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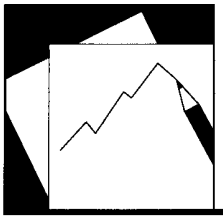

IMF Working Paper

How Effective Is Monetary Transmission in Low-Income Countries? A Survey of the Empirical Evidence

Prachi Mishra and Peter Montiel

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How Effective Is Monetary Transmission in Low-Income Countries? A Survey of the Empirical Evidence[†]

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Abstract

This paper surveys the evidence on the effectiveness of monetary transmission in low-income countries. It is hard to come away from this review with much confidence in the strength of monetary transmission in such countries. We distinguish between the "facts on the ground" and "methodological deficiencies" interpretations of the absence of evidence for strong monetary transmission. We suspect that "facts on the ground" are an important part of the story. If this conjecture is correct, the stabilization challenge in developing countries is acute indeed, and identifying the means of enhancing the effectiveness of monetary policy in such countries is an important challenge.

JEL Classification Numbers:E5, O11, O16

Keywords: monetary policy, exchange rate, interest rate, banks, institutions, developing countries

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I. INTRODUCTION

In the vast majority of low-income countries (LICs), fiscal policy has not traditionally represented a viable instrument for macroeconomic stabilization, and indeed has often represented a source of macroeconomic shocks, behaving procyclically and/or aggravating the effects of exogenous shocks. At the same time, the degree of central bank autonomy in these countries has often been limited, leaving little room for the exercise of an independent monetary policy. However, recent economic reforms among such countries have resulted in central banks becoming increasingly independent, not just *de jure*, but also *de facto*. With the reform of fiscal institutions usually lagging that of monetary ones, the responsibility for stabilization policy in low-income countries has increasingly fallen on their newly-independent central banks.

It is by no means clear, however, that this is a burden that central banks in low-income countries are capable of bearing. For central banks to be able to implement this responsibility, the policy instruments at their disposal must be effective in influencing aggregate demand. However, for a variety of reasons, the link between monetary policy instruments and aggregate demand – the monetary transmission mechanism – may be significantly weaker in low-income countries than it is in advanced and emerging economies. In particular, the financial structure of such countries suggests that the bank lending channel is likely to be the dominant channel of monetary transmission, but its effectiveness, which depends on the domestic institutional context, the structure of the banking system, and the intrinsic stability of the domestic macroeconomic environment, is problematic. Weak and unreliable monetary transmission would suggest restraint in the use of monetary policy, implying that placing primary responsibility for domestic macroeconomic stabilization on central banks may be misguided.[1] Assessing the empirical effectiveness of monetary policy in low-income countries is therefore an important topic for research. In this paper we take stock of what is known about this issue.[2]

The organization of the paper is as follows. In the next section, we summarize the arguments for expecting the bank lending channel to be the dominant vehicle for monetary transmission in low-income countries, as well as the theoretical reasons to believe that this channel may be both weak and unreliable under the conditions that usually characterize those economies.[3] The implication

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[1] See Mishra, Montiel, and Spilimbergo (forthcoming).

[2] For the purposes of our survey, the classification of countries into advanced, emerging and LICs follows Rogoff et. al. (2004). Emerging market economies are those that are included in the Morgan Stanley Capital International (MSCI) index. With the exception of Israel, which is in the MSCI index, advanced economies are those that are classified as upper income economies by the World Bank. All other economies constitute low-income countries (LICs).

[3] While the bank lending channel is likely to be the dominant channel of monetary transmission in low-income countries, our primary interest is in the broad effectiveness of monetary transmission in such countries, rather than in the bank lending channel as such. We therefore restrict our attention to studies that examine the ultimate effects of central bank monetary policy actions on aggregate demand, leaving aside those that focus on the more narrow question of the effects of monetary policy on commercial bank behavior, without examining subsequent effects on aggregate demand. Such studies have tended to take one of two approaches: they have investigated the extent of

is that the effectiveness of monetary policy in those countries is an empirical issue. The methodology of choice in this respect – for industrial-country and emerging-market applications, as well as for studies of low-income countries -- has consisted of the derivation of impulse response functions (IRFs) from estimated vector autoregressions (VARs). Accordingly, our examination of the evidence focuses on studies of this type. To place these studies in context, Section III presents some brief background on the application of the VAR methodology to the study of monetary transmission, focusing specifically on the alternative identification strategies that have been employed in low-income country applications.

