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Financial Inclusion and Monetary Policy in Emerging Asia

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Introduction

The degree of financial inclusion has important implications for firms and households in many emerging and developing economies.[1] Without access to formal financial institutions, and with relatively underdeveloped capital markets, firms may need to rely on retained earnings, or informal sources of funding for investment. Similarly, households may need to use their savings, or borrow from informal sources at exorbitant interest rates, to invest in human capital or start up small businesses. This underscores the importance of access to finance for economic growth and the promotion of income equality (e.g., Beck et al. 2007; Burgess and Pande 2005). Indeed, financial inclusion has been suggested to be "a tool for addressing critical issues of persistent poverty and underdevelopment" (Alliance for Financial Inclusion 2012, p. 6).

But the degree of financial inclusion is also of direct relevance for monetary policy. Perhaps the most obvious channel is through the importance of interest rates in the economy. In environments with limited financial inclusion, the direct impact of changes in interest rates on agents' inter-temporal decisions about consumption, investment, and savings may be weaker than in economies with nearly universal financial access. Policymakers have explicitly acknowledged the link between financial inclusion and the potency of monetary policy (Khan 2011; Tombini 2012). Theoretical research has discussed the implications of limited financial access for the policy reaction function of central banks (e.g., Galí et al. 2004; Bilbiie 2008), and for the effectiveness of monetary policy (Di Bartolomeo and Rossi 2007). More recently, the degree of financial inclusion has been argued to matter for optimal monetary policy outcomes in terms of output and inflation volatility (Mehrotra and Yetman 2014).

Given its importance, it is not surprising that many central banks in emerging markets have explicit objectives regarding financial inclusion.

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[1] The Global Partnership for Financial Inclusion, launched by the G20 leaders to promote inclusion, has defined financial inclusion as "a state in which all working age adults, including those currently excluded by the financial system, have effective access to the following financial services provided by formal institutions: credit, savings (defined broadly to include current accounts), payments, and insurance." See Consultative Group to Assist the Poor (CGAP 2011).

For instance, within emerging Asia, the Reserve Bank of India has taken policy initiatives to facilitate branch expansion in poor areas and relaxed the requirements for opening bank accounts. It has also advised banks on financial products to ensure that the financial needs of customers are met (Chakrabarty 2013). The Central Bank of Malaysia Act 2009 explicitly incorporates financial inclusion as a central bank objective. Among various other measures to promote inclusion, the Bank Negara Malaysia—Malaysia's central bank—has an in-house centre that provides information about financial services to the public, highlighting the importance of financial literacy (Zeti 2005). The Bangko Sentral ng Pilipinas has made efforts to build a regulatory environment that supports financial inclusion, including in microfinance (Bangko Sentral ng Pilipinas 2013).

Internationally, many central banks, and other public sector institutions are members of the Alliance for Financial Inclusion (AFI), a member-driven peer learning framework. Some institutions have set quantifiable financial inclusion goals for their economies by signing the Maya Declaration.[2] The G20 has endorsed the Financial Inclusion Action Plan, recognising the importance of financial inclusion in the global development agenda (Global Partnership for Financial Inclusion 2014). The Bank for International Settlements hosts the secretariats for four standard-setting bodies engaged in addressing supervisory and regulatory issues.[3] Financial inclusion is very important for both national and international regulatory bodies, as financial exclusion carries risks and costs, including those associated with financial instability (Caruana 2012).

Despite the prominence of financial inclusion in national and international policy agendas, there is little empirical literature about the interaction between financial inclusion and monetary policy. In this chapter, we focus on two implications of financial inclusion for monetary policy. First, we empirically evaluate the interest rate sensitivity of output and prices in emerging Asian economies with different levels of financial inclusion. This is done both by estimating output Euler equations and examining

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[2] Maya Declaration is the statement of AFI network commitment to financial inclusion.

[3] The Basel Committee on Banking Supervision; the Committee on Payments and Market Infrastructures; the International Association of Insurance Supervisors; and the International Association of Deposit Insurers.

the impact of interest rate shocks on output and prices in panel vector autoregressions. In previous theoretical modelling, the demand of credit-constrained households that are not able to smooth consumption is typically postulated to depend only on current period income, with no role for interest rates (Galí et al. 2004). Bilbiie and Straub (2012) present a model in which changes in asset market participation can lead to a change in the sign of the interest rate coefficient in the output Euler equation. Such considerations suggest that there could be important differences in the interest rate sensitivity of output and prices across economies, depending on the level of financial inclusion.

The second question of interest concerns the relationship between limited financial inclusion and the central bank's policy targets. Recent theoretical work by Anand et al. (2015) suggests that welfare enhancing monetary policy in economies with a high share of unbanked consumers and a large share of food in the consumption basket involves the targeting of headline instead of core inflation. Changes in food prices affect the real incomes, and thus consumption demand of the financially excluded, and should therefore be taken into account by policymakers when conducting macroeconomic stabilisation. We use consumption expenditure data from India to highlight how some of these interactions manifest themselves. Moreover, using data on real interest rate dynamics and core and headline inflation rates, we evaluate how closely the setting of the monetary policy stance by emerging Asian central banks resembles the theoretical model's predictions.

We find that the interest rate sensitivity of output and prices is somewhat higher in economies with a greater degree of financial inclusion. This conclusion arises from estimates of the real interest rate coefficient in output Euler equations and from vector autoregressions that consider impacts of nominal interest rate shocks on output and prices. However, in many cases, the differences between economies at different levels of financial access are small. This could stem from indirect effects of interest rate changes, whereby financially included consumers initially react to the change in monetary policy stance, with subsequent impacts on real wages, and thus consumption of the financially excluded households as well.[4] Moreover, we find evidence that in some emerging Asian economies with a significant

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[4] See Di Bartolomeo and Rossi (2007) who outline this possibility in a theoretical model.

share of unbanked consumers, and a considerable portion of food in overall consumption, real interest rates have moved more closely with headline than core inflation, in line with Anand et al. (2015). Yet, the differences in the correlations that arise from the data appear to be small.

In this chapter, we do not consider the financial stability implications of financial inclusion. There are various channels through which greater financial inclusion affects financial stability, many of them relevant for central bank policies.[5] Financial stability may be enhanced by increased availability of core funding for banks as deposits increase; more diversified lending portfolios as lending to small and medium-size enterprises expands; and an improved monetary transmission mechanism. At the same time, inclusion may be detrimental for financial stability if lending standards are adversely affected, or unregulated parts of the financial system grow in importance.[6]

We also leave out many other issues that feature prominently in policy discussions related to financial inclusion. One pertains to the optimal supply-side response, seeking to determine how policymakers can best enhance financial inclusion, be it through efforts to increase financial literacy or through regulatory policies that allow for financial innovation, for example. Another, and no less important task, is to understand the demand side. Why do some consumers voluntarily choose to be financially excluded, while others resort to informal money lenders at very high interest rates instead of borrowing from formal financial institutions?

This chapter is structured as follows. The next section provides some stylised facts about the degree of financial inclusion in emerging Asian economies. Section 'Financial Inclusion and Monetary Policy: Some Theoretical Arguments' mentions previous, mostly theoretical, literature about the links between financial inclusion and monetary policy. This is followed by an investigation of the interest rate sensitivity of output and prices in section 'Empirical Evidence on Interest Rate Sensitivity', while section 'Financial Inclusion and Monetary Policy Targets' discusses

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[5] See Mehrotra and Yetman (2015) for a discussion of the implications of financial inclusion for central banks more broadly.

