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Monetary transmission in low-income countries: An overview

Peter J. Montiel

Employment and Labour Market Policies Branch

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Preface

The primary goal of the ILO is to work with member States towards achieving full and productive employment and decent work for all. This goal is elaborated in the ILO Declaration 2008 on *Social Justice for a Fair Globalization*,[1] which has been widely adopted by the international community. Comprehensive and integrated perspectives to achieve this goal are embedded in the Employment Policy Convention of 1964 (No. 122), the *Global Employment Agenda* (2003) and – in response to the 2008 global economic crisis – the *Global Jobs Pact* (2009) and the conclusions of the *Recurrent Discussion Reports on Employment* (2010 and 2014).

The Employment Policy Department (EMPLOYMENT) is engaged in global advocacy and in supporting member States in placing more and better jobs at the center of economic and social policies and growth and development strategies. Policy research and knowledge generation and dissemination are essential components of the Employment Policy Department's activities. The resulting publications include books, country policy reviews, policy and research briefs, and working papers. [2]

The *Employment Policy Working Paper* series is designed to disseminate the main findings of research on a broad range of topics undertaken by the branches of the Department. The working papers are intended to encourage the exchange of ideas and to stimulate debate. The views expressed within them are the responsibility of the authors and do not necessarily represent those of the ILO.

Azita Berar Awad
Director
Employment Policy Department

[1] See http://www.ilo.org/public/english/bureau/dgo/download/dg_announce_en.pdf
[2] See http://www.ilo.org/employment.

Foreword

The paper starts with the premise that, throughout the world, monetary policy has come to bear primary responsibility for short-run macroeconomic stabilization. In order to perform this function, however, monetary policy must have the capacity to exert a reliable influence on aggregate demand. This is known as the monetary policy transmission mechanism.

In the context of high-income economies, there is general consensus on how the monetary policy transmission mechanism works. It links monetary policy to aggregate demand through a variety of channels (such as the interest rate and exchange rate channel). A substantial amount of empirical work conducted over the last two decades confirms these theoretical predictions for high-income economies.

Theory suggests that the monetary policy transmission mechanism operate very differently in low-income countries because of their particular institutional features such as poor linkages with private international financial markets, the widespread use of fixed exchange rate regimes and very small and illiquid securities markets. The key transmission channel in the context that characterizes many low-income countries, therefore, must operate through bank lending.

The effectiveness of this channel is also problematic under low-income country conditions. The paper then reviews a growing body of empirical evidence investigating the effectiveness of monetary transmission in low-income economies in a comparative context. Empirical work undertaken by this author with others suggest that strong effects of monetary policy shocks on bank lending rates are found for high-income countries and somewhat less so for emerging economies, but not for low-income ones.

To the extent that these findings accurately represent the facts on the ground, there are potentially important policy implications. First, excessive monetary activism should be avoided. Second, inflation targeting should be adopted with care, since central banks in countries with weak and unreliable transmission may have difficulty hitting their targets. Third, if monetary transmission is indeed weak and unreliable, the value of monetary autonomy as a consideration in evaluating the desirability of adopting capital account restrictions or freely floating exchange rates is diminished. Finally, since macroeconomic stabilization has been shown to be an important growth determinant, the value of institutional reforms that would enhance the effectiveness of monetary policy as a stabilization instrument is enhanced.

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Executive Summary

Throughout the world, monetary policy has come to bear primary responsibility for short-run macroeconomic stabilization. This is as true in low-income economies as it is in high-income and emerging ones. In order to perform this function, however, monetary policy must have the capacity to exert a reliable influence on aggregate demand. The links between the monetary policy actions and aggregate demand is referred to as the monetary policy transmission mechanism.

In the context of high-income economies, there is general consensus on how the monetary policy transmission mechanism works. It links monetary policy to aggregate demand through a variety of channels, including through both short- and long-term real interest rates on marketable securities as well as on commercial bank lending rates, through the premium that borrowers have to pay over risk-free interest rates, through the exchange rate, and through asset values in equity and real estate markets. In the case of contractionary policy, for example, theory suggests that the sale of Treasury bills by the central bank reduces aggregate demand by increasing both short-term and long-term interest rates, increasing bank lending rates (or reducing bank loan supply), increasing the premium that borrowers have to pay over safe lending rates, appreciating the real exchange rate, and reducing both equity and real estate values. A substantial amount of empirical work conducted over the last two decades, primary based on VARs, confirms these theoretical predictions for high-income economies.

Theory suggests that the monetary policy transmission mechanism must operate very differently in low-income countries. First, such countries are typically poorly linked with private international financial markets, and the majority operate fixed exchange rates. This means that monetary policy actions will tend to have limited effects on the exchange rate. Second, because of institutional deficiencies that leave the costs of overcoming asymmetric information problems and enforcing contracts very high, securities markets tend either not to exist, or to be small and illiquid when they do. Thus monetary policy cannot affect aggregate demand by influencing the interest rates on marketable securities or to exert wealth effects on private spending through equity and real estate markets. The key transmission channel in the context that characterizes many low-income countries, therefore, must operate through bank lending.

However, the effectiveness of this channel is problematic under low-income country conditions. First, the formal financial sector tends to be small, so much of the economy does not transact with banks. This means that even if monetary policy is able to affect the conditions on bank lending, impacts on aggregate demand may be muted. Second, there are reasons to believe that the effects of monetary policy on bank lending may themselves be weak and unreliable. They may be weak because the marginal borrower in the low-income setting is likely to be a small and opaque microenterprise with little effective collateral to offer, making the costs of servicing such borrowers high. The implication is that the marginal cost-of-lending curve faced by banks is likely to be steep in the vicinity of the profit-maximizing equilibrium. If so, vertical displacements in this curve caused by monetary policy would tend to have limited effects on loan supply. Policy effects may be unreliable, on the other hand, because the oligopolistic structure of banking in many low-income countries suggests that the responses of individual banks to monetary policy actions will depend on game-theoretic considerations that are likely to be highly context-specific.

There is a growing body of empirical evidence investigating the effectiveness of monetary transmission in low-income economies. At the simplest level, some studies have examined pass-through from central bank policy rates to bank lending rates. Mishra, Montiel and Spilimbergo (2012), for example, found that such pass-through was significantly weaker in low-income countries than in high-income and emerging ones. More sophisticated VAR studies for individual countries, in contrast with results for high-income countries, have typically not been able to find strong, reliable, and theory-consistent

effects of monetary policy actions on aggregate demand, as measured by indicators such as the price level and the level of real output (see the recent survey by Mishra and Montiel 2013). Finally, while the identifying restrictions imposed in many of these studies may be questionable, an attempt to use less problematic long-run restrictions based only on monetary neutrality in a heterogeneous panel context by Mishra, Montiel, Pedroni and Spilimbergo (2014) produced similar results: strong and theory-consistent effects of monetary policy shocks on bank lending rates were found for high-income countries and somewhat less so for emerging economies, but not for low-income ones.

It remains possible, of course, that data problems (short spans of noisy data characterized by frequent structural shifts in low-income countries) and methodological problems (misspecification and improper identifying restrictions) may account for these results. Accordingly, there is an urgent need to continue to meet these research challenges in empirical studies of the effectiveness of monetary transmission in low-income countries.

However, to the extent that these findings accurately represents the facts on the ground, there are potentially important policy implications. First, excessive monetary activism should be avoided. This means that Taylor rules should be less responsive to inflation-target and GDP gaps in low-income countries with weak and unreliable transmission than in high-income ones. In turn, this implies putting a higher premium on the potential use of fiscal and exchange rate policies as stabilization instruments. Second, inflation targeting should be adopted with care, since central banks in countries with weak and unreliable transmission may have difficulty hitting their targets. If adopted, the regime should not be overly ambitious about how quickly and with what precision the target will be hit. Third, if monetary transmission is indeed weak and unreliable, the value of monetary autonomy as a consideration in evaluating the desirability of adopting capital account restrictions or freely floating exchange rates is diminished. Finally, since macroeconomic stabilization has been shown to be an important growth determinant, the value of institutional reforms that would enhance the effectiveness of monetary policy as a stabilization instrument – already high on other grounds – is enhanced.