The remainder of the paper reviews the evidence. Because the number of low-income countries is quite large and these countries are very heterogeneous, our survey requires an organizing principle.[4] As is well known, the channels of monetary transmission in a specific economy depend on the presence or absence of barriers to international capital movements and its exchange rate regime, as well as on its financial structure. Because countries in the same geographic region often exhibit similarities in their links to international financial markets and adopt similar exchange rate regimes, and because a country's financial structure is heavily influenced by its legal and institutional environments -- both of which have strong regional commonalities -- differences in the country characteristics that matter for monetary transmission are likely to be much more pronounced among countries in different geographic regions than among those in the same region. Accordingly, we classify low-income countries into five geographic regions, and examine the evidence region by region in Sections IV-IX. Section X summarizes our findings and their implications.

II. MONETARY TRANSMISSION AND THE BANK LENDING CHANNEL IN DEVELOPING COUNTRIES

In an advanced economy, monetary transmission is assumed to operate mostly through four mechanisms: the interest rate channel, the asset channel, the credit channel, and the exchange rate channel. In a nutshell, central bank policies that alter the supply of bank reserves affect the interest rate that commercial banks charge for very short-term lending (typically to each other, in the form of money-market rates), and arbitrage across the maturity spectrum transmits these effects to the rate of return on long-term bonds. With price stickiness and rational expectations, long-term real interest rates are affected, influencing the demand for a broad range of capital goods. This represents the interest rate channel. Arbitrage between long-term bonds on the one hand, and equities and real assets, on the other, affects stock market values and real estate prices,

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"pass-through" from central bank policy rates to bank lending rates, using either aggregate or bank-specific data, or they have used bank-specific data to examine how individual-bank characteristics affect the response of bank lending to monetary policy shocks. A recent example of the former is Mishra, Montiel, and Spilimbergo (forthcoming). Studies of the latter type have been patterned after Kashyap and Stein (1995).

[4] As of 2010, 134 of the IMF's 187 member countries were classified as low-income countries. This total refers to member countries that are not classified by the institution as either advanced or emerging economies.

which in turn affect household wealth and consumer spending, constituting the asset channel. Arbitrage between assets denominated in domestic and foreign currencies affects the real exchange rate, which alters the composition of both consumption and investment spending between domestic and foreign goods. This constitutes the exchange rate channel. Finally, credit market frictions imply that some borrowers have access to external funds only through bank credit, while others must pay a premium over the risk-free rate that depends on their net worth (the external finance premium). The credit channel captures the dual effects that changes in the supply of banking system reserves exert on aggregate demand through changes in the terms on which bank customers have access to loans (the bank lending channel) as well as through changes in the external finance premium (the balance sheet channel).

There are strong *a priori* reasons, based on the structure of the financial systems in many low-income countries, to believe that the monetary transmission mechanism in such countries should differ substantially from that in advanced and emerging economies. Low-income countries are characterized by the absence of well-functioning markets for fixed-income securities, equities, and real estate, by very imperfect links with private international capital markets, and by heavy central bank intervention in foreign exchange markets.[5] This leaves little scope for the functioning of the conventional interest rate channel, the asset channel, or the exchange rate channel.[6] Because these other channels are likely to be weak, and because banks are by far the dominant formal financial intermediaries in such economies, the bank lending channel is likely to be dominant in low-income countries, with the balance sheet channel operating as a financial accelerator – i.e., as a factor that magnifies the effect of the bank lending channel by increasing the external finance premium when bank credit is plentiful and reducing it when such credit is scarce. In short, the bank lending channel, supplemented by a derivative balance sheet channel, is likely to be the dominant channel for monetary transmission in low-income countries, to the extent that such transmission is effective.

If monetary transmission in low-income countries is dominated by the bank lending channel, the effectiveness and reliability of monetary transmission in these countries depends on the properties of this specific channel. The relevant properties concern two links in the causal chain from monetary policy actions to aggregate demand: that between monetary policy actions and the availability and cost of bank credit, and that between the availability and cost of bank credit and aggregate demand. When the formal financial sector is small, as is true in the vast majority of low-income countries, the second of these links is likely to be weak. But the link between

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[5] See the evidence in Sections IV-IX.