[6] See Han and Melecký (2013), Hannig and Jansen (2010) and Morgan and Pontines (2014).

the implications of financial inclusion for the targets of monetary policy. Finally, we conclude in section 'Conclusion'.

Measuring Financial Inclusion in Emerging Asia

Examining the implications of financial inclusion for monetary policy requires a measure of the degree of financial access. While many economies produce comprehensive domestic estimates (e.g., India, Malaysia), the need for a consistent cross-country comparison implies that a measure available for a large sample of economies is preferable. The source for financial inclusion indicators used in this study is the World Bank's Global Findex database (Demirguc-Kunt and Klapper 2012; Demirguc-Kunt et al. 2015). The database covers over 140 economies, thus including both advanced and emerging countries. About 1000 persons were surveyed in each economy during each of the 2011 and 2014 calendar years.[7]

Figure 4.1 shows our benchmark indicator for financial inclusion: the share of population of age 15 or higher that has an account at a formal financial institution: a bank, credit union, cooperative, post office, or microfinance institution.[8] There is significant variation in terms of formal account ownership in our sample of emerging Asian economies.[9] The economies can be roughly divided into three groups. The first group comprises India, Indonesia, and the Philippines, and account ownership ranges between 28 % and 53 % of the population. In the second group, including China, Malaysia, and Thailand, between 78 % and 81 % of the population has an account at a formal financial institution. Finally, the level of account ownership in Hong Kong SAR, Korea, and Singapore, exceeding 90 %, is similar to that in the three major advanced economies shown as a comparison group in the figure. The global average in 2014 was 62 %. Between 2011 and 2014, emerging Asian economies recorded

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[7] In some large economies, the number of persons surveyed was higher. For example, in 2014, the sample size was 3000 and more than 4000 in India and China respectively.

[8] Both individually and jointly owned accounts are included. Account ownership numbers also include those adults who reported having a debit or an ATM card.

[9] The sample comprises nine emerging Asian economies whose central banks are members of the BIS.
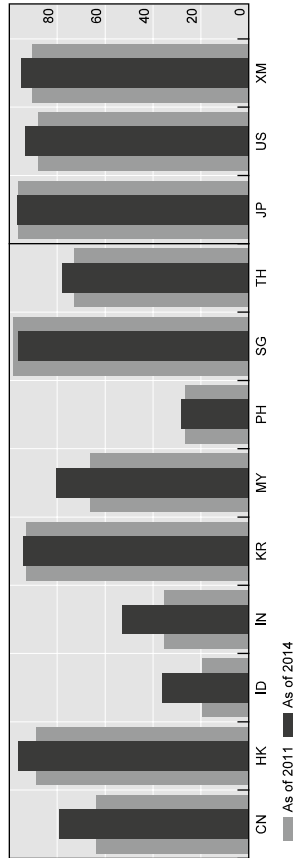
Fig. 4.1 Financial inclusion indicators: ownership of account. Share of adults who had an account at formal financial institution, in %. *CN* China, *HK* Hong Kong SAR, *ID* Indonesia, *IN* India, *KR* Korea, *MY* Malaysia, *PH* the Philippines, *SG* Singapore, *TH* Thailand, *JP* Japan, *US* United States, *XM* euro area. *Source*: World Bank, Global Findex Database; Demirguc-Kunt et al. (2015)

notable advances in account ownership, particularly in India, Indonesia, and Malaysia, partly reflecting supply side initiatives from the governments and/or central banks.

An analysis of the determinants of the observed levels of financial inclusion is beyond the scope of this chapter. However, we note that the variation between the three different groups of economies is consistent with Demirguc-Kunt and Klapper (2012) who show that income levels correlate closely with the degree of financial inclusion across economies. Indeed, in the first group of economies (India, Indonesia, Philippines), GDP per capita in 2014 averaged US$ 2675 measured at current prices, while it amounted to US$ 7946 in the second group (China, Malaysia, Thailand), and US$ 41,430 in the third (Hong Kong SAR, Korea, Singapore).[10]

The numbers shown above do not include mobile money accounts, which are an increasingly important means of conducting financial transactions for many emerging economy households. While some mobile money accounts are not directly connected to an account at a formal financial institution, they provide financial transaction services similar to traditional bank accounts. In the emerging Asian economies considered here, mobile money is particularly important in the Philippines, where 15 % of adults in the 2011 survey reported using a mobile phone in the past year to pay bills, or to receive or send money. In the 2014 survey, close to 36 % of Korean account holders reported that they had made transactions from their account using a mobile phone, while 19 % had done so in China. The increased use of mobile money has important implications for regulatory authorities, as discussed by Caruana (2014) and Sriram et al. (2012).

Figure 5.2 provides another perspective to financial inclusion, documenting the share of adults who reported saving at a formal financial institution in the previous year. As financial access facilitates the inter-temporal smoothing of consumption, the savings dimension is very important. Dividing the economies into three groups in terms of savings behaviour in 2014 results in a similar composition as when account ownership is used. In India, Indonesia, and the Philippines, between 14 % and 27 % of the population saved money at a formal financial institution in the past year. In

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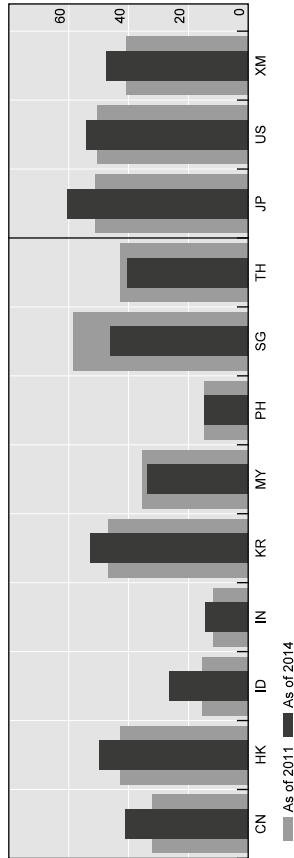[10] Simple averages across economies, based on data from IMF WEO.

Fig. 4.2 Financial inclusion indicators: savings at formal financial institution. Share of adults who saved at a formal financial institution in the past year, in %. *CN* China, *HK* Hong Kong SAR, *ID* Indonesia, *IN* India, *KR* Korea, *MY* Malaysia, *PH* the Philippines, *SG* Singapore, *TH* Thailand, *JP* Japan, *US* United States, *XM* euro area. *Source:* World Bank, Global Findex Database; Demirguc-Kunt et al. (2015)

China, Malaysia, and Thailand, between 34 % and 41 % did so. The share in Hong Kong SAR, Korea, and Singapore, at around 50 %, was similar to the Euro area and the United States. In the sample of Asian emerging market economies, the share of savers at a formal financial institution increased the most in China and Indonesia during the past three years. In some economies such as Singapore, the share fell instead.

As shown by Figs. 4.1 and 4.2, formal account ownership does not necessarily imply its use for savings purposes, possibly stemming from high costs of using accounts, or the lack of trust among poor in formal financial institutions. There are, of course, alternative methods of saving. In 2014, 25 % of adults in Indonesia reported using community-based methods for saving in the past year, such as informal savings clubs or a person outside the family—an increase of 11 percentage points from 2011. But there is also a large group of consumers who report that they did not save by any means, including by placing cash under a mattress, in the past year. The share of such adults was 62 % in India in 2014.