1. Introduction

Throughout the world, the primary responsibility for conducting short-run macroeconomic stabilization has tended in recent years to fall to central banks. Fiscal policy has often been constrained by concerns for fiscal sustainability, or rendered too rigid by parliamentary conflicts over the distribution of fiscal benefits, to allow the active use of fiscal policy for stabilization purposes, except under extreme circumstances such as in the early stages of the Great Recession. The use of the exchange rate as a discretionary stabilization instrument also fell out of favor during the 1990s as the consequence of the "bipolar view" of exchange rate regimes, which maintained that officially-determined exchange rates with an "opt-out clause" (i.e., policy discretion) were untenable in a world of high capital mobility. Even under the managed exchange rate regimes that have been adopted by many emerging economies, "management" tends to refer to the role of the exchange rate as one of the objectives of monetary policy, rather than as an independent policy instrument in its own right. In short, monetary policy has become the instrument of choice for stabilizing the economy in response to exogenous shocks.

Whether monetary policy can effectively perform this role, however, even in the hands of a competent central bank, depends on its ability to influence aggregate demand – i.e., on the strength and reliability of the monetary transmission mechanism. In the context of high-income countries, it has become widely accepted that outside of highly-unusual "liquidity trap" circumstances, monetary policy as conventionally conducted can have powerful effects on aggregate demand. The prestige of the Fed, the ECB, the Bank of England and other OECD central banks largely derives from this consensus. Even in exceptional "liquidity trap" circumstances unconventional monetary policies (e.g., in the guise of "quantitative easing") are perceived as making potentially strong contributions to the reactivation of economic activity (though this is more controversial). The consensus on the effectiveness of conventional monetary policy under normal circumstances has been reached on the basis of both theory and evidence. Theory suggests various channels through which monetary policy can influence aggregate demand, and the evidence – primarily in the form of VARs -- has frequently (after some initial bumps) uncovered effects consistent with those predicted by theory.1

In low-income countries (LICs) the role of the central bank in short-run economic stabilization is, if anything, more central than that in high-income countries, in part because in contrast with high-income countries fiscal policy has tended to be pro-cyclical, and in part because the central bank tends to be the locus of macroeconomic expertise in LICs. Yet much less is known – either theoretically or empirically – about the effectiveness of monetary transmission in LICs. This paper takes stock of where we stand on this issue. Its central message is that there are strong theoretical reasons to expect the channels of monetary transmission to be quite different in LICs from what they are in high-income economies, and reasons as well to fear that the predominant channel of monetary transmission in such countries, the bank lending channel, could prove to be weak and unreliable. If that is the case, the overall strength and reliability of monetary transmission in LICs would be called into question. For reasons discussed below, the jury is still out on whether this is so. If true, however, it has diverse and important implications for policy.

The structure of the paper is as follows: the next section reviews the standard description of monetary transmission as applied to high-income economies, provides a brief description of the evidence supporting effective transmission in that context, and notes the institutional underpinnings for the various transmission channels comprising the standard view. Section 3 considers the important ways in which the institutional and macroeconomic environment in a "typical" LIC differs from that assumed in the standard textbook

[1] Boivin et. al. (2010) and Coibion (2012), for example, provide recent overviews of the evidence for the United States.

description, and what the implications of those differences are for monetary transmission. The key finding in that section is that transmission in the LIC context is likely to operate predominantly through the bank lending channel. Section 4 then considers what the characteristics of the LIC environment may imply for the strength and reliability of that channel. The existing evidence on the strength and reliability of monetary transmission in LICs is reviewed in section 5. While the evidence is not conclusive for both data and methodological reasons, the surprising scarcity of evidence supporting strong and reliable transmission in LICs suggests that the proposition that transmission may instead be weak and unreliable in many LICs deserves to be taken seriously. The policy implications of that perspective are drawn out in section 6. Section 7 summarizes and concludes.

2. Monetary Transmission in High-Income Countries: Theory and Evidence

2.1 Channels of transmission in the textbook model

The standard textbook description of monetary transmission in high-income countries proceeds as follows:

If the objective of the central bank is to restrain aggregate demand, it sells short-term government securities in a liquid secondary market. This has the effect of contracting the size of the central bank's balance sheet. The buyers of those securities are either commercial banks themselves or individuals and institutions who pay for them by drawing on their commercial bank balances, so in either case commercial banks experience a contraction in their reserve holdings. Although bank liabilities in the form of deposits contract by a similar amount, fractional reserve banking implies that the reduction in bank reserve holdings exceeds the reduction in their demand for reserves due to their reduced deposit liabilities. In the presence of an active interbank market, the resulting reserve scarcity increases the interbank rate. That rate is most often the variable that central banks explicitly target as their operating instrument.

The increase in the interbank rate makes interbank lending relatively attractive for commercial banks compared to holding highly-liquid short-term government securities. The resulting reduced demand for those securities by commercial banks causes their yield to rise, inducing a widespread increase in money-market rates, since such rates are closely related to the yields on short-term government securities. Since money market rates represent the opportunity cost to the public of holding commercial bank deposits, the increase in the rate will reduce the demand for deposits, and through it the total demand for the monetary base. In equilibrium, the increase in the money market rate must be such that the reduced demand for the monetary base exactly offsets the reduced supply of base caused by the central bank's open-market sale. Under sticky prices and rational expectations, this higher nominal short-term interest rates becomes a higher short-term *real* interest rate, and the increase in the short-term real interest rate induces households to steepen their consumption profiles, deferring current consumption in favor of future consumption. The resulting contraction in aggregate household consumption demand constitutes the *short-term interest rate channel* of monetary transmission.[2]

To the extent that the central bank is perceived as seeking a *persistent* increase in money market rates, arbitrage across the term structure in liquid securities markets will cause real *long-term* bond rates to rise as well, discouraging long-lived investments in physical capital and residential structures. This creates a second channel of monetary

[2] The effectiveness of this channel depends on the degree of intertemporal substitutability in consumption. The higher such substitutability, the more powerful the short-term interest rate channel.

transmission, the *long-term interest rate channel*, which operates primarily on investment spending.

The higher returns available on domestic securities of all maturities encourage banks to hold securities instead of extending loans. The reduced supply of bank loans could take the form of higher bank lending rates and/or increased rationing in the bank loan market. In either case, a separate channel of monetary transmission – the *bank lending channel* -- would be operative to the extent that some subset of bank borrowers is bank-dependent – i.e., cannot access securities markets.[3] Since such borrowers may be households or firms, this channel would operate through both the consumption and investment components of aggregate demand.

The increase in the entire spectrum of domestic interest rates, on both securities and bank loans, would have several other negative effects on aggregate demand. First, to the extent that the capital account is open – at least *de facto* -- the higher domestic interest rates would attract foreign capital to the domestic economy, and to the extent that the exchange rate is at least partially market-determined, the nominal exchange rate would tend to appreciate. Under sticky prices, this nominal appreciation translates into a *real* exchange rate appreciation, inducing substitution on the part both of domestic as well as foreign agents away from purchasing domestic goods and toward the purchase of foreign goods, further decreasing aggregate demand. This *exchange rate channel* operates on the current account component of aggregate demand, inducing a contractionary increase in the current account deficit or reduction in the current account surplus.[4]

Finally, higher long-term domestic interest rates increase the discount factor applying to expected future real estate rental income as well as expected future equity dividends, reducing their present values. In the presence of liquid real estate and equity markets, this will cause real estate prices to decline and stock market values to contract. Coupled with the decreased market value of fixed-coupon securities, the resulting decrease in household wealth reinforces the decline in private consumption, resulting in a *wealth channel* of monetary transmission. In turn, this generalized decline in asset values reduces the value of the collateral that households and firms can offer to lenders (whether borrowing is done by issuing securities or incurring bank loans). This increases the external finance premium that borrowers must pay over and above risk-free market interest rates, discouraging borrowing by both households and firms. This *balance sheet channel* thus creates a financial accelerator – i.e., a factor that magnifies the effects of market interest rates on borrowing costs. Because the bank lending channel and balance sheet channel both rely on the existence of credit market imperfections that make some borrowers bank-dependent and result in a positive external finance premium, they are often jointly referred to as the *credit channel*.

