives and husbands was compiled during the supplementary data collection in 2014, with the aim of identifying the youngest son in every family.

[19] As before, we additionally use a nonparametric matching method to test for differences in marriage stability between youngest sons and other sons. In accordance with our parametric result, we do not find a significant difference.

[20] As in every IV estimation, the treatment effect has a local interpretation; that is, it is the effect for women who live with the parent generation only because they are married to a youngest son.

where i indexes individual women. $Coresidence_i$ is a dummy variable that captures whether a woman lives with at least one parent or parent-in-law in the same household, and $Youngest\ Son_i$ denotes whether she is married to a youngest son.[21] LFP_i is her labor force participation. $\mathbf{X}_i$ is a vector of control variables, including the characteristics of the woman (age, educational attainment, and ethnicity), the residence (province, community is urban, and availability of kindergarten), and the husband (educational attainment). We also control for the conditioning variables: the husband's age, number of brothers, and oldest living parent's age.

Unlike related studies (Maurer-Fazio et al. 2011; Oishi and Oshio 2006; Sasaki 2002; Shen et al. 2016), we do not control for the number of children in the household because this variable turns out to be a bad control in our context. The number of children is determined by being married to the youngest son. To illustrate this, we regress the number of children up to age 5 on being married to the youngest son, controlling for the conditioning variables. We restrict this exercise to the number of children up to age 5 because these children are not yet in school and are most likely to affect female labor supply. The relationship between the number of children and being married to the youngest son is positive and significant (Table A3 in the online appendix). We subsequently estimate the effect of coresidence on the number of children, instrumenting coresidence with being married to the youngest son. We find that, *ceteris paribus*, coresiding couples have 0.553 more children (Table A4 in the online appendix). Because we are interested in establishing causality between coresidence and female labor supply, controlling for the number of children would be inappropriate.[22]

In the first stage of the estimation (Eq. (1)), the endogenous variable (coresidence) is treated as a linear function of the instrument (being married to the youngest son) and the remaining control variables ($\mathbf{X}_i$). In the second stage (Eq. (2)), we estimate a linear probability model and replace coresidence with the predicted values from the first stage ($Coresidence_i$). β_2 is the unbiased effect of coresidence on female labor force participation. The main two-stage estimation results are presented in panel B of Table 3; the main OLS results are presented in panel A. Full estimation results are reported in Tables A5–A7 in the online appendix.

The estimation equations for the effect of coresidence on hours of work are as follows:

$$Coresidence_i = \alpha_1 + \alpha_2 Youngest\ Son_i + \mathbf{X}_i'\alpha_3 + \epsilon_i, \tag{3}$$

and

$$WH_i^* = \gamma_1 + \gamma_2 \widehat{Coresidence}_i + \mathbf{X}_i'\gamma_3 + \mu_i, \tag{4}$$

where WH_i^* is the linear index determining working hours WH_i ($WH_i = 0$ if $WH_i^* \leq 0$; $WH_i = WH_i^*$ if $WH_i^* > 0$). All other variables are defined as earlier. The first stage is identical to Eq. (1). We slightly adapt our approach for the second stage and employ an

[21] Only-sons are defined as youngest sons, but we always control for the number of brothers. Deleting only-son observations does not indicate a bias but decreases the precision of our estimates. We hence prefer the specification with all observations included.

[22] Controlling for the number of children does not change the results much, though.

Table 3 Estimation results: Labor force participation

	(1)	(2)	(3)	(4)	(5)
A. OLS Estimation Results (coresidence exogenous)					
Coresidence	–0.168**	–0.057	–0.023	–0.054	–0.055
	(0.030)	(0.036)	(0.037)	(0.037)	(0.037)
B. Two-Stage Least-Squares Estimation Results (coresidence endogenous)					
First stage					
Married to youngest son	0.316**	0.204**	0.210**	0.209**	0.207**
	(0.031)	(0.032)	(0.031)	(0.030)	(0.030)
F statistic	104.104	41.640	46.720	49.780	48.820
Second stage					
Coresidence	–0.196†	–0.084	–0.105	–0.045	–0.048
	(0.101)	(0.185)	(0.175)	(0.170)	(0.172)
Number of Observations	1,048	1,048	1,048	1,048	1,048
Conditioning Variables		✓	✓	✓	✓
Wife Characteristics			✓	✓	✓
Residence Characteristics				✓	✓
Husband Characteristics					✓

Notes: Standard errors are shown in parentheses. Conditioning variables: husband's age, husband's number of brothers, and age of the husband's oldest living parent. Wife characteristics: age, educational attainment, and ethnicity. Residence characteristics: province, community is urban, and availability of kindergarten. Husband characteristics: educational attainment.