Figure 4.3 provides a third proxy for financial inclusion, indicating the share of people who report having borrowed money from a formal financial institution in the past year. In this case, the share was lowest in 2014 for China, Hong Kong SAR, and India (all below 10 %), followed by Indonesia and the Philippines. Since 2011, the shares had fallen in both India and Thailand. But importantly, the numbers do not include outstanding loans, such as mortgages, or the use of credit cards as a source of short-term borrowing. The share of adults with outstanding mortgages in our sample was highest in 2014 in Singapore, over 31 %, followed by Korea and Malaysia, between 18 % and 19 %. In contrast, the proportion of the population with mortgages was less than 6 % in India, Indonesia, and the Philippines. The share of adults with a credit card ranged from 1.1 % in Indonesia to 64 % in Hong Kong SAR. Between 2011 and 2014, credit card ownership increased by around 8 percentage points in both China and Malaysia, to 16 % and 20 % respectively.

Caution is warranted when drawing conclusions regarding both the level and changes in the degree of financial inclusion. In the case of India, for example, bank accounts were a requirement for all participants

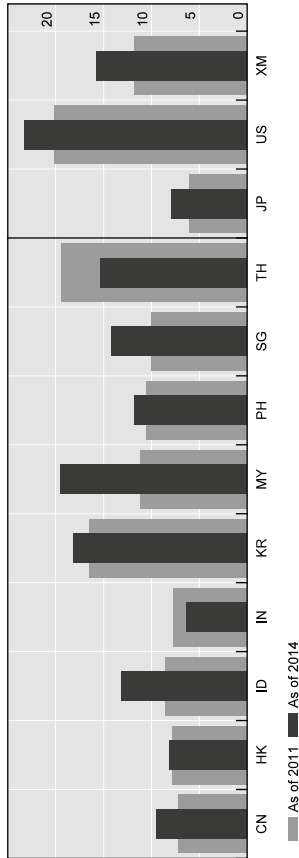**Fig. 4.3** Financial inclusion indicators: loans from formal financial institution. Share of adults who borrowed from a formal financial institution in the past year, in %. *CN*=China; *HK*=Hong Kong SAR; *ID*=Indonesia; *IN*=India; *KR*=Korea; *MY*=Malaysia; *PH*=the Philippines; *SG*=Singapore; *TH*=Thailand; *JP*=Japan; *US*=United States; *XM*=euro area. *Source*: World Bank, Global Findex Database; Demirguc-Kunt et al. (2015)

in the national rural employment guarantee scheme introduced in 2005 which then increased the number of accounts (Deininger and Liu 2013). To be sure, account ownership helps ensure that government transfers accrue to those intended, and may lead households to adopt other financial products as well. But mere account ownership may not contribute to consumption smoothing, or affect monetary policy transmission if the accounts are not used for saving or borrowing. Another reason figures on account ownership may exaggerate the degree of financial inclusion is that some accounts may be dormant (Subbarao 2012). Finally, the share of borrowers in any given period may reflect cyclical factors instead of improved financial access, which may help to explain some of the reductions in measures of inclusion for some countries displayed in Figs. 4.1, 4.2, and 4.3.

Financial Inclusion and Monetary Policy: Some Theoretical Arguments

Theoretical work on financial inclusion and monetary policy is related to research on limited asset market participation. Various implications have been considered in the literature. These include, inter alia, modelling the behaviour of agents who are neither able to save nor borrow; the stability conditions of monetary policy rules in an environment of limited financial access; the effectiveness of monetary policy when some agents are excluded from the formal financial system; and the implications for optimal policy outcomes in terms of output and inflation.

Many authors model financial exclusion by incorporating rule-of-thumb consumers into the theoretical framework. These consumers do not save or borrow. Instead, they consume all of their disposable income every period, which implies that their demand is determined by current real wages. As interest rates do not affect their inter-temporal consumption decisions, the transmission mechanism of monetary policy is affected by the degree of financial inclusion in the economy.

Using a framework that has provided the basis for many subsequent papers, Galí et al. (2004) introduce rule-of-thumb consumers in an otherwise standard sticky price model. They show that the presence of

such consumers, together with their interaction with countercyclical mark-ups, changes the range of parameter values for which a Taylor-type interest rate rule guarantees stability in the economy. As the share of rule-of-thumb consumers increases, the nominal interest rate must increase by more, for a given change in the inflation rate, in order for equilibrium to be determined. Therefore, increasing the nominal interest rate by more than the inflation rate—the so-called Taylor principle—will not necessarily guarantee stability when some consumers are rule-of-thumb. Galí et al. (2004) also show that when the monetary policy reaction function is forward looking, a large share of rule-of-thumb consumers may result in no equilibrium at all, or stability may require that nominal interest rates increase by less than the rise in inflation.

Drawing on the approach by Galí et al. (2004), Di Bartolomeo and Rossi (2007) argue that monetary policy effectiveness could actually increase when a fraction of consumers are unable to smooth consumption. In their framework, an increase in interest rates reduces the consumption of the financially included consumers. This induces a fall in real wages and consumption demand of the financially excluded households as well. As this "Keynesian" effect dominates the impact of inter-temporal substitution on consumption, monetary policy effectiveness increases as the share of credit constrained consumers' rises in the model.

In the model by Bilbiie (2008), a stable equilibrium generally requires that monetary policy is passive—nominal interest rates rise by less than inflation—when there is a large share of agents who are not able to smooth consumption. The author calls this the "inverted Taylor principle". In related work, Bilbiie and Straub (2013) argue that the monetary policy of the US Federal Reserve prior to the 1980s was consistent with equilibrium determinacy and macroeconomic stabilisation, even if monetary policy was passive. In Bilbiie and Straub (2012), the authors show how changes in asset market participation can lead to a change in the sign of the interest rate coefficient in the output Euler equation when asset market participation increases.

In contrast to some of the work mentioned above, Ascari et al. (2011) and Colciago (2011) argue that limited asset market participation may not fundamentally change the nature of optimal monetary policy. They show that if nominal wages are assumed to be sticky, the Taylor principle

is restored as a determinant of determinacy, even if the share of financially constrained consumers is large. On the other hand, Motta and Tirelli (2010) find that the introduction of consumption habits in the framework with financially excluded consumers will restore Bilbiie's inverted Taylor principle. These findings suggest that it is the interaction of various frictions that determine the conditions required for a stable equilibrium.

Moving on to policy outcomes in terms of output and inflation, Mehrotra and Yetman (2014) focus on the interaction between financial inclusion and the volatilities of the key target variables of the central bank. They show that, as the share of financially included consumers increases, the ratio of output volatility to inflation volatility will rise if the central bank is conducting policy to maximise the weighted welfare of the financially included and excluded consumers. The financially excluded population benefits more in relative terms from output than inflation stabilisation, as they are unable to smooth consumption over time. The authors use data for a large cross-section of economies to confirm the model's predictions.

In the models mentioned above, the assumption of rule-of-thumb consumers implies that there are extreme borrowing constraints affecting the financially excluded. Nevertheless, previous literature has suggested various ways through which consumption smoothing can occur in practice even without access to formal financial institutions. The financially excluded households can trade assets such as land or jewellery. Rosenzweig and Wolpin (1993) show how consumption smoothing has occurred through trading livestock in India. Also, farmers can adjust how much they work in response to shocks (Jayachandran 2006). Loans could be obtained from family, friends, or informal lenders. Allen et al. (2008) document the large extent to which Chinese entrepreneurs use loans from friends and "private credit agencies", especially in the growth phase of enterprises, despite the typically high interest rates charged by private lenders. Thus, the financially excluded may be able to smooth consumption through informal means, but the extent to which interest rate setting by the central bank directly affects their inter-temporal choices may still be limited, unless the interest rates in the informal sector are benchmarked to the formal sector.