[6] To avoid misunderstanding, it is important to emphasize that, consistent with the description of the monetary transmission mechanism presented above, when we refer to the exchange rate channel we are referring to the effects on aggregate demand of central bank intervention in domestic securities or banking markets that are mediated through endogenous responses of the nominal exchange rate, and *not* to the aggregate demand effects of central bank intervention in the foreign exchange market. We define the former as monetary policy, and the latter as exchange rate policy.

monetary policy actions and the availability and cost of bank credit may be weak as well. Specifically, the literature suggests that it may be undermined by two factors:[7]

- If the banking industry is noncompetitive, changes in banks' costs of funds may be reflected in bank profit margins, rather than in the supply of bank lending.

- If a poor institutional environment increases the cost of bank lending, banks may restrict lending activity in a manner that weakens the effects of monetary policy actions on the supply of loans.

In Appendix 1 we develop a simple model of bank lending behavior that illustrates the possible roles of both of these factors, implying that the actual strength of the bank lending channel, even in bank-dominated financial systems such as those that characterize most low-income countries, is an empirical issue. The model demonstrates that the effectiveness and reliability of the bank lending channel cannot be taken for granted in the context of low-income countries. Central bank policy actions will have weak effects on commercial bank lending rates when the marginal cost of new lending is sharply increasing in the volume of loans and when the degree of competition in the banking sector is weak. Both conditions are likely to be prevalent in many low-income countries. The reliability of the bank lending channel, in turn, depends on the extent to which the factors that determine commercial banks' intermediation costs prove to be stable. Since such factors may include non-structural ones that are subject to frequent change in low-income countries, the upshot is that the transmission mechanism may prove both weak and unreliable in such countries. The issue is an empirical one.

III. EMPIRICAL METHODOLOGY

In recent years, a large literature has emerged that has attempted to measure the empirical effect of monetary policy on aggregate demand. Much of this literature has focused on the experience of the United States and other advanced countries, as well as (to a significantly lesser extent) on emerging economies. However, there is now a substantial body of work on low-income countries as well. Because several aspects of the methodologies employed remain controversial, before turning to an examination of this evidence it is useful to consider several methodological issues.

1. Choosing the monetary policy indicator

First, providing evidence on the effectiveness of monetary transmission requires obtaining an empirically observable indicator of the stance of monetary policy. While the central bank may ultimately seek to influence aggregate demand, and while it conducts monetary policy by altering the size of its balance sheet, in practice it alters the size of its balance sheet so as to seek to determine the value of some financial variable that it believes to be linked to aggregate demand

[7] See, for example, Cottarelli and Kourelis (1994), as well as Kwapil and Scharlet (2006).

through the monetary transmission mechanism. This financial variable – the central bank's intermediate target – may be a monetary aggregate, a short-term interest rate, the exchange rate, or some combination of these variables (e.g., a monetary conditions index). If the intermediate target of monetary policy is misidentified by the investigator, then the correlation between the variable that is mistakenly taken as an indicator of the central bank's intermediate target and the state of aggregate demand may reflect the common influence of third factors on both variables, rather than the sought-for independent effect of monetary policy on aggregate demand. Such factors are likely to be sample-specific, so that the correlation between the chosen target and aggregate demand will vary from sample to sample, depending on the sources of shocks that prove to be dominant in each sample. This correlation would therefore provide no information on the true effect of monetary policy on aggregate demand.

The intermediate target of monetary policy has often been identified on *a priori* grounds, based on prior knowledge about the operating procedures of the monetary authorities. An alternative approach has been to include the candidates for intermediate targets (typically a short-term interest rate and a narrow monetary aggregate) in the VAR and impose restrictions on the reduced-form VAR innovations designed to extract the structural monetary policy innovations. For example, Gordon and Leeper (1994) estimated a monthly VAR for the United States with seven variables consisting of the unemployment rate, real output, the price level, a long-term interest rate, commodity prices, the stock of reserves, and the federal funds rate. They then specified the following structural model for the reserves market:

$M = a_1R + a_2P + a_3Y + e^d$ (demand for reserves)

$R = a_4M + a_5R_{10} + a_6CP + e^s$ (supply of reserves)

where Y, P, R_{10}, CP, M, and R denote respectively the innovations in reduced-form VAR equations for real output, the price level, the long-term interest rate, commodity prices, the stock of reserves, and the federal funds rate, and e^d and e^s are respectively structural shocks to the demand and supply of reserves.[8] These equations can be estimated directly from the VAR residuals, allowing e^d and e^s to be extracted. In this setup, e^s is the relevant monetary policy shock. A similar approach, using a different model of the reserves market, was adopted by Bernanke and Mihov (1998). These approaches have the virtue that rather than specifying the intermediate target *a priori*, they allow the data to identify it.