Source: Life in Kyrgyzstan (LIK) Survey, 2011 wave, authors' own calculations.

†$p < .10$; **$p < .01$

IV Tobit model to account for the censored nature of the dependent variable. The main IV Tobit estimation results are presented in panel B of Table 4. The main Tobit results are shown in panel A. Full estimation results are reported in Tables A8 and A9 in the online appendix.

The first-stage results show that being married to the youngest son has a positive and highly significant effect on intergenerational coresidence. Women who married a youngest son are 21 percentage points more likely to coreside compared with women who married an older son (Tables 3 and 4, column 5). We test for strength of the instrument and report the relevant *F* statistics in Tables 3 and 4. The *F* statistic is >40 in all specifications and hence is sufficiently large to rule out weak instrument problems (Staiger and Stock 1997).

Instrumenting coresidence with being married to the youngest son in all specifications yields a negative effect. When we compare the OLS and IV regressions with a Hausman test, we cannot reject the consistency of OLS; both OLS and IV models produce consistent parameter estimates. Column 1 of Table 3 shows a significant effect of –20 percentage points on female labor force participation (–17 percentage points in the OLS). Including the control variables in columns 2–5 reduces the effect to between –5 and –11 percentage points (between –2 and –6 percentage points in the OLS) and makes it insignificant. A similar picture emerges when we analyze the effect of coresidence on working hours (Table 4). As shown in column 1, coresidence

Table 4 Estimation results: Working hours

	(1)	(2)	(3)	(4)	(5)
A. Tobit Estimation Results (coresidence exogenous)					
Coresidence	–14.241**	–4.388	–1.241	–3.220	–3.319
	(2.672)	(3.131)	(3.180)	(3.218)	(3.228)
B. IV Tobit Estimation Results (coresidence endogenous)					
First stage[a]					
Married to youngest son	0.316**	0.204**	0.21**	0.209**	0.207**
	(0.031)	(0.032)	(0.031)	(0.030)	(0.030)
F statistic	104.104	41.64	46.72	49.78	48.82
Second stage					
Coresidence	–19.731*	–12.161	–15.009	–9.023	–9.193
	(8.874)	(16.120)	(15.528)	(14.982)	(15.136)
Number of Observations	1,048	1,048	1,048	1,048	1,048
Conditioning Variables		✓	✓	✓	✓
Wife Characteristics			✓	✓	✓
Residence Characteristics				✓	✓
Husband Characteristics					✓

Notes: Standard errors are shown in parentheses. Conditioning variables: husband's age, husband's number of brothers, and age of the husband's oldest living parent. Wife characteristics: age, educational attainment, and ethnicity. Residence characteristics: province, community is urban, and availability of kindergarten. Husband characteristics: educational attainment.

Source: Life in Kyrgyzstan (LIK) Survey, 2011 wave, authors' own calculations.

[a] The first stage is identical to the first stage in Table 3.

*$p < .05$; **$p < .01$

significantly reduces the number of women's working hours by 20 hours (14 hours in the Tobit) per week. Adding control variables reduces the effect to between –9 and –15 hours (between –1 and –4 hours in the Tobit) per week (columns 2–5), and this effect is again insignificant.[23] The effect sizes—although insignificant—are not negligible.

After we control for the conditioning variables in column 2 in Tables 3 and 4, the estimated effects do not change much with the inclusion of the additional control variables in columns 3–5. The key variable is the age of the husband, which proxies the age of the woman. As shown in tables in the online appendix, younger women are more likely to coreside (Table A6), are less likely to participate in the labor force (Tables A5 and A7), and work fewer hours (Tables A8 and A9). Controlling for the age of the woman, either explicitly in columns 3–5 or implicitly in column 2, therefore reduces the stark difference in labor force participation and working hours between coresiding and noncoresiding women.