2.2 The evidence

Monetary policy transmission can be thought of as occurring in several steps: from an exogenous central bank action to a variety of endogenous financial market variables such as market interest rates, commercial bank lending rates, exchange rates, and equity as well as real estate prices, from these to aggregate demand, and from aggregate demand to the ultimate macroeconomic variables of interest, such as output and the price level. Empirical work on monetary policy transmission in high-income countries has explored the effects of central bank policy actions both on the financial variables that transmit the effects of those

[3] The standard reference for a model of this channel is Bernanke and Blinder (1988).

[4] It is worth noting that to the extent that domestic agents hold assets or liabilities denominated in foreign exchange, the exchange rate may also affect aggregate demand through a wealth effect (see the next paragraph), and may affect the price level directly through a pass-through effect, likely to be more important in more open economies.

actions to aggregate demand as well as the ultimate effects of those actions on the macroeconomic variables that are of ultimate interest.

Based on Sims' (1980) argument that the exclusion restrictions imposed in standard macroeconomic structural models are literally incredible, this literature has primarily relied on VARs. The literature is vast. A useful summary of results in high-income countries is provided by Kim (1999), who investigates monetary policy effects in the G-7 countries individually, using a common structural identification scheme. He concludes:

> *In response to [contractionary] money supply shocks, initially, the interest rates rise significantly and monetary aggregates fall significantly. The price levels decline smoothly and significantly at least at some horizons. The output levels do not increase significantly. The world export commodity price indices in terms of domestic currency fall significantly. The estimated responses are very close to expected movements of macro-variables in a monetary contraction in most G-7 countries* (p. 398).

There is little debate about the qualitative direction of these effects in the high-income country context, since a large number of studies has confirmed them. There is less agreement about their quantitative magnitude. However, even at the low end the consensus is that the effects are important. Coibin (2012), for example, concludes that an intermediate estimate still implies that a 100 basis point increase in the Federal Funds rate in the United States would result in a peak contraction of two percent in industrial production.

2.3 Institutional underpinnings of the textbook model

The standard description of monetary transmission in high-income countries relies on the existence of liquid and well-functioning markets of several types: a well-functioning and highly liquid interbank market for reserves, a well-functioning and highly liquid secondary market for government securities with a broad range of maturities, well-functioning and highly liquid markets for equities and real estate, and a well-functioning and highly liquid foreign exchange market. Such markets not only exist, are liquid, and function well independently, but are also linked to each other through effective arbitrage relationships. Such arbitrage operates along several margins: between the interbank market and the market for short-term government securities, between domestic short-term and long-term securities, between long-term securities and equities, between domestic and foreign securities, and between domestic financial and real assets. In addition to these characteristics of the domestic financial system the standard description also assumes that monetary policy decisions are made by an independent central bank, that the country is characterized by perfect capital mobility, and that the central bank operates a floating exchange rate.[5]

Such a description is clearly intended to apply to an economy with a highly developed and competitive financial system. As such, it takes as given several aspects of the institutional environment in which the financial sector operates. Most importantly, it assumes a strong institutional setting in which property rights are clear and are effectively enforced, so that borrowers can offer meaningful collateral to lenders. It assumes that accounting standards and disclosure requirements are stringent, so that the activities of borrowers are transparent and credit bureaus can reliably assess borrower creditworthiness. It assumes that the legal framework for the enforcement of creditor rights is well developed,

[5] The relationship between central bank independence and the effectiveness of monetary transmission is subtle. As mentioned, the transmission from short-term to long-term rates depends on agents' interpretation of what an unanticipated change in monetary policy indicates about future monetary policy; this in turn depends on agents' understanding of the central bank's true policy reaction function – i.e., on the central bank's objectives and its credibility. Because central bank independence affects the nature of the bank's policy reaction function, it may be expected to affect agents' interpretation of what current monetary policy implies for expected future monetary policy.

so that bond covenants can be enforced, bankruptcy proceedings are clear and efficient, and shareholder rights are protected. It assumes that financial markets are competitive, including the banking sector, and that the banking sector is well enough regulated that the creditors of banks – including other banks – do not anticipate counterparty risk in the normal course of doing business. It assumes that the country's financial markets are open to foreign borrowers and lenders, both *de facto* and *de jure*, and that the central bank allows wide scope for the market determination of the exchange rate. Finally, it assumes that the domestic economy is populated by a class of borrowers who have sufficient equity in their own enterprises – including established reputations to uphold – and are sufficiently transparent, that they can have regular access to securities markets.[6] Under these conditions credit frictions are minimized, a formal financial system can thrive, and financial intermediation can primarily be conducted through formal financial markets, among which efficient arbitrage relationships can prevail.

As I shall argue below, these conditions are rarely satisfied in low-income countries, which raises doubts about the relevance of the standard textbook description of monetary transmission for such countries. The question is how far off the mark this description is for a "typical" LIC.

3. Are Low-Income Countries different?

In 2010, the IMF classified 134 of its 187 member countries as low-income countries. This is obviously a diverse group of countries, and no generalization is likely to apply to them all. Yet many of these countries share certain features of their financial environments that make the context in which monetary policy operates very different from that described in the last section. In this section I describe these differences and draw out their implications for monetary transmission.

- The prevalence of households at near-subsistence levels of consumption implies that a larger share of consumption is likely to follow hand-to-mouth behavior, leaving a reduced scope for intertemporal substitution in consumption.

Even if households had unrestricted access to the formal financial sector in LICs, it is likely that consumption in the LIC context would be less sensitive to changes in short-term real interest rates, simply because low incomes coupled with subsistence requirements make household saving rates low, leaving little scope to defer consumption to the future or service debt that was accumulated in the past. This implies a reduced sensitivity of aggregate consumption to changes in short-term real interest rates, weakening the short-term interest rate channel.

- LICs are characterized by less independent central banks, a small degree of *de facto* integration with international capital markets, and little exchange rate flexibility

These characteristics of the macroeconomic and policy environment have important implications for the channels of monetary transmission. Specifically, they would fundamentally alter the monetary transmission mechanism in LICs relative to what was described in the last section by restricting the roles of the long-term interest rate, wealth, and exchange rate channels. Reduced central bank independence means in practice that the central bank is more subservient to the wishes of the finance ministry and therefore more sensitive to changes in the political environment. The upshot is that current central bank actions become less reliable predictors of future central bank actions than would be the case under an independent central bank with a stable policy reaction function. This reduces the strength of the links between the current money-market interest rates that the central bank

[6] The fact that not *all* domestic borrowers possess these characteristics – and therefore can access such markets -- is what creates the scope for a separate bank lending channel for monetary transmission.

can (in principle) influence directly and the long-term interest rates that are more relevant to investment decisions, undercutting the long-term interest rate channel. At the same time, since long rates underpin asset pricing in equity and real-estate markets, weak links between short-term policy rates and long-term rates undermine the wealth channel of transmission. On the other hand, weak links with international capital markets imply limited arbitrage between domestic and foreign securities and therefore reduced sensitivity of capital flows to changes in domestic interest rates. Coupled with the prevalence among LICs of exchange rate regimes that allow very limited scope for exchange rate flexibility (see Montiel 2011), this implies that the exchange rate channel is unlikely to be an important channel of monetary transmission in many low-income countries.

- The quality of the institutional and regulatory environment is poor

At the most fundamental level, the institutional environment in low-income countries is much weaker than that in high-income countries. This is not simply a generality: poor institutional quality (political instability, poor accountability, weak property rights, a poorly functioning legal system) can be expected to affect both the size of the financial sector as well as the environment in which it operates, by increasing the costs of financial intermediation.