Empirical Evidence on Interest Rate Sensitivity

We next move to examining the link between the effectiveness of interest rates as a policy tool and financial inclusion. Our first approach for evaluating the interest rate sensitivity of output consists of estimating Euler equations for Asian economies with different levels of financial inclusion. Inter-temporal substitution through interest rates is likely to be stronger the larger the share of consumers who have access to formal financial institutions, other things being equal. At the same time, we cannot rule out indirect effects of interest rate changes that could be operative even with the presence of many excluded consumers. Our approach is similar in spirit to Bilbiie and Straub (2012) who examine the stability of output Euler equations in the United States between the late 1970s and early 1980s, and attribute a detected structural break to changes in asset market participation over time. However, in contrast to that study, our focus is on the differences between economies at the same point in time.

The Euler equations are based on hybrid models, similar to those considered by Fuhrer and Rudebusch (2004), of the following form:

$$y_t = a_0 + a_1 y_{t-1} + a_2 y_{t-2} + \mu E_t y_{t+1} + \beta E_{t-1} \left[\frac{1}{\kappa} \sum_{j=0}^{\kappa-1} \left(i_{t+j} - \pi_{t+j+1} \right) \right] + \eta_t \tag{4.1}$$

Here, output reflects optimising consumption choices. The inclusion of past output in Eq. (4.1) is consistent with habit formation, where a household's utility depends partly on current consumption relative to past consumption (Fuhrer 2000). y_t denotes the output gap, and $E_t y_{t+1}$ Tis the expectation of period $t+1$ output formed at time t. i_t is the nominal interest rate, and $E_{t-1} \pi_{t+j+1}$ captures expectations of future inflation. It is straightforward to incorporate longer-term interest rates by adjusting the value of k. We use as benchmark analysis the case where $k=1$, but also consider longer-term interest rates where $k=4$.

We also estimate a simple forward-looking model that does not feature persistence in output. Setting $a_1 = a_2 = 0, k = 1$, it can be written as:

$$y_t = a_0 + \mu E_t y_{t+1} + \beta \left(i_t - E_t \pi_{t+1} \right) + \eta_t \tag{4.2}$$

This is theoretically closer to the Investment-Savings (IS) curve of micro-founded models, although its empirical fit could be worse than that of a hybrid model, given the observed persistent behaviour of output over time.

Our sample comprises nine economies in emerging Asia. The estimation period runs from 2000Q1 to 2013Q2, with minor differences between economies due to data availability. In order to compare the interest rate sensitivity of output in economies with different levels of financial inclusion, we divide the sample into two separate groups, using the World Bank's indicator of account ownership in 2011.[11] The first group comprises Hong Kong SAR, Korea, Singapore, and Thailand. The degree of account ownership varied between 73 % and 98 % of the population. In the second group that includes China, India, Indonesia, Malaysia, and the Philippines, the degree of account ownership was between 20 % and 66 % of the population in 2011.

We estimate the output Euler equation for each economy individually by generalised method of moments (GMM), and then examine the mean and median coefficients on the real interest rate for the two groups.[12] As instruments, we use lags 1–4 of the "endogenous" variables: the output gap, inflation, and nominal interest rates. The output gap is based on data for real GDP, with the cycle extracted by means of a Hodrick-Prescott (HP) filter, and a conventional smoothing parameter of 1600.[13] We consider different model specifications, including models with overnight and policy interest rates; hybrid and forward-looking specifications; and both short and longer-term interest rates, setting $k = 1$ and $k = 4$, respectively.

The results reported in Table 4.1 suggest that the interest rate sensitivity of output tends to be marginally higher in economies with a greater

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[11] We use 2011 instead of 2014 as the former is more relevant for the estimation sample.

[12] We acknowledge that there are other factors beyond financial inclusion that may affect the interest rate sensitivity of output, including financial depth and financial development more broadly.

[13] We recognise the limitations of the Hodrick-Prescott filter in estimating the output gap precisely, including the presence of end-point bias. But, since our focus is on estimating the interest rate sensitivity of output, we proceed with the HP filter as a simple and widely used methodology for estimating the output gap.

degree of financial inclusion. As an example, when policy interest rates are used and a forward-looking specification (Eq. 4.2) is estimated, the mean of the real interest rate estimates amounts to –0.168 in economies with a higher degree of financial inclusion, and –0.145 in the group featuring less financial access. Using medians instead, the difference between the coefficients becomes somewhat larger in magnitude (–0.123 vs. –0.057). The message that the real interest rate sensitivity is higher in economies with greater financial inclusion generally holds across the different models. The only exception is the mean coefficient in the forward-looking model with overnight interest rates although, even then, not when medians are used in place of means. The J test for overidentifying restrictions (not reported) does not reject the restrictions for any of the models reported in the table.

The statistical significance of the estimated real interest rate coefficient is generally weak, confirming the findings of Fuhrer and Rudebusch (2004). Only for Singapore and Thailand in the group of higher financial inclusion, and for the Philippines in the group of lower inclusion, are the negative estimated coefficients significantly different from zero

Table 4.1 Coefficient on real interest rate in optimising Euler equation

	Using policy rates			Using overnight rates		
	Forward-looking	Hybrid		Forward-looking	Hybrid	
	Short rate	Short rate	Long rate	Short rate	Short rate	Long rate
Mean, higher inclusion	–0.168	–0.080	–0.042	–0.130	–0.068	–0.046
Mean, lower inclusion	–0.145	0.052	–0.015	–0.160	0.028	–0.030
Median, higher inclusion	–0.123	–0.023	–0.046	–0.106	–0.038	–0.035
Median, lower inclusion	–0.057	0.002	–0.014	–0.065	–0.006	–0.023

Source: Authors' calculations

Note: The group of economies with higher levels of financial inclusion includes Hong Kong SAR, Korea, Singapore, and Thailand; the group with lower levels includes China, India, Indonesia, Malaysia, and the Philippines. The forward-looking models are based on Eq. (4.2), and the hybrid models are based on Eq. (4.1)

in at least three of the models, at the 10 % level. This suggests caution when interpreting differences between the coefficient estimates reported in Table 4.1.

Another approach to evaluating interest rate sensitivity in the different economies consists of examining the impact of changes in nominal interest rates on output and prices. There is an extensive literature analysing the impact of interest rate shocks in vector autoregressive models (VARs), estimated for individual economies. Such models are increasingly used with panel data as well, thus incorporating both cross-sectional and time series dimensions (Canova and Ciccarelli 2013).

We estimate panel VAR models using the methodology proposed by Love and Zicchino (2006). Focusing again on two groups of economies, as in the Euler equations, we estimate trivariate VAR models with the vector of endogenous variables set as $[y, \pi, i]$.[14] The variables are defined identically to the Euler equations above, although only overnight rates are considered here. To account for cross-sectional heterogeneity, we include fixed effects by forward-mean differencing, the Helmert procedure (Arellano and Bover 1995). Two lags of endogenous variables are included in the estimation.