2. Identifying exogenous monetary policy shocks

The second problem is that even if, say, a short-term domestic interest rate can be taken as the intermediate target of monetary policy, and innovations in the behavior of this interest rate are extracted from a reduced-form VAR, these innovations do not necessarily represent exogenous

[8] For brevity, we will use these symbols to represent the indicated variables (or their equivalent versions) throughout the rest of the paper, and will introduce new symbols only as new variables are introduced.

monetary policy shocks. The key problem is that monetary policy may respond contemporaneously to other variables in the system. Thus, to the extent that the innovation in the equation for the monetary policy instrument is correlated with innovations in other macroeconomic variables, the innovation in the monetary policy variable that is obtained from an estimated reduced-form VAR may represent some combination of an exogenous monetary policy shock and an endogenous contemporaneous response of monetary policy to innovations in other variables. It may be, for example, that interest rates are unexpectedly raised during a given period *because* the monetary authorities observe an innovation in aggregate demand. The challenge is to remove the effects of such responses from the innovation in the monetary policy variable so as to identify the *exogenous* component of the innovation in the policy variable. This is the standard identification problem. Extracting the exogenous component of the monetary policy innovation (the monetary policy shock) from the reduced-form VAR residuals requires departing from the "atheoretic" stance on which the VAR approach was originally based. Not surprisingly, therefore, it has proven to be the most controversial aspect of the methodology.

This issue has been addressed in several ways:

i. Choleski decompositions

Under a Choleski decomposition, the relationship among the reduced-form innovations is assumed to be recursive, so that if variables are ordered according to their place in the recursive chain, the reduced-form innovation in the first variable is assumed to be structural, while that in the second is a structural innovation in the second variable combined with a contemporaneous response to the structural innovation in the first variable, that of the third is a structural innovation in the third variable combined with a contemporaneous response to the structural innovations in the first two variables, and so on. Christiano, Eichenbaum and Evans (1999) therefore refer to this as the "recursiveness assumption."

Crude implementations of the Choleski scheme (as in Sims' original "atheoretic approach) have tended to order the monetary policy variable first, on the implicit assumption that innovations in this variable are exogenous, but may affect the other variables in the VAR contemporaneously. In a three-variable system, for example, containing real output, the price level, and a monetary policy variable, the monetary policy variable would be ordered first, followed, say, by real output and the price level (M, Y, P). The identifying assumptions are that monetary policy does not react contemporaneously to innovations in real output and the price level, and that innovations in the price level do not affect real output contemporaneously.

However, this neglects the possibility that innovations in other macro variables (such as real output and the price level) may be part of the information set available to monetary policymakers, and that they may therefore respond to innovations in such variables contemporaneously. Bernanke and Blinder (1992) proposed a recursive identification scheme based on the information available to policymakers and the speed with which policy variables affect the endogenous macro variables. This scheme has been used widely in low-income

country applications. In an estimation based on monthly data for the United States, they argued that the monetary policy variable should actually appear *last* in the Choleski ordering, on the assumption that the endogenous macro variables in their VAR could be observed contemporaneously by policymakers, but that monetary policy variables would tend to affect the endogenous macro variables with a lag.[9] The alternative ordering in this case would place real output first, followed by the price level and the monetary policy variable.

The policy variable has not always been ordered last, however. Peersman and Smets (2001), for example, investigated the monetary transmission mechanism in the Euro area using VARs based on quarterly data and imposing a Choleski decomposition ordered as real GDP, consumer prices, a domestic nominal short-term interest rate (the monetary policy variable) and the real exchange rate (Y, P, R, RER, where RER is the real exchange rate). The assumptions in this case were that in setting its monetary policy, the ECB looks at real GDP and consumer prices, but not at the exchange rate, while the exchange rate is affected contemporaneously by all the variables ordered before it, and neither the interest rate nor the exchange rate has any effect on real GDP and consumer prices within the quarter. In short, this approach to identification assumes that the monetary policy shock is orthogonal to the variables in the central bank's information set: the shock is not influenced contemporaneously by variables in the information set, and does not influence such variables contemporaneously.