Asymmetric information and opportunistic behavior make financial intermediation a costly activity. It involves incurring brokerage, loan evaluation, loan monitoring, and contract enforcement costs. It is precisely these costs that make external finance more expensive than self-finance, and generate a corresponding "external finance premium." The magnitude of these costs – and therefore that of the premium -- depends on the economy's institutional environment. The clearer and more secure are property rights, the more stringent are accounting and disclosure standards, the less prevalent is corruption, the clearer are creditor rights, and the more honest and efficient the judiciary, the smaller these costs should be.[7] As shown in Table 1, indicators of the quality of institutions that are relevant for reducing the costs of financial intermediation, such as transparency indicators, indicators of property rights, the rule of law, control of corruption, effectiveness of the judiciary, and effectiveness of contract enforcement, are much weaker in low-income countries than in high-income ones. The implication is that brokerage costs, loan evaluation costs, loan monitoring costs, and costs of contract enforcement, are likely to be much higher in low-income countries than in high-income ones.

- Securities markets are small, poorly developed, and illiquid

Governments in low-income countries are generally unable to issue long-term securities domestically. Consequently, there is no observable market-based term structure, which creates more uncertainty about future short term interest rates. There is no active secondary market for government securities of any maturity, so the shorter-term securities that governments issue tend to be absorbed by banks, who hold them to maturity. Thus central banks cannot conduct monetary policy through open-market operations in liquid secondary market for securities. Instead, monetary policy is conducted through purchase and sale of Treasury bills at primary auctions and/or through the amounts and terms of credit extended by the central bank to commercial banks (rediscounts).

[7] De Soto (1990) placed the role of insecure property rights in restricting access to credit in poor countries at the heart of the development challenge.

Table 1. Cross-Country Indicators of Institutional Quality

	High income	Low income
Institutional quality* (2.5 = high, -2.5 = low)		
Rule of law	1.47	-0.51
Political stability and absence of violence	0.92	-0.31
Voice and accountability	1.08	-0.34
Government effectiveness	1.44	-0.52
Regulatory quality	1.34	-0.45
Control of corruption	1.54	-0.49
Property rights and contract enforcement**		
Security of property rights (0 = low, 4 = high)	3.56	1.60
Land tenure insecurity (0 = low, 4 = high)	0.44	2.77
Security of private contracts (0 = low, 4 = high)	3.67	1.89
Functioning of the justice system (0 = poor, 4 = efficient)	3.37	1.68
Transparency**		
Standardization of accounting information (0 = poor, 4 = good)	3.70	1.75
Information on firms' capital (0 = none, 4 = good)	3.23	1.00
Accounting information on banks (0 = unreliable, 4 = reliable)	3.88	2.33
Creditor protection**		
Insolvency law (0 = no procedure, 4 = efficient)	3.22	1.23

Sources: * Kaufman, Kraay and Mastruzzi (2009); **Institutional Profiles Database

Since the institutional setting described in the previous bullet makes financial intermediation for the private sector a much more costly activity in low-income than in high-income countries, we would expect the formal financial system to look very different in low-income countries from that in high-income ones. In particular, we would expect banks to dominate the formal financial sector in LICs, in preference to arms-length securities markets. The reason is that banks are institutions that specialize in acquiring and processing financial information that is not otherwise publicly available. Purchasers of marketable securities, by contrast, do not make such investments. They rely on publicly-available information and on information that is made available to the public at large by prospective sellers of securities. It is this shared information that makes securities marketable. The scarcity of such information as well as of mechanisms for enforcing bondholder rights would lead us to expect securities markets to be much smaller in LICs than in countries with more conducive institutional arrangements.

The facts bear this out. As Table 2 indicates, the primary securities markets in LICs are dominated by government issues: private firms are unable to issue marketable bonds to domestic buyers. The implication is that the long-term interest rate channel as commonly understood – i.e., as operating through interest rates on long-term marketable securities rather than through bank loans – is inoperative. Moreover, few firms are listed in domestic stock markets, listed firms tend to be closely held because of deficiencies in stockholder protection, and the shares of listed firms are not actively traded. With limited recourse to the issuance of bonds or equity, domestic firms that do not have access to foreign funds thus tend to rely on self-financing or bank loans.

Table 2. Cross-Country Indicators of Security Market Development

	High income	Low income
Policies to promote securities market development (index)*	1.00	0.56
Bond market development**		
Private bond market capitalization/GDP	0.51	0.00
Public bond market capitalization/GDP	0.46	0.43
Stock market development**		
Stock market capitalization to GDP (%)	0.90	0.27
Number of listed companies per 10,000 people	0.43	0.23
Stock market turnover ratio (value traded/capitalization) (%)	0.79	0.02

Sources: * IMF Structural Reforms Database; ** World Development Indicators

Finally, real estate markets are highly illiquid, so real estate values in low-income countries are not easily marked to market. The absence of active and liquid markets in bonds, stocks and real estate tend to short-circuit the wealth channel.

- Money and interbank markets are poorly developed

The same institutional deficiencies that militate against the development of liquid securities markets tend to stunt the development of interbank markets. In particular, a generalized lack of transparency results in mutual distrust among banks and increases perceptions of counterparty risk. Coupled with the fact that, for reasons to be described below, unlike banks in high-income countries, banks in developing countries tend to have chronic excess reserves, this results in limited development of interbank markets. The upshot is that central bank policy actions are not immediately registered in interbank rates.[8]

In short, the small scope for intertemporal substitution in consumption on the part of LIC households, the absence or poor development of securities markets, the small size and illiquid condition of markets for assets and real estate, the imperfect degree of integration with international financial markets and prevalence of fixed exchange rates that tend to characterize low-income countries, together suggest that the short-run and long-run interest rate channels, the wealth channel, and the exchange rate channel are all likely to be relatively weak under the conditions that characterize many LICs. Under these conditions, therefore, we would expect the bank lending channel to take center stage – at least in relative terms. It is important to emphasize, however, that *a priori* reasons to expect other channels of transmission to be weak do not create a presumption that monetary transmission itself would necessarily be weak in the "typical" LIC environment, since a relatively stronger bank lending channel could in principle more than compensate for relative weakness in other transmission channels. Accordingly, I now turn to factors that may affect the strength of the bank lending channel in LICs.

- While the formal financial sector tends to be dominated by banks in LICs, the formal banking sector tends to be small relative to the size of the economy.

As shown in Table 3, while financial intermediation in low-income countries is indeed dominated by banks, the formal banking sector in such countries is on average much smaller, as measured by the ratio of bank assets to GDP, or by the availability of branch

[8] For case study evidence, see IMF (2005). However, while this affects the information environment in which central banks operate (changes in demand for liquidity tend to be observable only at Treasury auctions and at the discount window), it need not have implications for the effectiveness of monetary transmission.

banks, than in high-income countries. Non-bank financial intermediaries also play a much smaller role, so that credit to the private sector from the entire formal financial system, as well as the number of adults with accounts in the formal financial system, are both much smaller in LICs than in HICs. Recall that the transmission mechanism proceeds in two steps: from central bank actions to financial variables, and from financial variables to aggregate demand. When the formal financial sector is small, much of the economy does not interact with the sector. Therefore, any effect of monetary policy on formal financial sector variables (e.g., bank loan rates) would have weaker effects on aggregate demand than when formal financial intermediation is extensive. In other words, the second step in money transmission – as captured by the elasticity of aggregate demand to formal financial sector variables – would tend to be weak when the formal financial sector is small.