After estimating the reduced form models, shocks are identified by the conventional Cholesky decomposition of the variance-covariance matrix. The ordering of the variables is in line with the vast empirical work on the identification of monetary policy shocks, where interest rate shocks are assumed to affect output and prices only with a lag. This assumption can be justified on a theoretical basis, including the predetermination of expenditures and rigidities in price setting (Woodford 2003). The focus of our analysis is on the impact on output gap and inflation of a shock to the nominal interest rate in the two groups of economies.

The second column of Table 4.2 shows the magnitude of a one standard deviation shock to the interest rate in the two groups of economies. It is immediately clear that short-term interest rates are much more volatile in economies with a lower degree of financial inclusion. This

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[14] Indonesia is excluded from the second group in the panel VAR estimation due to the counterintuitive result of a persistent positive impact from an interest rate shock to inflation.

Table 4.2 Impact of shocks to nominal interest rate

	One standard deviation shock to interest rate	Response to 1 percentage point shock in interest rate	
	Using overnight rates	Output gap	Inflation
Higher financial inclusion	0.32	0.42	1.22
Lower financial inclusion	0.69	0.26	0.42

Source: Authors' calculations

Note: The last two columns show the maximum impact during the next six quarters on output gap and prices, in % of a one percentage point shock to the nominal interest rate. Details on the estimated VARs are in the text

could reflect the larger size, and a more frequent occurrence of shocks in economies with lower income levels (Aguiar and Gopinath 2007). In similar vein, it is possible that a lack of financial inclusion itself works to magnify the effects of the shocks hitting the economy. The greater volatility of interest rates in economies with a lower degree of inclusion is in line with Mehrotra and Yetman (2014). The authors show theoretically that, when faced with productivity shocks, interest rates will decline by more in those economies with less inclusion, as they need to respond to a greater decline in inflation. In contrast, private sector agents in economies with greater inclusion respond to positive productivity shocks by a further increase in investment, limiting any fall in prices, and thus requiring a smaller change in interest rates.

The next two columns focus on the impact of interest rate shocks, in particular, the maximum point impact of a nominal interest rate shock of one percentage point on the output gap and inflation, during the six quarters following the occurrence of the shock. The estimates, *prima facie*, suggest that the impact of an interest rate shock on output and inflation is larger in economies with a higher degree of financial inclusion. In particular, in the model with two lags, the point impact on output is around 1.5 times as large, and the impact on inflation three times as big in these economies, compared to those with less financial access. However, as with the GMM estimates, there is a considerable amount of estimation uncertainty, in part because all the complex interactions in the data are not explicitly modelled in our small scale VAR. In particular,

using 90 % confidence intervals, statistically significant impacts are only observed for the group with a lower level of financial inclusion, and then only when the impact on output is considered.[15]

What explains the relatively small differences in the interest rate sensitivity of output that are observed in the estimates of the Euler equations? One possibility is that our estimates are also capturing indirect effects of changes in interest rates on output. While financially excluded consumers are not directly affected by a change in policy interest rates, they may be affected by the change in demand by the financially included households, possibly through changes in real wages (Di Bartolomeo and Rossi 2007). If the financially excluded households adjust their demand in a similar way to the financially included, we should see a change in output across the economy, which is then reflected in the estimates, even if not explicitly controlled for.

Another possible explanation for the small observed differences is that changes in policy rates may affect informal lending rates in the economy. Thus, households formally classified as "excluded" but relying on such sources of borrowing will be affected. Qin et al. (2013) provide evidence that informal lending rates in the city of Wenzhou have been sensitive to monetary policy measures by the People's Bank of China, consistent with this argument.

Finally, as an important caveat, to the extent that emerging economies use multiple instruments in setting their monetary policy, our results regarding the interest rate sensitivity of output and inflation only capture one of the many instruments used by the monetary authorities (Filardo et al. 2014).

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[15] If a VAR with 1 lag is estimated instead, the impact on inflation is again larger for the economies with greater financial inclusion, while the impact on output is similar for both groups. In this case, the impact on inflation of an interest rate shock appears statistically significant for some quarters for economies with a higher degree of financial inclusion, albeit again with very large confidence intervals.

Financial Inclusion and Monetary Policy Targets

The empirical analysis in the previous section suggests that interest rate sensitivity may be somewhat lower for economies where a large segment of the population remains outside the ambit of the formal financial sector. As postulated in literature, one of the reasons for this divergence could be the role of interest rates in consumption. The demand of credit-constrained consumers essentially depends on their current disposable income. In emerging and developing economies, a large proportion of these consumers are likely to be in the agricultural sector, with their disposable income principally in the form of current wage income and real wages dependent on flexible goods prices, in particular food prices. This could also have implications for the central bank's choice of inflation target for conduct of monetary policy.

Conventional models of the New Keynesian type suggest that monetary policy should target core inflation and aim at achieving price stability in the fixed price sector, which is characterised by menu costs and sticky price adjustments (Aoki 2001). However, recent theoretical work by Anand et al. (2015) suggests that, when there is a significant share of population without access to the financial system and the share of food in total consumption expenditure is high, monetary policy that targets headline instead of core inflation may increase welfare.[16] When food prices increase, aggregate demand by credit-constrained consumers in the agricultural sector increases, further increasing inflation pressures. This gives a role for headline inflation targeting—using as a target an index where food price are included. Monetary policy needs to react to the increase in aggregate demand by the credit-constrained households, including limiting the initial food price increase.

Anand et al. (2015) argue that the conditions outlined in their model are particularly likely to prevail in developing economies. Considering a sample comprised of seven Asian emerging markets and three advanced economies, it does appear that a lower level of financial inclusion is

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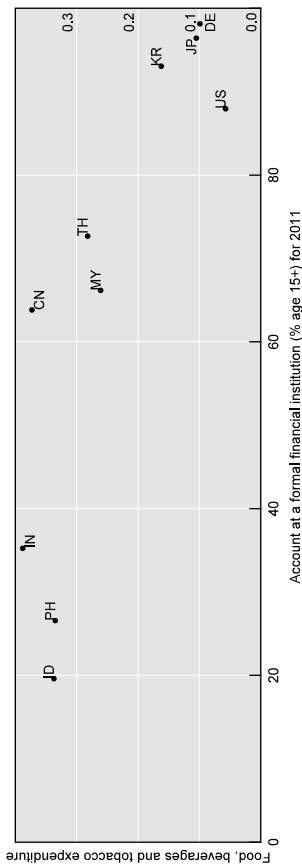
[16] See also Prasad (2014).

Fig. 4.4 Share of additional income spent on food. Distribution of additional $1 of income across broad expenditure categories, as of 2005. Shown is the share of the category "Food, beverages and tobacco". *Source*: International Food Consumption Patterns database, United States Department of Agriculture; World Bank, Global Findex Database; Demirguc-Kunt and Klapper (2012)
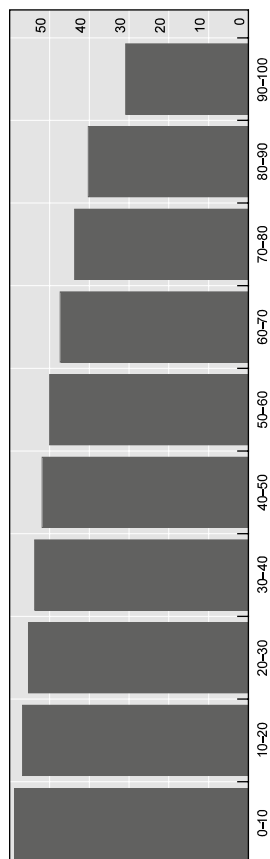
Fig. 4.5 Share of food in total expenditure, India. In % by decile class of expenditure.
Source: Authors' calculations based on unit level data from the National Sample Survey Organisation Survey on Employment and Unemployment, 2011–2012

associated with a higher share of food in overall expenditure. Figure 4.4 depicts the share of additional US$1 of income that is spent on food, together with the share of population that had an account at a formal financial institution in 2011. The relationship within our sample appears to be highly nonlinear. Similar marginal income elasticities are recorded for very different levels of account ownership, when the latter is below 80 % of the population. In contrast, the marginal income elasticity drops sharply for advanced economies with high levels of account ownership.