ii. Non-recursive (simultaneous) identification

A problem with this approach, however, is that the central bank may be able to observe variables that it can affect contemporaneously, and even if it does not seek to influence these variables directly, it may react to them anyway, since they may convey information about variables that the central bank does care about. In the Peersman and Smets four-variable system, for example, the central bank may choose to respond to innovations in the exchange rate because it conveys information about future prices. This would invalidate one of Peersman and Smets' exclusion restrictions. Whenever non-predetermined variables enter the central bank's information set, the recursiveness assumption fails, and additional *a priori* restrictions are required equal in number to the number of non-predetermined variables included in the central bank's information set.[10]

As long as those additional restrictions also satisfy the rank condition for identification, the monetary policy shock can be identified in a fully simultaneous system. An influential approach

[9] In another well-known application, Bernanke and Gertler (1995) ordered variables as Y, P, CP, and R. The assumption was again that the Fed observed all of (Y, P and CP) in making its policy decisions, but the federal funds rate R did not affect these variables within the period.

[10] One way to see the difficulty in this case is that when the monetary policy shock is no longer orthogonal to the variables in the central bank's information set, the shock can no longer be extracted from a simple OLS regression of the policy variable on the variables in the central bank's information set. If the VAR contains at least some variables that are predetermined with respect to monetary policy, however, the monetary policy shock can be extracted with an IV regression of the policy variable on the variables in the central bank's information set, using the predetermined variables as instruments.

to doing so was developed by Sims and Zha (1998). To describe their approach in a simplified setting, consider the Peersman and Smets four-variable system augmented with a money stock variable, yielding a five-variable VAR. The order condition requires 10 restrictions in this case. Assuming that real output is not affected contemporaneously by any of the other variables in the system and the price level is only affected by real output yields 7 exclusion restrictions. Interpreting the innovation in the money stock as arising from innovations in money demand allows the exchange rate to be excluded from that equation, yielding an eighth restriction. Finally, if the central bank can observe the exchange rate and the relevant monetary stock contemporaneously, but not real output and the price level, this yields the final two exclusion restrictions required for identification in the interest rate equation. In this framework, the exchange rate is allowed to respond to all the other variables contemporaneously. Note that shocks to real output and the price level can be solved for recursively in this system, but the shocks to monetary policy, money demand, and the exchange rate must all be solved for simultaneously.[11][12]

Kim and Roubini (2000) proposed an alternative structural model applicable to a small open economy that has often been used for structural identification in low-income countries. It is essentially a generalization of Sims and Zha (1998), in that it includes the world commodity price level and a world short-term interest rate, but otherwise follows the Sims-Zha framework closely. The Kim-Roubini framework contains seven variables: world commodity prices CP, an external interest rate R*, domestic real output Y, the domestic price level P, the money stock M, the domestic short-run interest rate R (treated as the policy variable in their model, as in Sims and Zha) and the nominal exchange rate S. They treated world commodity prices as exogenous under the small country assumption, and therefore unaffected by other shocks. However, the world interest rate R* is taken to be affected by world commodity prices, as is domestic real output Y. these two variables are unaffected by any other variables in the model on impact. Thus Kim and Roubini assume that output is affected in the short run only by supply shocks, but they identify supply shocks driven by other than commodity prices separately. The domestic price level is affected in Phillips Curve fashion by both CP and Y. Using a money demand interpretation as in Sims and Zha, the money stock M is unaffected contemporaneously by CP, R*, or S. The central bank can observe world commodity prices and interest rates as well as the exchange rate and the relevant monetary stock contemporaneously, but not real output and the price level. Thus the monetary policy rate R is taken to be contemporaneously unaffected by Y and P. As in Sims and Zha (1998), the exchange rate is potentially contemporaneously affected by all the other variables.

[11] If the central bank does not react to the exchange rate, this scheme becomes similar to that of Gordon and Leeper (1994) and Bernanke and Mihov (1998), which require only the money demand and monetary policy shocks to be solved for simultaneously.

[12] A third approach to identification, relying on long-run restrictions on policy effects, has not been implemented in the low-income country literature to be discussed in the next section, so we will not review it here.