We test for heterogeneity in the effect of intergenerational coresidence on female labor supply among different groups of women. To do so, we interact the coresidence variable with a number of characteristics of the woman or her family (Tables A10 and

[23] We also ran an IV estimation for the impact of coresidence on the number of working hours of only those women with positive working hours. The results were again negative but statistically insignificant.

A11 in the online appendix): residence in an urban area (column 1), the woman's educational attainment (column 2), her age cohort (column 3), the age of the oldest living parent of her husband (column 4), an indicator whether this oldest living parent is in retirement age (column 5), the woman's number of children up to the age of 5 (column 6), and an indicator for whether other young women live in the same household with whom duties could potentially be shared (we call them *substitute women*) (column 7). We compute both OLS and IV estimates, but the latter are shown only if our instrument is sufficiently strong in each respective subsample.

Few of the interaction terms are statistically significant. OLS estimates suggest that the effect of coresidence on female labor supply is negative for women in the age cohort 40–50, and it is close to 0 for women in the age cohorts 20–29 and 30–39 (column 3). Although the respective IV estimates are insignificant, they are qualitatively in line with the OLS results. In addition, women without young children appear to be negatively affected by coresidence, but the effect turns positive with the second young child, possibly because coresiding parents and in-laws participate in caregiving (OLS estimates in column 6). IV estimates are again insignificant, and they are much smaller in magnitude; as before, however, they reflect the OLS estimates.

Comparison of Estimated Effects With Other Countries

Previous empirical studies on the labor market effects of intergenerational coresidence invariably found a positive impact. These studies used data from the United States (Kolodinsky and Shirey 2000), Japan (Oishi and Oshio 2006; Sasaki 2002), and China (Maurer-Fazio et al. 2011; Shen et al. 2016). Among these countries, patrilocality is common in China (Ebenstein 2014) and, to a lesser extent, in Japan (Takagi et al. 2007). Yet, the studies on China do not capture the full extent of patrilocality. Maurer-Fazio et al. (2011) focused on urban China, where patrilocality is practiced much less than in rural China,[24] and Shen et al. (2016) fully excluded patrilocality by restricting their analysis to women's coresidence with own parents.

Interestingly, the magnitude of the estimated effects is smaller in settings with a higher prevalence of patrilocality. Living with parents or in-laws increases the probability of female labor force participation by 56 percentage points in the United States (Kolodinsky and Shirey 2000), by 28 percentage points in China when analysis is limited to coresidence with own parents (Shen et al. 2016), by 19–24 percentage points in Japan (Oishi and Oshio 2006), and by 7 percentage points in urban China (Maurer-Fazio et al. 2011). We compare our estimated effects for Kyrgyzstan with these numbers. Taking the full model (column 5 of Table 3) as a reference point, we can reject at the 1 % significance level that our OLS estimate is larger or equal to the smallest effect that had been estimated previously (0.07 in Maurer-Fazio et al. 2011). For the IV estimate, which has a much larger variance, we can still reject at the 10 % significance level that it is larger or equal to the second smallest effect (0.19 in Oishi and Oshio 2006). Our estimates hence appear to be less positive than what most

[24] The Global Data Lab database (Institute for Management Research, Radboud University 2017) reported a patrilocality index of 0.81 for urban China and 2.55 for rural China. The *patrilocality index* is the log of the percentage of patrilocal residence divided by the percentage of matrilocal residence. Thus, the larger the value, the more patrilocal is the setting. For comparison, Kyrgyzstan had a mean patrilocality index of 2.31 at the national level in the period 2000–2016.

previous findings suggest. Given that Kyrgyzstan has the highest prevalence of patrilocality among these samples, this finding fits the pattern well.

Channels

We find that coresidence with parents or in-laws does not significantly affect female labor supply in Kyrgyzstan. In this section, we examine all the aforementioned channels through which coresidence may influence women's labor market outcomes. For three channels, we can conduct a causal analysis; for the other two channels, we can provide only descriptive evidence.[25]

First, we exploit information on women's time use in our estimation sample. We run an IV estimation in which hours spent on elder care, housekeeping, and childcare are outcome variables. We expect that coresidence leads to more time spent on elder care and housekeeping (Ebenstein 2014; Grogan 2013) and less time spent on childcare. Grandparents—and especially grandmothers—are known to be heavily involved in childcare in Kyrgyzstan (Kuehnast 2004). Among all women in our sample, 10 % spend time on elder care (if any, 1.2 hours per day, on average), 96 % spend time on housekeeping (if any, 5.6 hours per day, on average), and 64 % spend time on childcare (if any, 2.8 hours per day, on average).