Similar differences in food consumption patterns are prevalent also *within* individual economies. Engel's law suggests that as income increases, the proportion of income spent on food falls. Figure 4.5 compares the share of food in total expenditure among different expenditure deciles in India. Whereas in the lowest decile class of expenditure about 60 % of expenditure is allocated on food, the share drops monotonically, to about 30 % for the richest decile.

Another important reason for focusing on headline inflation instead of core inflation stems from the second round effects of food price shocks in emerging economies (Walsh 2011). When a large share of the population is credit-constrained, a sudden increase in food prices could lead to a spike in consumption volatility. For households to maintain previous consumption levels, without access to borrowing, wages may have to rise significantly. This increases the potential for second round effects on inflation, including for agricultural goods prices. Indeed, Jacoby (2013) finds that farm wages in India are highly elastic to changes in the relative price of food, and there are significant spillover effects to non-agricultural wages as well. The data from the World Bank confirms that rural households have more limited financial access than their urban counterparts, with the share of account ownership 16 percentage points lower in rural than in urban areas globally in 2011.[17]

The potential for food price increases to create second-round effects is particularly clear when the costs of living of different segments of the population are considered. Using data for India, we estimate the hypothetical inflation rate faced by the different segments of population in the face of food price shocks, other things remaining constant. If there is a 20 %

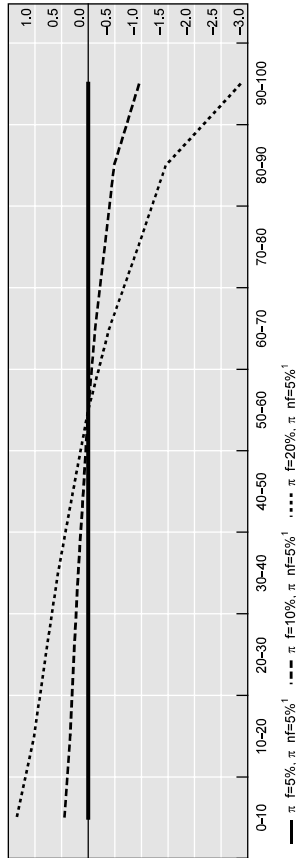[17] See also Basu and Srivastava (2005) for the Indian case.

Fig. 4.6 Asymmetric impact of food price driven inflation. Deviation from average inflation, in percentage points; by decile class of expenditure. '*n* and *nf* denote food and non-food components of inflation, respectively. *Sources*: National data; authors' calculations
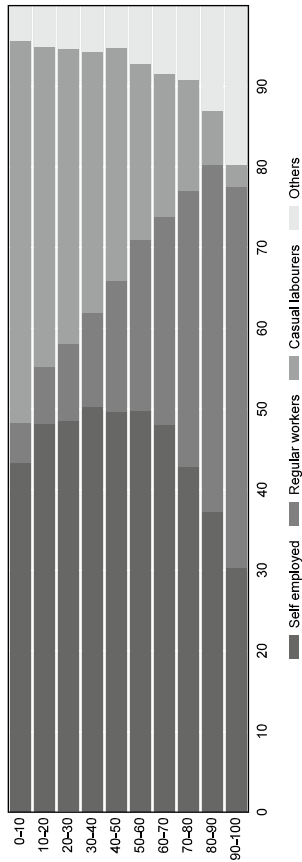
Fig. 4.7 Employment profile of households in India. Shares as % of total; by decile class of expenditure. *Source*: Authors' calculations based on unit level data from the National Sample Survey Organisation Survey on Employment and Unemployment, 2011–2012

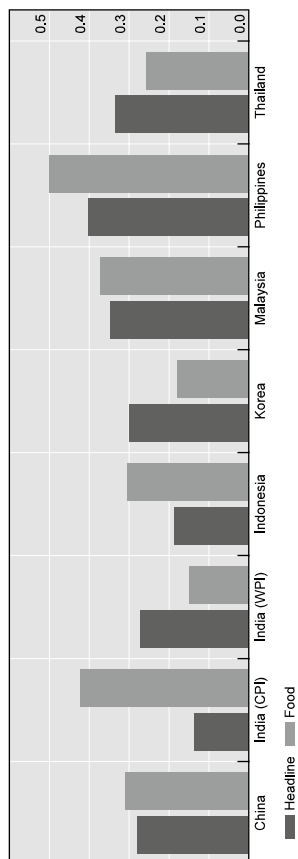**Fig. 4.8** Persistence of inflation. Persistence is computed as the coefficient on the lagged term of an AR(1) process of inflation. Inflation is the first difference of the (log) price index. *Sources:* CEIC; authors' calculations

increase in food prices but non-food prices go up only by 5 %, the lowest expenditure decile would face a hypothetical inflation rate that is about 1.5 percentage points higher than the average hypothetical rate (Fig. 4.6).

In India, as in many other emerging markets, most employees in the lower expenditure class work either as casual labourers or as self-employed (Fig. 4.7). Given that the access to the formal financial system for this group is limited, the demand for wage increases in the casual labour market to maintain past levels of consumption could be strong. And, given that about half of the labour force in India works in the agricultural sector, wage pressures in that sector could be particularly large, potentially leading to persistence in food price inflation.

In line with such interactions, estimates indicate that food price inflation is as persistent as headline inflation in some emerging Asian economies (Fig. 4.8). Modelling inflation as a simple autoregressive process, and using the lagged coefficient as a measure of persistence, food price inflation appears to be more persistent than headline inflation in China, Indonesia, Malaysia, and the Philippines. A similar result is obtained for India when consumer price index (CPI) inflation is used. In the cases of Korea and Thailand—the former with a lower marginal income elasticity of food than the other six emerging economies in our sample (Fig. 4.4)—the persistence of food price inflation is lower than that of headline inflation.

With these considerations in mind, we next provide empirical evidence related to the price indices that serve as targets of monetary policy in emerging Asia. Regarding the stated targets, four economies out of the seven in the sample had explicit inflation targeting regimes during our study period. Indonesia and the Philippines specified their targets in terms of consumer price inflation during the sample. Korea targeted core inflation during 2000–2006, and from 2007 onwards it has specified its inflation targets in terms of CPI inflation. Thailand targeted core inflation until end-2014, and switched to headline inflation targeting from the beginning of 2015 onwards. China and Malaysia do not explicitly target inflation. However, there is evidence that broader inflation measures than core inflation are important gauges of price pressures for the central banks in these economies. For example, in the case of China, the Government's Central Economic Work Conference

sets an annual goal for CPI inflation. Moreover, the People's Bank of China emphasises the importance of food prices for inflation pressures, suggesting that persistently high food prices will "shove up the cost of living, feed inflationary expectations, and may cause cost-pushing inflation" (People's Bank of China 2007, p. 78). For Malaysia, headline inflation is measured by the consumer price index, thus including food prices.