Table 3. Cross-Country Indicators of the Size of the Formal Banking Sector

	High income	Low income
Size of banks and other financial intermediaries*		
Ratio of deposit money bank assets to GDP (%)	129.66	19.58
Bank branches per 100,000 adults (commercial banks)	30.12	2.92
Ratio of non-bank financial institutions assets to GDP (%)	17.70	0.13
Ratio of private credit by deposit money banks and other financial institutions to GDP (%)	111.59	15.53
Adults with an account at a formal financial institutions to total adults (%)	93.05	14.35

Source: World Development Indicators, 2014

- Competition in the banking sector tends to be weak in LICs

As already mentioned, banks in LICs tend to face little competition from non-bank financial intermediaries. In addition, the limited degree of LIC integration with international financial markets also restricts the amount of competition that domestic banks are exposed to from foreign bank or nonbank financial institutions. Within the industry itself, the banking sector in LICs is often more concentrated than that in high-income countries, with a small number of banks controlling a large share of banking sector assets and deposits (Table 4). Bank competition is also limited in LICs by a larger preponderance of state-owned banks. Table 4 shows that although banks in LICs tend to face higher costs of doing business than their counterparts in LICs (partly because of the institutional deficiencies highlighted above), they also tend to operate with substantially higher net interest margins and greater returns to equity than their HIC counterparts. The relevance of this observation for monetary transmission is discussed in the next section.

Table 4. Cross-Country Indicators of Competition in the Banking Sector

	High income	Low income
Industrial structure of banking system*		
Cost to income ratio (percent)	54.30	62.42
Bank concentration	0.67	0.73
Net interest margin (%)	0.02	0.06
Return on equity (10 year average)	11.96	15.83

Source: World Development Indicators, 2014

- The production sector in LICs tends to be dualistic

Firms in low-income countries tend to cluster at the extremes of the size distribution – i.e., a large number of very small firms coexist with a small number of very large ones. Tybout (2000) has dubbed this phenomenon the "missing middle" in industrial structure and has documented it for the manufacturing sector of a large number of developing countries. As he notes, the prevalence of small firms is likely to be even larger in the agricultural and service sectors. Two characteristics of very small firms tend to make them particularly costly to lend to: they tend to be less capital-intensive than larger firms and so have less collateral to offer, and in many cases firms stay small to be less visible to the regulatory and tax authorities, making them more opaque bank customers. Not surprisingly, small firms tend to rely heavily on informal financial markets.

4. The bank lending channel in LICs: Theory

In short, even though the bank lending channel is likely to be the dominant channel for monetary transmission in LICs, the institutional environment in such countries is such that the formal banking sector is relatively small. This tends to weaken the second step in monetary transmission – that from bank lending (loan rates and/or loan supply) to aggregate demand. In this section I consider how the first step in monetary transmission through the bank lending channel – that from central bank policy actions to bank lending – is likely to operate in the LIC environment.

As noted in the last section, the environment in which banks operate in LICs is characterized by severe credit-market frictions in the forms both of asymmetric information as well as of high costs of contract enforcement, making financial intermediation a costly activity. Potential bank loan customers exhibit dualism in size, with smaller firms possessing less collateral as well as being more opaque. The banking sector in such countries faces little external competition, either from domestic non-bank institutions or from foreign bank or nonbank institutions. Finally, competition is also limited within the banking sector.

How should we expect these characteristics to influence the effects of monetary policy on bank lending? A simple framework helps to answer this question. Suppose that a bank's cost of making the quantity of loans L, given by C(L), can be described as:

$$C(L) = R_B L + F(L),$$

1) where R_B is the marginal cost of funds to the bank, given by the opportunity cost of lending in the form of the Treasury bill rate, determined by monetary policy through T-bill auctions in which banks participate as perfect competitors. F(L) is the loan production function, capturing the costs of activities such as loan evaluation, monitoring, and contract enforcement (i.e., what banks do), with $F' > 0$ and $F'' > 0$. The shape of F( ) depends on the severity of credit frictions as well as on the characteristics of the bank's loan clientele. The convexity of the loan production function – i.e., its positive second derivative -- arises from cost-minimizing behavior

by banks: banks first extend loans to customers that are less costly to service (transparent borrowers with good collateral) and place less desirable borrowers at the end of the lending queue. In this setting the marginal cost of lending is given by:

$$MC(L) = R_B + F'(L).$$

(2) When low-cost borrowers are plentiful, F' will tend to be constant and small for a wide range of L, but as the bank begins to extend loans beyond these favored customers, F' will begin to increase and will do so more sharply the more opaque and less well endowed with collateral is the marginal borrower. Under the dualistic production structure described in the last section, we would expect $F'' >> 0$, since extending loans to opaque microenterprises is an expensive proposition for banks – i.e., under these conditions, the marginal cost of lending tends to be relatively flat over the range of lending to large firms and then to quickly become very steep when lending is extended to smaller firms.

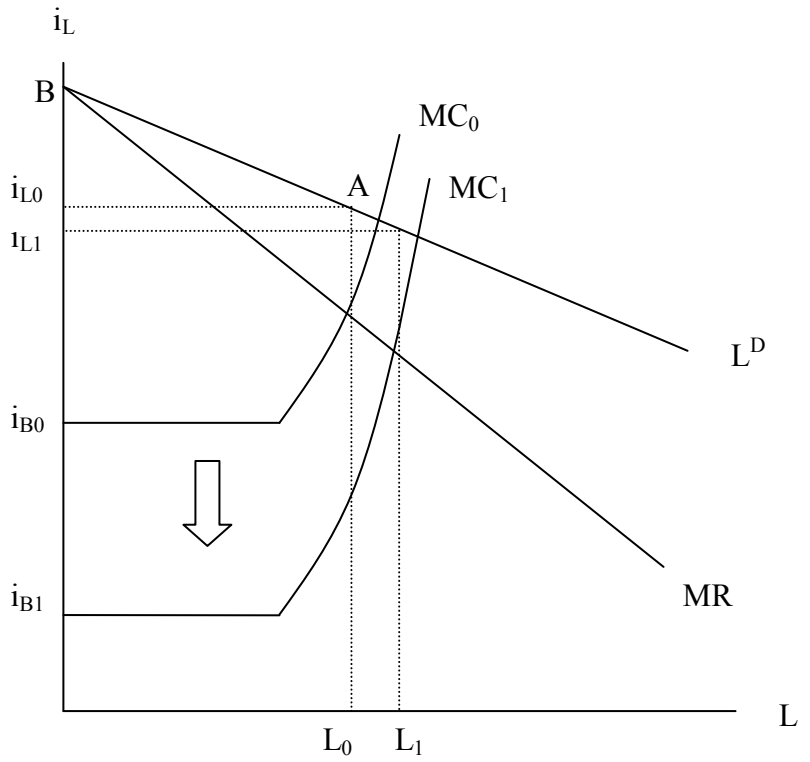
To capture the role of imperfect competition in the banking sector, assume that the sector is monopolistically competitive. Figure 1 depicts a profit-maximizing equilibrium for a bank possessing some monopoly power and operating in a LIC-type environment.[9] Its marginal cost curve MC_0 has a flat range corresponding to loans that are extended to large, relatively transparent firms, but then a sharply rising range when the intermediary extends its lending to small and opaque borrowers. The degree of monopoly power enjoyed by the bank determines the slopes of the demand and marginal revenue curves that it faces, with more monopoly power being associated with steeper slopes. The bank maximizes profits where marginal revenue equals marginal cost, extending loans in the amount L_0 and charging the loan rate i_0.

Monetary policy determines T-bill rates and thus the opportunity cost of funds to financial intermediaries, causing the bank's marginal cost curve to shift vertically (e.g., in the case of a monetary expansion, to MC_1 in Figure 1). Now consider the effects of such a shift on bank lending rates. First, given the MR curve, the steeper the MC curve (the larger F''), the smaller the effect of a vertical shift of the MC curve on total loan volume and therefore on the loan rate. At the extreme, if the MC curve is vertical at the initial profit-maximizing point, loan volumes and lending rates would be unaffected. Thus, if a marginal borrower is a microenterprise, as is likely to be the case under the dualistic production structure characteristic of LICs, monetary policy actions are unlikely to have much effect on bank lending rates. Banks would simply absorb the additional resources made available by monetary expansions into reserves and release the additional resources required by monetary contractions from their reserve holdings.