3. Exploring channels of transmission

Finally, though our ultimate concern is with the effectiveness of monetary transmission in developing countries, as indicated in the last section our priors on this issue are based on the view that several conventional transmission channels are likely to be inoperative in such countries, and that there are reasons to suspect that the channel that is most likely to be operative – the bank lending channel -- may be weak and/or unstable. Several of the papers that we will review in the next five sections explicitly investigate the strength of particular transmission channels. Before moving to the evidence, therefore, it is worth pausing to consider how this is done.

There are essentially two approaches, both of which require the inclusion in the VAR of a variable (or variables) intended to serve as an indicator of a specific channel of transmission. Consider, for example, the bank lending channel. To assess the role of this channel, the stock of bank credit and/or the bank lending rate would be included among the endogenous variables in the VAR. Assuming that monetary policy shocks are found to have significant effects on aggregate demand (as revealed by statistically significant values of the IRFs for real output and/or the price level), the contribution of the bank lending channel to this outcome can be assessed as follows:

i. The first approach determines whether the monetary policy shock has a statistically significant effect (as reflected in the IRF) on the lending rate or the stock of bank credit in the direction predicted by theory (i.e., a monetary contraction should produce a contraction in bank credit and/or an increase in the lending rate). An affirmative answer suggests a statistically well-defined role for the bank lending channel, but does not indicate the quantitative strength of that channel.

ii. To assess the latter, Ramey (1993) suggested a simulation approach, based on a comparison of impulse response functions of the aggregate demand indicator (output or prices) to a monetary policy shock when the bank lending variable is permitted to respond endogenously to the shock and when it is treated as an exogenous variable. The difference between the two IRFs provides a measure of the quantitative strength of the bank lending channel.

There is a large number of studies that have applied the VAR methodology to the estimation of the effects of monetary policy in low-income countries. The next five sections examine the results of these studies, focusing on recent papers, almost entirely written over the past decade. The focus on recent papers is motivated by the fact that, beginning in the early 1990s, many low-income countries have undertaken extensive domestic financial liberalization and reform, have liberalized their capital accounts, and have altered their exchange rate regimes. All of these changes can potentially affect the monetary transmission mechanism, so studies based on more recent data are likely to be much more informative on the current strength of this mechanism in the reforming countries. Unfortunately, this means that many of the studies to be reviewed have

yet to be published, which deprives us of a convenient filtering device. The vast majority of these papers are in mimeo or working paper form. They have largely been prepared by researchers at central banks and international financial institutions.

For the reasons explained in the introduction, our examination of the literature is organized by geographic regions. Because multi-country studies tend to apply a uniform methodology across countries, they are particularly informative about cross-country differences in mechanisms of monetary transmission. Accordingly, in each case we consider multi-country studies first (if available) before turning to individual country applications.

IV. SUB-SAHARAN AFRICA

Except for South Africa, all the economies in sub-Saharan Africa are low-income countries. Table 1 describes several characteristics of these economies that can be expected to influence the channels of monetary transmission. Column 1 presents an advanced-country benchmark for these characteristics, column 2 the average for all LICs in the region, and the remaining columns pertain to each of the individual countries in the region for which we have systematic studies of the effectiveness of monetary transmission. As Table 1 indicates, on average the LICs in sub-Saharan Africa are substantially less integrated with international financial markets and are more likely to intervene in foreign exchange markets than is the typical advanced country, characteristics that tend to impair the exchange rate channel. They also have poorly developed domestic bond (the absence of data for LICs in this area is telling) and stock markets, reducing the scope for the conventional interest rate channel as well as the asset channel respectively. Turning to characteristics that are relevant for the bank lending channel, the LICs in this region have much smaller formal financial sectors, including the banking sector, relative to the sizes of their economies than do advanced countries, their banking systems are less competitive (banks have larger interest margins and higher concentration ratios), and their banks operate in a much less favorable institutional environment. All of these characteristics call into question the strength and reliability of the bank lending channel, as suggested by the model in Appendix I.