Table 5 reports the results. Coresidence with parents or in-laws leads to an average of between 11 (OLS estimate) and 27 (IV estimate) more minutes spent per day on elder care (column 1). To see whether this time commitment comes at the cost of leisure, we also run an estimation with time spent on leisure as the outcome variable (column 4). Coresiding women indeed seem to have less time for leisure: between 16 (OLS estimate) and 41 (IV estimate) minutes less. These numbers match well with those in column 1, indicating that elder care reduces leisure time. However, only the OLS estimate is statistically significant in column 4, leading us to regard this as suggestive evidence only.

The finding of higher elder care among coresiding women fits well into the previous literature on patrilocal societies. This literature argues that parents value sons much more than daughters because parents of sons enjoy elder care within the house provided by the daughter-in-law, whereas parents of daughters have no caretakers (Ebenstein 2014). This differential valuation explains the fact that women in patrilocal societies tend to have fewer children if the firstborn was a male (Grogan 2013). Ebenstein (2014) argued that parents are even willing to abort daughters because daughters will not be able to provide elder care.

In contrast, coresidence does not significantly influence the time spent by women on housekeeping or childcare (columns 2 and 3, Table 5). The point estimates for childcare are positive for both OLS and IV estimation, but they are statistically insignificant. Hence, coresiding women do not provide significantly more childcare, although they have more young children than women who do not coreside. This finding may indicate that parents or in-laws who live in the same household care for young children.[26] For

[25] Descriptive statistics of the channel variables can be found in Table A12 in the online appendix.

[26] In the 2013 LIK, respondents were asked to report the main caretaker (if not institutionalized childcare) of children aged 0–5. For our sample of women who coreside with their in-laws, grandparents are the main caretakers of young children in 15 % of the cases. Other relatives do not play a major role for childcare.

Table 5 Channel analysis 1: Woman's time use

	Hypothesized Channels			Supplementary
	Elder Care (in hours)	Housekeeping (in hours)	Childcare (in hours)	Leisure (in hours)
	(1)	(2)	(3)	(4)
A. OLS Estimation Results (coresidence exogenous)				
Coresidence	0.189**	0.377†	0.104	–0.260*
	(0.036)	(0.203)	(0.146)	(0.131)
B. Two-Stage Least-Squares Estimation Results (coresidence endogenous)				
Second stage				
Coresidence	0.450**	–0.659	1.071	–0.691
	(0.171)	(0.950)	(0.689)	(0.611)
Number of Observations	1,048	1,048	1,048	1,048
Conditioning Variables	✓	✓	✓	✓
Wife Characteristics	✓	✓	✓	✓
Residence Characteristics	✓	✓	✓	✓
Husband Characteristics	✓	✓	✓	✓

Notes: Standard errors are shown in parentheses. Elder care (in hours per day) is the total time a woman spent on elder care. Housekeeping (in hours per day) is the total time a woman spent housekeeping (e.g., cooking, washing, laundry, cleaning, shopping, repairs, and other household tasks). Childcare (in hours per day) is the total time a woman spent on childcare. Leisure (in hours per day) is the total time a woman spent on leisure (reading, TV, radio, computer, Internet, cinema, theater, concert, physical exercise, conversations with friends/family/on the phone, social reunion, religious activity, and community work).

Source: Life in Kyrgyzstan (LIK) Survey, 2011 wave, authors' own calculations.

†$p < .10$; *$p < .05$; **$p < .01$

housekeeping, the point estimates are positive and significant in the OLS estimation but negative and insignificant (with large standard errors) in the IV estimation, which makes detecting a tendency difficult. In any case, in contrast to that suggested by the previous literature for the United States, Japan, and China, we cannot confirm substantial parental assistance related to housekeeping in Kyrgyzstan.