Now consider the role of the degree of competition in the formal financial sector. For a given shape of the marginal cost curve for each bank, the less competitive the financial sector (the steeper the demand curve facing each individual bank), the less responsive the supply of funds will be to changes in monetary policy. To see this, imagine rotating the loan demand curve L^D in a clockwise direction around the point A in Figure 1. Doing so makes the loan demand curve steeper, decreasing its elasticity and increasing the bank's degree of monopoly power. As L^D become steeper, the point B moves vertically upward along the vertical axis, and MR becomes steeper as well. Consequently, the profit-maximizing points of intersection between marginal revenue and marginal cost move to the southwest along their respective marginal cost curves MC_0 and MC_1. The effect is to narrow the *horizontal* distance between those points, thereby reducing the expansion of the bank's loans for a given reduction in its opportunity cost of funds.

[9] For simplicity, I ignore the general-equilibrium implications of monopolistic competition here, but see Mishra et al (2014).

Figure 1. Financial Frictions, Monopoly Power, and Monetary Transmission



In short, there are theoretical reasons to believe that the LIC financial environment is one in which the strength of monetary transmission depends heavily on that of the bank lending channel, but at the same time, the same environment provides reasons to suspect that the bank lending channel may be weak. Importantly, in addition to being weak, the channel may also be unreliable.

Reliability would tend to be most in question when the bank lending channel is dominant and the banking industry is noncompetitive. When the bank lending channel is dominant, monetary transmission depends heavily on the reaction of banks to monetary policy shocks. If the banking sector is oligopolistic rather than monopolistically competitive as in the simple model of this section, the reactions of banks to changes in their marginal cost of funds triggered by monetary policy actions would tend to depend on game-theoretic considerations that are likely to be sensitive to the macroeconomic and financial conditions prevailing at the time that the monetary policy action is undertaken. This context dependence would tend to make it difficult for the central bank to predict the banking sector's response to monetary policy actions.

Taken together, these observations suggest the possibility of both weak and unreliable monetary transmission in LICs. But because the full spectrum of conditions that yield this result may not hold in many cases (e.g., LICs differ in their quality of institutions, in their degree of financial market development, in their exchange rate regimes, in the competitiveness of their banking sectors, and so on), the issue of the effectiveness of monetary transmission in LICs is an empirical one. What is certain is that there can be no presumption of effective transmission under typical LIC conditions, and that empirical evidence on the effectiveness of transmission derived from high-income countries is uninformative about monetary transmission in LICs. To assess the effectiveness of monetary transmission in low-income countries, therefore, what we require is direct empirical evidence from LICs themselves.

5. Monetary Transmission in Low-Income Countries: Evidence

There is a substantial amount of such evidence. It takes various forms, examining the effects of central bank monetary policy actions on financial variables such as bank lending rates, on the effects of financial variables on indicators of aggregate demand, and of the ultimate effects of central bank policy actions on aggregate demand indicators, without considering the intervening effects on financial variables. Because the interpretation of LIC evidence is complicated by data and methodological issues, before turning to that evidence I first examine what micro-based evidence from high-income countries teaches us about factors influencing the strength of the bank lending channel. My purpose is to establish the proposition that the strength of that channel cannot be taken as given, but depends on characteristics of the environment in which banks operate as well as characteristics of the banks themselves, making the effectiveness of the channel in the specifically LIC environment an open question.

5.1 Bank characteristics and the bank lending channel in high-income countries

A classic study by Kashyap and Stein (2000) uses micro data for individual banks to investigate the impact of monetary policy on bank lending in the United States. They find that this impact differs across banks, and depends systematically on several bank characteristics. Most relevant for current purposes, transmission tends to be weaker for banks with more liquid balance sheets -- i.e., banks with highly liquid balance sheets are unlikely to pass on changes in policy interest rates to their lending rates. This finding is confirmed by studies on the Euro area. Ehrmann et al. (2001), in a comprehensive study of the structure of banking and financial markets in the Euro area, find that the effect of monetary policy on the supply of bank loans is most dependent on the liquidity of individual banks. Similarly, summarizing the evidence from several individual country studies, Angeloni et al. (2003) conclude that banks' liquidity position seems to be an important determinant of the strength of the bank-lending channel in the Euro area.

This evidence suggests that where banks opt to remain highly liquid, the bank lending channel tends to be weak. In other words, the characteristics of the environment in which they operate that induce banks to hold high levels of liquidity also tend to be conducive to weakness in the bank lending channel. This is consistent with the model of the last section: if the marginal costs of information-intensive lending to the private sector begin to rise steeply after banks extend a relatively small amount of such loans, the asset side of bank balance sheets will tend to be dominated by government securities, rather than loans. In high-income countries, this would be interpreted as high liquidity, since such securities can readily be traded in secondary markets. But this is exactly the situation in which the bank lending channel is likely to be weak: precisely because marginal costs are rising steeply, banks would tend to respond to monetary policy actions by altering their holdings of securities, rather than by altering their lending behavior. Under such conditions, lending rates and the supply of bank loans would exhibit little responsiveness to monetary policy actions.

5.2 Pass-through in LICs

To investigate whether the effects of central bank policy actions on bank lending behavior differ between LICs and other countries (both high-income and developing) Mishra, Montiel and Spilimbergo (2012) undertake a similar exercise to that of Kashyap and Stein, but at the macro level – i.e., they examine the links between central bank policy rates and bank lending rates (known as interest rate pass-through) across countries. They

proceed in two steps: based on the finding that discount credit is used as a monetary policy instrument in LICs, they explore the partial correlation in monthly data between discount rate changes and money market rate changes across three sets of countries: high-income, emerging, and low-income.[10] In the second step, they examine the partial correlation between money-market rates and bank lending rates. They find that the short-run correlation between changes in discount rates and money market rates is almost three times as high in high-income economies as in LICs, while long-run correlations are almost twice as high. The short-run correlation between money market rates and bank lending rates, on the other hand, proved to be twice as high in high-income economies as in LICs, while the long-run correlation was some 20 percent higher. The suggestion is that links between policy rates and bank lending rates tend to be much weaker in LICs than in high-income countries.[11]

Mishra, Montiel and Spilimbergo proceed to explore the characteristics of the financial environments of the countries in their sample that account for their results. When they restrict their sample to the period after the year 2000 (to avoid possible contamination of their results by financial repression), drop emerging market economies from the sample, and examine the partial correlation between bank lending rates and discount rates directly, they find that pass-through is increased by increased transparency (as a measure of institutional quality) and reduced by increased bank concentration (as a measure of competition in the banking sector), consistent with the model of section 3. However, even after controlling for those two variables, an interaction term between changes in the discount rate and a LIC dummy proved to be negative and statistically significant, suggesting that factors other than those included in the regression are inhibiting pass-through in LICs.

5.3 The VAR evidence

One problem with the regressions of the type run by Mishra, Montiel and Spilimbergo is that they cannot claim to describe the effects of exogenous monetary policy shocks on bank lending rates, since the changes in discount rates that they use as explanatory variables may be responding to market interest rates, or both market rates and discount rates may be responding to third factors – i.e., Mishra, Montiel and Spilimbergo do not claim to describe the effects of identified monetary policy shocks. The empirical literature on the effectiveness of monetary policy transmission has addressed this issue by employing VARs.

Mishra and Montiel (2013) recently surveyed the findings of the country-specific VAR literature on monetary policy transmission in LICs. They reviewed a large number of country studies of transmission in LICs, with countries drawn from all over the world and grouped into five geographic regions. As is well known, VAR methods face several important challenges, chief among these being the need to achieve an appropriate identification of monetary policy shocks. This requires, among other things, identifying the correct policy instrument in a particular application, including in the VAR all of the relevant information variables that the central bank may use in setting policy, and allowing sufficiently rich endogenous dynamics for the reduced-form residuals to be white noise. The 39 studies reviewed by Mishra and Montiel confronted these issues in a variety of ways. All of them employed short-run restrictions for identification, and the vast majority used structural rather than reduced-form VARs, basing their structural restrictions on

[10] Their regressions controlled for lagged values of discount rates and money market rates in the first step, and of money market rates and bank lending rates in the second step. Consistent with the observation in section 3 that interbank markets frequently do not operate in LICs, only 45 of 109 LICs in their sample reported money market rates.