During the sample period, the Reserve Bank of India was operating under a multiple indicator approach wherein price stability was one of the key objectives. However, it moved to flexible inflation targeting with the signing of the Agreement on Monetary Policy Framework with the government in February 2015. The inflation target is defined in terms of the consumer price index.

Another approach to analyse policy targets is to empirically examine how strongly the prevailing monetary policy stance has been adjusted in relation to movements in the different price indices. Here, we evaluate the correlation coefficients of real policy interest rates with deviations of inflation from target,[18] to unveil potentially differing responses to changes in headline (consumer price) and core inflation. A larger positive coefficient would imply that real rates have adjusted by more—either through changes in nominal interest rates or changes in expected inflation—to movements in the measure of inflation. At the same time, we acknowledge that the unconditional correlations may reflect the mix of demand and supply shocks hitting the economy, in addition to the specific measure of inflation that the central bank responds to.

Our sample runs from 2000Q1 to 2013Q2 for most economies.[19] Two different interest rates are considered: the central bank's policy rate and an overnight rate (money market/interbank lending rate, or a comparable measure).

Table 4.3 shows that, in all economies, the real ex ante interest rates are positively correlated with both headline and core inflation. When inflation increases relative to target (or inflation increases relative to past aver-

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[18] In the case of core inflation, the target is specified as the 20 quarter moving average of core inflation.

[19] The sample starts in 2002Q1 for the Philippines due to the adoption of inflation targeting in 2002. Other minor differences in samples result from data availability for the different economies.

Table 4.3 Correlation of real interest rate with inflation gap

	Using policy rates		Using overnight rates	
	CPI inflation gap	Core inflation gap	CPI inflation gap	Core inflation gap
China	0.11	0.01	0.27	0.28
India	0.27	0.40	0.35	0.44
Indonesia	0.45	0.38	0.39	0.29
Korea	0.29	0.09	0.33	0.14
Malaysia	0.30	0.24	0.30	0.26
Philippines	0.06	0.06	0.05	0.06
Thailand	0.25	0.57	0.19	0.54

Source: Authors' calculations

Note: The table shows the correlation coefficient between the real *ex ante* interest rate, defined as the nominal interest less inflation four quarters ahead, and a measure of inflation gap. The core inflation target is computed as the 20 quarter moving average of core inflation. For those economies that do not have an explicit inflation target, CPI inflation targets are computed as the 20 quarter moving average of CPI inflation

age inflation), real interest rates tend to increase as well. The correlation coefficients are higher in some cases when CPI inflation is considered, suggesting that real rates respond more strongly to headline than core inflation, but the differences are small. Higher correlation coefficients for overall consumer price than core inflation are observed in Korea, and to a smaller extent in Malaysia and Indonesia as well. In the case of Thailand, real rate movements appear to be more strongly associated with core inflation, which is in line with their stated monetary policy framework during the sample period.

In India, correlation coefficients are higher when core inflation is used, which may seem surprising. But it could arise from the "multiple indicator approach" of the Reserve Bank of India, especially prior to the recent emphasis of the central bank on consumer prices. In the multiple indicator approach, different indicators, including prices, were monitored by the Reserve Bank in order to provide inference regarding the appropriate policy stance. Moreover, the focus was more on inflation based on wholesale price index in the absence of a nationwide representative CPI measure.

In sum, the official frameworks (for the inflation targeters) and policy communication (for the others) indeed appear to provide support for the

importance of headline inflation in the policy frameworks. This is in line with what Anand et al. (2015) suggests to be welfare enhancing in economies with limited financial inclusion and a considerable share of food in the consumption basket, based on their theoretical model. Our empirical exercise, however, generally confirms that real rates are positively correlated with both headline and core inflation with only limited differences observed between the price indices.[20]

Conclusion

Limited access to financial services has implications for economic growth and inequality, but it also matters for the conduct of monetary policy. In this chapter, we have analysed the links between financial inclusion and monetary policy, focusing on the interest rate sensitivity of output and prices, and the targets of monetary policy, in emerging Asian economies with different degrees of financial inclusion.

Estimating output Euler equations, we obtain some evidence that the interest rate sensitivity of output is stronger in economies with a higher degree of financial inclusion. Panel VAR estimates deliver similar results for both output and prices. However, the differences that arise between economies with various degrees of financial access, in particular when estimating Euler equations, are not sizeable. This could arise due to indirect effects of interest rate changes on aggregate demand that also affect the financially excluded population, possibly working through the demand response of the financially included households.

Regarding the implications for the targeted price indices, emerging Asian central banks tend to emphasise headline, rather than core, price indices both in their formal monetary policy frameworks and communication. This is in line with the theoretical results of Anand et al. (2015) related to the targets of monetary policy in environments of limited financial inclusion and a high share of food in the consumption basket. However, the distinction between core and headline inflation targeting appears less strong

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[20] Of course, there are various reasons beyond the interaction of financial exclusion with a large share of food in the consumption basket for why central banks may prefer to target headline inflation rather than core inflation. See for example Bullard (2011).

when we use actual data to evaluate the correlation of real interest rate movements with core and consumer price inflation, respectively.

Given central banks' and other policymakers' efforts to encourage greater financial inclusion, the interest rate channel of monetary policy could well increase in importance in many emerging and developing economies over time. However, several microeconomic and structural aspects—not discussed in this chapter—are important as well. These include the costs incurred by households when using formal financial services; the extent to which financial innovation can boost the supply of financial services available to previously excluded households and small and medium-size enterprises; and how strongly banks pass through changes in the monetary policy stance to the real economy. How much monetary transmission and consumption smoothing in the economy can be enhanced through greater financial inclusion is likely to depend, to an important extent, on such factors.

References

Aguiar, M., & Gopinath, G. (2007). Emerging market business cycles: The cycle is the trend. *Journal of Political Economy, 115*(1), 69–102.

Allen, F., Qian, J., & Qian, M. (2008). China's financial system: Past, present, and future. In L. Brandt & T. G. Rawski (Eds.), *China's great economic transformation* (pp. 506–568). Cambridge: Cambridge University Press.

Alliance for Financial Inclusion. (2012). *The first G20 Global Partnership for Financial Inclusion (GPFI) forum*. Forum Report. http://www.gpfi.org/sites/default/files/documents/GPFI%20Forum%20Report.pdf

Anand, R., Prasad, E. S., & Zhang, B. (2015). What measure of inflation should a developing country central bank target? *Journal of Monetary Economics, 74*, 102–116.

Aoki, K. (2001). Optimal monetary policy responses to relative-price changes. *Journal of Monetary Economics, 48*(1), 55–80.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29–51.

Ascari, G., Colciago, A., & Rossi, L. (2011). *Limited asset market participation: Does it really matter for monetary policy?* (Bank of Finland Research Discussion Papers No. 15–2011). Bank of Finland.) Helsinki.

Bangko Sentral ng Pilipinas. (2013). *Financial inclusion initiatives 2013*. http://www.bsp.gov.ph/downloads/publications/2013/microfinance_2013.pdf

Basu, P., & Srivastava, P. (2005). *Scaling-up microfinance for India's rural poor* (World Bank Policy Research Working Paper No. 3646). Washington, DC: World Bank.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth, 12*, 27–49.

Bilbiie, F. O. (2008). Limited asset markets participation, monetary policy and (inverted) aggregate demand logic. *Journal of Economic Theory, 140*(1), 162–196.