Second, we exploit variation in income provided to the household by the parent generation and in parents' and in-laws' gender attitudes. Because we rely on information that the parents or in-laws themselves provided, we here need to restrict our sample to those households where women are coresident. Instead of a causal analysis, we therefore investigate whether parents' or in-laws' income and gender attitudes are related to female labor force participation and the number of working hours. We control for the same variables as earlier, except for the conditioning variables.[27] This exercise serves as a plausibility check for the aforementioned income and gender attitudes channels; the results have no causal interpretation. Estimation results are found in Table 6 (OLS for labor force participation and Tobit for working hours).

[27] The conditioning variables are neglected because we restrict the analysis to coresiding households and do not use information on being married to the youngest son.

Table 6 Channel analysis 2: Parents' financial contributions and gender preferences

	Labor Force Participation		Working Hours	
	(1)	(2)	(3)	(4)
Financial Contribution to the Household				
Income parents (in l,000 som)[a]	–0.004		–0.555	
	(0.004)		(0.530)	
Parents' Preferences				
Gender attitudes (standardized)[b]		0.00008		0.571
		(0.022)		(2.155)
Number of Observations	501	490	50l	490
Wife Characteristics	✓	✓	✓	✓
Residence Characteristics	✓	✓	✓	✓
Husband Characteristics	✓	✓	✓	✓

Notes: Standard errors are shown in parentheses. The analysis is restricted to coresiding women.

Source: Life in Kyrgyzstan (LIK) Survey, 2011 wave, authors' own calculations.

[a] Includes income of all coresiding parents earned as employees and received as pension contributions.

[b] Average gender attitudes of coresiding parents in the household. We define preferences as the parents' attitude toward the role of females in society. Gender attitudes are measured using seven self-reported items. Item responses are reported on a 4-point Likert scale ranging from strongly disagree (l) to strongly agree (4). We identify two liberal and five traditional items. We then use all items to conduct a factor analysis and to extract one single latent factor. To facilitate the interpretation, we use a standardized index ranging from weaker traditional attitudes (lower index values) to stronger traditional attitudes (higher values).

In terms of parents' income, we restrict attention to wage income and pension income because we are interested in the pure income effect and want to rule out effects on female labor supply from family-owned businesses that may provide employment to women. Among all intergenerational households, 86 (17 %) benefit from parents' or in-laws' labor income, and 316 (63 %) receive pension income. In households with labor income, the average earned per month is 7,992 som (approximately 173 US$). In households with pension income, the average monthly pension is 4,453 som (approximately 96 US$). As expected, we observe a negative correlation between parents' or in-laws' income and coresiding women's labor supply (columns 1 and 3). However, the estimates are not statistically significant.

We measure parents' or in-laws' gender attitudes in terms of their expressed attitudes toward the role of females in society. LIK respondents reported their level of agreement on a 4-point Likert scale, ranging from strongly disagree (1) to strongly agree (4) on seven statements (listed in Table A13, online appendix). We conduct a factor analysis to extract one single latent factor from the seven statements. To facilitate interpretation, we use a standardized index ranging from weaker traditional attitudes (lower index values) to stronger traditional attitudes (higher index values). Our estimation results suggest that parents' or in-laws' gender attitudes are unrelated to female labor force participation and working hours (columns 2 and 4).

Conclusion

We investigate the role of coresidence with the parent generation for married women's labor market outcomes in Kyrgyzstan. We find that coresidence has no significant effect on women's labor force participation and the number of working. Given that extended family members usually live close by, this finding could suggest that female labor supply is treated as a family optimization problem. When a woman receives an attractive work opportunity, the parental generation—possibly in addition to other extended family members—might find ways to accommodate her increased work-time demands regardless of whether she is coresident or lives in a separate household nearby. When parents or in-laws require care in old age, however, coresidence does matter: compared with noncoresiding women, coresiding women spend significantly more time on elder care, apparently at the cost of having less time for leisure. Despite the fact that we cannot detect effects on women's labor market exposure overall, this additional burden—on average, one-half hour per day—seems nonnegligible.

The analysis in our study provides an illustrative example for how culture matters for economic outcomes. Kyrgyzstan is a patrilocal society, in which coresident women are expected not only to take care of their in-laws in old age but also to do housekeeping for them after they move into the household upon marriage. We find that women who coreside do not differ significantly from women who do not coreside in terms of time spent on housekeeping. This fact makes the patrilocal setting different from those of prior studies, in which parents and in-laws in China, Japan, and the United States are assumed to provide substantial assistance with housekeeping. Living with the parent generation is less conducive to female activity in the labor market in our patrilocal setup than in nonpatrilocal settings.