[11] Note that the exercise was restricted to LICs that reported money market rates. Those countries would be expected to be more financially developed than those that did not, and thus closer to the financial environment that characterizes high-income countries.

existing studies for high-income countries. Some of the studies considered transmission from monetary policy to financial variables only, and others to indicators of aggregate demand such as real output and the price level. The strength of transmission was judged on the basis of the size of measured monetary policy effects on the variables of interest as captured in impulse response functions (IRFs), and its reliability on the width of the confidence bands around the estimated IRFs.

The vast majority of the studies reviewed were unable to estimate IRFs with the theoretically-predicted sign, of economically-meaningful magnitudes, and with confidence bands that did not cross the horizontal axis over a policy-relevant time frame. This was true whether the effects examined were on financial variables or on aggregate demand indicators such as output and the price level. Mishra and Montiel concluded that it was difficult to find evidence of strong and reliable monetary transmission in LICs from these studies, although they noted that the culprits may have been data and methodology (noisy data and frequent structural shifts, on the one hand, and inappropriate identification, on the other) rather than the facts on the ground.

One reason to suspect inappropriate identification is that, in order to attempt to achieve identification in their structural VARs, many of the studies reviewed essentially adopted assumptions made in specific well-known studies on high-income countries, rather than derived from country-specific information about the country under study. These assumptions involved both the nature of the monetary policy instrument as well as the contemporaneous relationship among the structural residuals. The latter essentially depends on the information available to central banks and the speed with which central bank actions affect endogenous macroeconomic variables, both of which are likely to be country-specific.

To address these potential problems, Adam, Mbowe, Montiel and O'Connell (2012) and Montiel (2013) conducted VAR studies for Tanzania and Uganda respectively in which the monetary policy instrument was explicitly that used by the monetary authorities during the sample period, and in which identification restrictions were based on country-specific information. The results confirmed weak and unreliable effects for Tanzania, but were somewhat more optimistic for Uganda, where a positive monetary policy shock had effects that were consistent with theory with respect to the bank lending rate, the exchange rate (Uganda had a floating rate over the sample period), and the price level, but not on real economic activity. Even in this case, however, the impacts of monetary policy were more powerful on intermediate variables such as the bank lending rate and the exchange rate than on indicators of aggregate demand such as the price level or real activity. The upshot was that, while monetary policy appears to have operated as expected in Uganda over the sample period, there was little evidence that it was able to exert powerful effects on aggregate demand during that period. The small size of the formal financial sector in Uganda was perceived to be a likely explanation.

A very different approach to the identification challenge was taken by Mishra, Montiel, Pedroni and Spilimbergo (2014), who applied heterogenous nonstationary panel methods to a large set of high-income, emerging and low-income countries to investigate the effects of monetary policy shocks on bank lending rates (i.e., the first step in transmission). They identified shocks using the long-run restrictions suggested by monetary neutrality, which they judged to be a necessary approach in the context of a sample consisting of a large and diverse group of countries, where the types of short-run restrictions employed in the literature would be unlikely to be uniformly applicable. Mishra et. al. found wide variations in the impulse responses of bank lending rates to domestic monetary policy shocks across countries. Consistent with the other results reported above, they found that monetary policy shocks were more likely to affect bank lending rates in the theoretically-expected direction in countries with better institutional frameworks, more developed financial structures, and less concentrated banking systems. As described in the previous section, LICs score poorly along all of these dimensions, and Mishra et. al. indeed found that LICs exhibited much weaker transmission of monetary policy shocks to bank lending rates than did high-income and emerging economies.

Yet a third approach to addressing the identification issue was adopted by Berg et. al. (2013). This paper interprets an announcement in October of 2011 by the East African Community (EAC) that its member countries (Kenya, Rwanda, Tanzania, and Uganda) would respond to rising inflation by undertaking a coordinated monetary tightening as an exogenous monetary policy shock in all of these countries, on grounds that the tightening was unexpected. The authors then explore, using a descriptive approach, the apparent macroeconomic effects of this event. They refer to this as a "narrative" approach to identification. They find strong policy effects consistent with theory in Kenya, which has the most developed financial markets in the region, as well as in Uganda, which was operating an "inflation targeting lite" monetary policy regime at the time. However, effects were markedly weaker in Tanzania and Rwanda. Berg et. al. interpret these results as partly explained by the fact that the former engaged in monetary targeting and the latter maintained a fixed exchange rate at the time. Note that despite the different approach to identification, the positive results for Uganda and negative ones for Tanzania are consistent with the findings of Adam et. al. (2012) and Montiel (2013) respectively. Moreover, strong effects in the presence of a well-developed financial system (Kenya) and weaker effects in the presence of a fixed exchange rate (Rwanda) are consistent with the arguments made in the two previous sections.[12]

In short, while the empirical literature is not devoid of evidence of effective monetary transmission in LICs, the preponderance of the evidence is consistent with the view that such instances may be the exception rather than the rule. It is worth emphasizing, however, that empirical research in this area is handicapped by noisy data, short samples, and the likelihood that sample periods are characterized by frequent structural change. The identification challenge also poses a serious obstacle, especially in contexts where the monetary authorities may use multiple instruments and neither the information available to the authorities nor the speed with which policy may affect macroeconomic variables are readily known. The extent to which these pitfalls, and not the facts on the ground, may account for the frequent finding of weak and unreliable transmission, remains for future research. What we can say at this point, however, is that unlike in the case of high-income countries, empirical research has yet to uncover systematic evidence of strong and reliable monetary transmission in LICs.

6. Policy Implications

As suggested at the end of section 3, it is clear from theory that there should be no presumption that monetary policy transmission would tend to be strong under the financial circumstances that characterize many LICs, and because those circumstances are so different from those that prevail in high-income countries, it is also clear that empirical findings for such countries are uninformative about the state of monetary transmission in LICs. What would tend to be dispositive is LIC-specific empirical evidence. But as reviewed in the last section, the evidence that has accumulated to date is not encouraging. Unfortunately, shortcomings in both empirical methodology and data quality make it difficult to reach a verdict on the issue that could be upheld with a high degree of confidence. As concluded at the end of the last section, it is safest to say that the strength and reliability of monetary transmission in individual LICs remains an open issue, pending further empirical work.

[12] The findings for Uganda, both by Berg et. al. (2013) and by Montiel (2013) raise the intriguing possibility that even under LIC-type conditions of financial development, monetary transmission may be strengthened with a floating exchange rate and some form of inflation targeting. This would be consistent with the arguments made in this paper, since allowing the exchange rate to float frees up an additional channel of monetary transmission, and adopting inflation targeting may increase the predictability of central bank actions. The latter may well affect the response of an oligopolistic banking industry such as Uganda's to a monetary policy action.

Nevertheless, because both theory and the available evidence are consistent with weak and unreliable monetary transmission in many LICs, it is prudent to consider what such a situation would imply for policy. In this section I take up this issue, drawing heavily from Mishra, Montiel, and Spilimbergo (2012).