Bilbiie, F. O., & Straub, R. (2012). Changes in the output Euler equation and asset markets participation. *Journal of Economic Dynamics and Control, 36*(11), 1659–1672.

Bilbiie, F. O., & Straub, R. (2013). Asset market participation, monetary policy rules, and the great inflation. *Review of Economics and Statistics, 95*(2), 377–392.

Bullard, J. (2011). Measuring inflation: The core is rotten. *Federal Reserve Bank of St. Louis Review, 93*(4), 223–233.

Burgess, R., & Pande, R. (2005). Can rural banks reduce poverty? Evidence from the Indian social banking experiment. *American Economic Review, 95*(3), 780–795.

Canova, F., & Ciccarelli, M. (2013). Panel vector autoregressive models: A survey. In T. B. Fomby, L. Kilian, & A. Murphy (Eds.), *VAR models in macroeconomics – New developments and applications: Essays in Honour of Christopher A. Sims* (pp. 205–246). Bingley: Emerald Group.

Caruana, J. (2012, October 29). *Financial inclusion: The role of the Basel process*. Opening remarks at the First Annual GPFI Conference on Standard-Setting Bodies and Financial Inclusion: Promoting Financial Inclusion through Proportionate Standards and Guidance, Basel.

Caruana, J. (2014, October 30). *Welcoming remarks*. 2nd Conference on Standard-Setting Bodies and Financial Inclusion: Standard-Setting in the Changing Landscape of Digital Financial Inclusion, Basel. http://www.bis.org/speeches/sp141031.htm

CGAP. (2011, November). *Global standard-setting bodies and financial inclusion for the poor*. A White Paper Prepared by CGAP on Behalf of the G-20's Global Partnership for Financial Inclusion.

Chakrabarty, K. C. (2013, September 6). *Financial inclusion in India: Journey so far and way forward*. Keynote address at the Financial Inclusion Conclave, New Delhi.

Colciago, A. (2011). Rule-of-thumb consumers meet sticky wages. *Journal of Money, Credit and Banking, 43*(2–3), 325–353.

Deininger, K. and Liu, Y. (2013). *Welfare and poverty impacts of India's national rural employment guarantee scheme: Evidence from Andhra Pradesh*. IFPRI Discussion Paper 1289. Washington, D.C.: International Food Policy Research Institute (IFPRI). http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/127809

Demirguc-Kunt, A., & Klapper, L. (2012). *Measuring financial inclusion: The Global Findex database* (World Bank Policy Research Working Paper, No. 6025). Washington, DC: World Bank.

Demirguc-Kunt, A., Klapper, L., Singer, D., & Oudheusden, P. V. (2015). *The Global Findex database 2014: Measuring financial inclusion around the world* (World Bank Policy Research Working Paper, No. 7255). Washington, DC: World Bank.

Di Bartolomeo, G., & Rossi, L. (2007). Effectiveness of monetary policy and limited asset market participation: Neoclassical versus Keynesian effects. *International Journal of Economic Theory, 3*(3), 213–218.

Filardo, A., Genberg, H., & Hofmann, B. (2014). *Monetary analysis and the global financial cycle: An Asian central bank perspective* (BIS Working Paper No. 463). BIS. Basel

Fuhrer, J. C. (2000). Habit formation in consumption and its implications for monetary-policy models. *American Economic Review, 90*, 367–390.

Fuhrer, J. C., & Rudebusch, G. D. (2004). Estimating the Euler equation for output. *Journal of Monetary Economics, 51*(6), 1133–1153.

Galí, J. J., López-Salido, D., & Vallés, J. (2004). Rule-of-thumb consumers and the design of interest rate rules. *Journal of Money, Credit and Banking, 36*(4), 739–763.

Global Partnership for Financial Inclusion. (2014). *2014 Financial inclusion action plan*. http://gpfi.org/sites/default/files/documents/2014_g20_financial_inclusion_action_plan.pdf

Han, R., & Melecký, M. (2013). *Financial inclusion for financial stability: Access to bank deposits and the growth of deposits in the global financial crisis* (World Bank Policy Research Working Paper, No. 6577). Washington, DC: World Bank.

Hannig, A., & Jansen, S. (2010). *Financial inclusion and financial stability: Current policy issues* (ADBI Working Paper, No. 259). ADBI. Tokyo

Jacoby, H. G. (2013). *Food prices, wages, and welfare in rural India* (World Bank Policy Research Working Paper No 6412). Washington, DC: World Bank.

Jayachandran, S. (2006). Selling labor low: Wage responses to productivity shocks in developing countries. *Journal of Political Economy, 114*(3), 538–575.

Khan, H. R. (2011, November 4). *Financial inclusion and financial stability: Are they two sides of the same coin?* Address at BANCON 2011, Chennai.

Love, I., & Zicchino, L. (2006). Financial development and dynamic investment behaviour: Evidence from panel VAR. *Quarterly Review of Economics and Finance, 46*(2), 190–210.

Mehrotra, A., & Yetman, J. (2014). *Financial inclusion and optimal monetary policy* (BIS Working Paper, No. 476). BIS. Basel.

Mehrotra, A., & Yetman, J. (2015). Financial inclusion: Issues for central banks. *BIS Quarterly Review*, *March*: 83–96.

Morgan, P., & Pontines, V. (2014). *Financial stability and financial inclusion* (ADBI Working Paper, No. 488). ADBI. Tokyo.

Motta, G., & Tirelli, P. (2010). *Rule-of-thumb consumers, consumption habits and the Taylor principle* (Working Paper No. 194). Milano: University of Milano-Bicocca.

People's Bank of China. (2007, Quarter Two). *China monetary policy report*. Beijing : Monetary policy analysis group of the People's Bank of China.

Prasad, E. S. (2014). Distributional effects of macroeconomic policy choices in emerging market economies. *IMF Economic Review, 62*, 409–429.

Qin, D., Xu, Z., & Zhang, X. (2013). *How much has private credit lending reacted to monetary policy in China? The case of Wenzhou* (SOAS Department of Economics Working Paper No. 178). SOAS Department of Economics. London.

Rosenzweig, M. R., & Wolpin, K. I. (1993). Credit market constraints, consumption smoothing, and the accumulation of durable production assets in low-income countries: Investments in bullocks in India. *Journal of Political Economy, 101*(2), 223–244.

Sriram, M. S., Chaturvedi, V., & Neti, A. (2012). *Too big to fail versus too small to be counted* (BIS Papers No. 62, pp. 93–118). BIS. Basel.

Subbarao, D. (2012). *Financial regulation for growth, equity and stability in the post-crisis world*. Inaugural address at the CAFRAL-BIS conference on "Financial Sector Regulation for Growth, Equity and Stability in the Post-Crisis World," Mumbai, November 15, 2011.

Tombini, A. (2012, October 29). *Opening remarks*. IV Fórum Banco Central sobre Inclusão Financeira, Porto Alegre.

Walsh, J. P. (2011). *Reconsidering the role of food prices in inflation* (IMF Working Paper No. 11/71). IMF. Washington, D.C.

Woodford, M. (2003). *Interest and prices: Foundations of a theory of monetary policy*. Princeton University Press: Princeton, NJ.

Zeti, A. A. (2005, December 12). *Enhancing financial literacy for sustained economic prosperity*. Dinner address at the Citigroup-INSEAD Financial Education Summit, Kuala Lumpur.