Acknowledgments This work was supported by the UK Department for International Development (DFID) and the Institute for the Study of Labor (IZA). It is an output of the project "Gender and Employment in Central Asia—Evidence from Panel Data." The views expressed are not necessarily those of DFID or IZA. We gratefully acknowledge the financial support received. Andreas Landmann received additional funding from project LA 3936/1-1 of the German Research Foundation (DFG). We thank Kathryn Anderson, Charles M. Becker, Marc Gurgand, Kristin Kleinjans, Patrick Puhani, and participants of conferences in Bishkek, Chicago, Dresden, and Göttingen for helpful and valuable comments. Many thanks in particular to Damir Esenaliev and Tilman Brück for their support.

References

Akiner, S. (1997). Between tradition and modernity: The dilemma facing contemporary central Asian women. In M. Buckley (Ed.), *Post-Soviet women: From the Baltic to central Asia* (pp. 261–304). Cambridge, UK: Cambridge University Press.

Anderson, K., Esenaliev, D., & Lawler, E. (2015, October). *Gender earnings inequality after the 2010 revolution: Evidence from the life in Kyrgyzstan surveys, 2010–2013*. Paper presented at the Life in Kyrgyzstan Conference, Bishkek, Kyrgyzstan.

Anderson, K. H., & Pomfret, R. (2002). Relative living standards in new market economies: Evidence from Central Asian household surveys. *Journal of Comparative Economics, 30,* 683–708.

Baker, M. J., & Jacobsen, J. P. (2007). A human capital-based theory of postmarital residence rules. *Journal of Law, Economics, & Organization, 23,* 208–241.

Bauer, A., Green, D., & Kuehnast, K. (1997). *Women and gender relations: The Kyrgyz Republic in transition*. Mandaluyong, Philippines: Asian Development Bank.

Becker, C. M., Mirkasimov, B., & Steiner, S. (2017). Forced marriage and birth outcomes. *Demography, 54,* 1401–1423.

Brück, T., Esenaliev, D., Kroeger, A., Kudebayeva, A., Mirkasimov, B., & Steiner, S. (2014). Household survey data for research on well-being and behavior in central Asia. *Journal of Comparative Economics, 42,* 819–835.

Chu, C. C., Kim, S., & Tsay, W.-J. (2014). Coresidence with husband's parents, labor supply, and duration to first birth. *Demography, 51,* 185–204.

Compton, J. (2015). Family proximity and the labor force status of women in Canada. *Review of Economics of the Household, 13,* 323–358.

Compton, J., & Pollak, R. A. (2014). Family proximity, childcare, and women's labor force attachment. *Journal of Urban Economics, 79,* 72–90.

Ebenstein, A. (2014). *Patrilocality and missing women.* Unpublished manuscript, Department of Economics, Hebrew University of Jerusalem, Jerusalem, Israel.

Ettner, S. L. (1996). The opportunity costs of elder care. *Journal of Human Resources, 31,* 189–205.

Fletcher, J. F., & Sergeyev, B. (2002). Islam and intolerance in central Asia: The case of Kyrgyzstan. *Europe-Asia Studies, 54,* 251–275.

García-Morán, E., & Kuehn, Z. (2017). With strings attached: Grandparent-provided child care and female labor market outcomes. *Review of Economic Dynamics, 23,* 80–98.

Giddings, L., Meurs, M., & Temesgen, T. (2007). Changing preschool enrolments in post-socialist central Asia: Causes and implications. *Comparative Economic Studies, 49,* 81–100.

Giovarelli, R., Aidarbekova, C., Duncan, J., Rasmussen, K., & Tabyshalieva, A. (2001). *Women's rights to land in the Kyrgyz Republic.* Retrieved from http://landwise.resourceequity.org/records/2426

Grogan, L. (2013). Household formation rules, fertility and female labour supply: Evidence from post-communist countries. *Journal of Comparative Economics, 41,* 1167–1183.

Ibraeva, G., Moldosheva, A., & Niyazova, A. (2011). *Gender equality and development: Kyrgyz country case study* (World Development Report 2012 Background Paper). Washington, DC: World Bank.