6.1 Stabilization

When the effects of monetary policy are weak and unreliable, activist monetary policy that attempts to stabilize output around its natural level may be counterproductive. If the effects of monetary policy on aggregate demand were weak but reliable, stabilization would simply require stronger policy action in response to shocks than would be indicated when monetary policy is more powerful. On the other hand, if policy effects are strong but unreliable, then as noted long ago by Brainard (1967), a policymaker concerned with stabilizing output around its natural level would be well advised to react to mute the policy response to shocks. Mishra, Montiel, and Spilimbergo (2012) show that when the effects of policy are unreliable, a weaker expected policy impact strengthens the case for policy restraint. Intuitively, the reason is precisely that weak expected policy effects call for larger policy changes in response to shocks, but given the unreliability of policy effects the larger the policy change the greater the danger of destabilizing the economy. Thus, weaker policy effects paradoxically call for *smaller* coefficients in Taylor rules governing the setting of monetary policy.[13]

The implication of restrained monetary policy activism, of course, is that other instruments must carry more of the stabilization load. This strengthens the case for increasing the scope for automatic fiscal stabilizers and increases the premium that LICs should place on fiscal flexibility. In particular, it suggests that fiscal rules that unduly restrain the use of fiscal policy as a stabilization instrument (e.g., balanced-budget rules) should be avoided. It also suggests that the exchange rate should be given a greater role in short-run macroeconomic stabilization, though that does not prejudge whether this expanded stabilization role should be in the context of freely-floating, managed, or "soft peg" exchange rate arrangements. It does suggest, however, that excessively rigid exchange rate pegs would tend to be undesirable in LICs characterized by weak and unreliable monetary transmission, even in countries where a limited degree of capital mobility would otherwise tend to preserve monetary autonomy.

6.2 Inflation targeting

A growing number of countries, including several LICs, have adopted inflation targeting (IT) as their monetary policy regimes in recent years. Under IT, the central bank puts its reputation on the line by publicly announcing a target for the inflation rate and committing itself to achieving that target, with various mechanisms for accountability. The idea is that, knowing that the central bank is accountable (if through no other means through a loss of reputation that would be involved in missing its announced target), the private sector would tend to form inflation expectations that would be in line with the central bank's target. Weak and unreliable transmission undermines this rationale for IT, however. Under weak and unreliable transmission, the central bank's ability to influence aggregate demand would be highly imperfect, and there would therefore be no reason for the private sector to form expectations consistent with the bank's announced inflation target. Moreover, even if the private sector did form such an expectation, the central bank would find it difficult to deliver on its announcement, and its failure to do so would

[13] It is worth noting, however, that they have no obvious implications for the relative weights on inflation and the GDP gap in the Taylor rule. Because monetary policy affects both variables through its effects on aggregate demand, weaker and less reliable links from policy to aggregate demand do not alter the *relative* effectiveness of monetary policy on inflation and the GDP gap.

undermine its credibility. Thus inflation targeting becomes a problematic monetary policy regime under weak and unreliable monetary transmission.

This should not, however, be taken to imply that weak and unreliable monetary transmission means that inflation targeting is never advisable in LICs. The extent of weakness and unreliability in monetary transmission matters, and the design of the IT regime can be tailored to match the strength and reliability of the transmission mechanism. Specifically, the weaker and less reliable monetary transmission is, the wider the band should be that defines the bank's margin of error in achieving its target, and the longer the horizon that the central bank should allow itself within which to achieve that target.

6.3 Exchange rate regimes

As mentioned above, an optimally more restrained monetary policy under weak and unreliable transmission suggests a more active role for the exchange rate as a stabilization instrument. This may or may not strengthen the case for floating exchange rates as opposed, for example, to managed rates. However, an important argument for floating rates is that in a world with high capital mobility, the famous "trilemma" of open-economy macroeconomics would suggest that monetary autonomy can only be achieved by allowing the exchange rate to float. However, monetary autonomy is valued primarily because it allows monetary policy to be used as a stabilization instrument. If monetary transmission is weak and uncertain, the value of monetary autonomy for this purpose is reduced. Hence, weak and uncertain monetary transmission tends to weaken the case for floating exchange rates under high capital mobility.[14]

6.4 Capital account restrictions

A similar issue arises with respect to the case for capital account restrictions. Again, based on the trilemma, one argument for the use of capital account restrictions has been that if effective, they permit a country to exercise monetary autonomy without sacrificing control over the exchange rate. Once again, however, if monetary autonomy becomes less valuable because weak and unreliable transmission suggests a reduced role for monetary policy in stabilization, the case for capital account restrictions on these grounds is weaker. This does not, of course, clinch the case for open capital accounts, since there may be other grounds for favoring restrictions (such as altering the maturity composition of capital inflows), but it does mean that the case for capital account restrictions becomes harder to make. [15]

6.5 Structural reforms: measures to mobilize "dead capital"

Improved property rights and creditor rights, enhanced transparency and a more efficient judicial system, together with a more competitive banking sector, would contribute to a stronger bank lending channel. In the longer term, they would also promote the development of domestic securities markets that would multiply the channels through which monetary policy can influence aggregate demand. One might therefore be tempted to draw the policy implication that weak monetary transmission calls for stronger commitment to such structural policies, in order to strengthen monetary transmission in LICs.

[14] This particular argument would be less pertinent for low-income countries that enjoy substantial monetary autonomy under fixed exchange rates because of limited capital mobility (see Ostry et. al. 2013). For such countries the case for floating rates would not rely on prospective gains in monetary autonomy, and therefore would not be weakened by weak and unreliable monetary transmission.

[15] Again, this observation is less pertinent for countries that already enjoy substantial monetary autonomy because of imperfect international financial integration.

But whether stronger monetary transmission is a desirable objective in the LIC context is an issue that I do not address here. I note, however, that improved institutional quality and a more competitive banking system are desirable in and of themselves in order to promote financial development – and through financial development, growth. They would also help to promote financial inclusion, including De Soto's mobilization of "dead capital," by facilitating the use of collateral, thereby expanding the opportunities available to the poor. These benefits make a strong case for measures to improve finance-enhancing institutions and to make banks more competitive. But the facts that macroeconomic stabilization is itself beneficial for growth, that the central bank tends to be the institution in most countries (not just LICs) that bears the central responsibility for macroeconomic stabilization, and that in many LICs the central bank is the primary repository of the country's macroeconomic expertise, suggest that the case for improving finance-enhancing institutions and making banks more competitive is made even stronger by the implications of such policies for the effectiveness of monetary policy as a stabilization instrument.

7. Summary and conclusions

It has long been acknowledged that the transmission mechanism for monetary policy is likely to be country-specific. It depends on characteristics of the macroeconomic and policy environment such as the country's degree of integration with international financial markets and its exchange rate regime, as well as on the country's financial structure. In this paper I have noted that the standard description of monetary transmission applied to high-income countries takes as given a set of properties of the macroeconomic environment and the country's financial structure that is not likely to apply to many low-income countries. In particular, the absence of large, liquid, and well-functioning securities markets in such countries, their limited integration with international financial markets, and their preference for fixed exchange rates preclude important roles for standard interest rate, wealth, and exchange rate channels of transmission, leaving the bank lending channel as the primary means through the actions of the monetary authority are able to influence aggregate demand in many such countries.

However, in many LICs securities markets are not well developed and international financial integration is limited precisely because deficiencies in the domestic institutional environment make financial intermediation a costly activity, particularly in the case of lending to small, opaque borrowers with little effective collateral to offer. The dualistic production structure that characterizes many LICs therefore results in sharply rising marginal costs of lending once the needs of a few favored clients have been satisfied. This tends to weaken the response of bank lending to monetary policy actions that alter banks' costs of funds. At the same time, the banking industry in LICs tends to be oligopolistic and to face little competition from outside the industry, making the response of banks to monetary policy actions highly context-specific and unreliable. In short, there are theoretical reasons to suspect that monetary transmission through the bank lending channel in many LICs may be weak and unreliable. While this is not a necessary state of affairs, is certainly country-specific, and is likely to be changing over time as financial development proceeds in LICs, a broad range of empirical evidence to date is consistent with the view that monetary transmission in LICs may be weaker and less reliable than in high-income countries. It remains to be determined whether this reflects shortcoming in data and empirical methodology or facts on the ground.

To the extent that it is the latter, however, important policy implications follow. Those implications include a more restrained use of monetary policy, more caution in the adoption of inflation targeting or more care in the design of IT regimes, and weaker cases for the adoption of floating exchange rates and the imposition of capital account restrictions. Most importantly, however, they suggest added urgency for the enterprise of institutional improvement in low-income countries, because the stabilization role of central banks is not easily replaced, and the enhanced macroeconomic stability that could be achieved with stronger monetary transmission in the hands of a competent central bank has proven to be an important contributor to economic growth.

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