Institute for Management Research, Radboud University. (2017). *Global data lab* [Database]. Retrieved from https://globaldatalab.org/

Kolodinsky, J., & Shirey, L. (2000). The impact of living with an elder parent on adult daughter's labor supply and hours of work. *Journal of Family and Economic Issues, 21,* 149–175.

Kuehnast, K. (2004). Kyrgyz. In C. R. Ember & M. Ember (Eds.), *Encyclopedia of sex and gender: Men and women in the world's cultures* (pp. 592–599). New York, NY: Kluwer Academic/Plenum.

Lilly, M. B., Laporte, A., & Coyte, P. C. (2007). Labor market work and home care's unpaid caregivers: A systematic review of labor force participation rates, predictors of labor market withdrawal, and hours of work. *Milbank Quarterly, 85,* 641–690.

Ma, S., & Wen, F. (2016). Who coresides with parents? An analysis based on sibling comparative advantage. *Demography, 53,* 623–647.

Maurer-Fazio, M., Connelly, R., Chen, L., & Tang, L. (2011). Childcare, eldercare, and labor force participation of married women in urban China, 1982–2000. *Journal of Human Resources, 46,* 261–294.

Mincer, J. (1958). Investment in human capital and personal income distribution. *Journal of Political Economy, 66,* 281–302.

Ministry of Labour and Social Development. (2017). *Sotsialnye utschreschdeniya* [Social institutions]. Bishkek, Kyrgyzstan: Ministry of Labour and Social Development. Retrieved from http://www.mlsp.gov.kg/?q=ru/sotsuchrejdeniya

Murdock, G. P. (1967). *Ethnographic atlas*. Pittsburgh, PA: University of Pittsburgh Press.

Nedoluzhko, L., & Agadjanian, V. (2015). Between tradition and modernity: Marriage dynamics in Kyrgyzstan. *Demography, 52,* 861–882.

Oishi, A. S., & Oshio, T. (2006). Coresidence with parents and a wife's decision to work in Japan. *Japanese Journal of Social Security Policy, 5*(1), 35–48. Retrieved from http://www.ipss.go.jp/webj-ad/WebJournal.files/SocialSecurity/2006/jun/oishi&oshio.pdf

Paci, P. (2002). *Gender in transition* (Departmental Working Paper No. 24617). Washington, DC: World Bank.

Posadas, J., & Vidal-Fernández, M. (2013). Grandparents' childcare and female labor force participation. *IZA Journal of Labor Policy, 2*(article 14), 1–20. https://doi.org/10.1186/2193-9004-2-14

Rubinov, I. (2014). Migrant assemblages: Building postsocialist households with Kyrgyz remittances. *Anthropological Quarterly, 87,* 183–215.

Sasaki, M. (2002). The causal effect of family structure on labor force participation among Japanese married women. *Journal of Human Resources, 37,* 429–440.

Schwegler-Rohmeis, W., Mummert, A., & Jarck, K. (2013). *Labour market and employment policy in the Kyrgyz Republic: Identifying constraints and options for employment development* (Technical report produced in conjunction with the GIZ Programme Vocational Education & Training and Employment Promotion in Kyrgyzstan). Bishkek, Kyrgyzstan: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Retrieved from http://zentralasien.ahk.de/uploads/media/20130301_KIRG_Study_on_Labour_Market_policy_EN.pdf

Shen, K., Yan, P., & Zeng, Y. (2016). Coresidence with elderly parents and female labor supply in China. *Demographic Research, 35*(article 23), 645–670. https://doi.org/10.4054/DemRes.2016.35.23

Staiger, D., & Stock, J. H. (1997). Instrumental variables regression with weak instruments. *Econometrica, 65,* 557–586.

Takagi, E., Silverstein, M., & Crimmins, E. (2007). Intergenerational coresidence of older adults in Japan: Conditions for cultural plasticity. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 62,* S330–S339.

Thieme, S. (2014). Coming home? Patterns and characteristics of return migration in Kyrgyzstan. *International Migration, 52*(5), 127–143.

UNICEF. (2017). TransMonEE [Database]. Florence, Italy: UNICEF Innocenti Research Centre. Retrieved from http://www.transmonee.org