Consistent with these findings, several authors have argued that the importance of the bank lending channel in many sub-Saharan African countries is limited by the small size of and imperfections in the financial sector. Sacerdoti (2005), for example, noted that banks in Africa tend to extend limited amounts of credit to the private sector, as the result of underdeveloped institutional means to cope with credit market frictions that increase the cost of financial intermediation. Instead, these banks have tended to hold 30-50 percent of their deposits as reserves at the central bank and in the form of short-term foreign assets. To the extent that credit market frictions make deposits at the central bank, government bonds, and foreign securities much closer substitutes among themselves than these alternative assets are with private sector credit, this situation would tend to weaken the transmission mechanism through the bank lending channel.[13] This hypothesis is supported by several studies that examine the strength of links

[13] In addition to banks' preference for liquidity, Laurens (2005) argued that the transmission from policy instruments to market interest rates in Africa is also hindered by shallow or dormant interbank markets.

between policy rates and ultimate macro objectives in a variety of African countries. Saxegaard (2006), for example, estimated that excess reserves amounted to over 13 percent of deposits on average in sub-Saharan banking systems in 2004, reflecting banks' unwillingness or inability to lend, and argued that the impact of monetary policy on bank credit is likely to be limited under such circumstances.

Table 2 reports the results of several recent VAR studies of the strength of monetary transmission in various sub-Saharan African countries. Most of those studies employ recursive schemes (Panel A). Identification is achieved for the policy variables by the Bernanke-Blinder approach -- i.e., by assuming that non-policy variables do not react contemporaneously to the policy variables, but the latter do react to the nonpolicy variables – or the Peersman-Smets approach, which assumes that monetary policy has no contemporaneous effects on the information variables used by the central bank, but can affect other variables contemporaneously.

Most of the studies listed in Table 2 used a short-term interest rate as the indicator of the monetary policy stance.[14]

The studies in Panel A of Table 2 largely focus on the effects of monetary policy innovations on aggregate demand, in the form of the domestic price level and level of real output, rather than on testing specific channels of transmission. None of those studies finds unambiguous evidence of large and statistically significant effects of monetary policy innovations on both aggregate demand indicators. Cheng's study on Kenya (2006) is unique in finding a statistically significant effect of monetary policy innovations on the price level, but he does not find a similar effect on output.

In principle, these outcomes could arise either because the central bank is unable to substantially influence commercial bank behavior or because commercial bank lending rates and/or loan supply have weak effects on aggregate demand. The study by Saxegaard (2006) suggests that the former may play a role. He compared the effects of monetary policy innovations in Nigeria, Uganda and the CEMAC countries under two regimes: one in which banks held excess reserves and one in which they did not. Saxegaard indeed found evidence that monetary policy shocks have weaker effects on output and inflation in Nigeria and Uganda in the excess-reserve regime,

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[14] Some of these studies suffer from serious flaws. For example, because Namibia maintains a currency board pegged to the South African rand, the study by Uanguta and Ikhide used the repo rate of the South African Reserve Bank (SARB) as their monetary policy indicator. Note, however, that their identification procedure treats the SARB's repo rate as affected by the contemporaneous values of several macro variables in Namibia. The implicit and dubious assumption, then, is that the SARB sets its repo rate with reference to the behavior of macroeconomic variables in Namibia. Similarly, though Ogunkula and Tarawalie (2008) described base money as the Bank of Sierra Leone's operating instrument and broad money as its intermediate target, they used the Treasury bill rate as the monetary policy variable in their VAR. In addition, their IRFs suggest permanent effects from monetary policy shocks, their results are characterized by a price puzzle, and no confidence intervals are presented.

suggesting that the central bank had little leverage on bank behavior under these circumstances. But that does not appear to be everything that is going on, since Saxegaard found that monetary policy innovations had equally weak effects on the aggregate demand indicators under both regimes in the CEMAC countries. Further evidence that the breakdown in monetary transmission in these countries is at least partly due to a weak effect of bank lending rates and loan supply on aggregate demand comes from Lungu (2008), who found that monetary policy innovations affected bank lending and deposit rates in all of the Southern African countries examined, but nonetheless had no effects on either indicator of aggregate demand.

As noted above, a large preponderance of the studies in Table 2 adopt a short-term interest rate as the monetary policy variable. This is worrisome, because many countries in sub-Saharan Africa are known to have used a monetary aggregate as their intermediate target during the sample periods used in these studies. However, it is not clear that the weak results are driven by a mis-identification of the monetary policy instrument. Abradu-Otoo, Philip, Amoah, and Bawumia (2003), for example, computed IRFs using generalized impulse responses.[15] However, they were unable to identify statistically significant effects of monetary policy shocks in Ghana over the period 1969-2002 (except in the short run on the monetary policy variable itself), whether the policy variable was taken to be M2 or the T-bill rate, and the point estimates in their IRFs were often inconsistent with theory (e.g., a positive innovation in the T-bill rate was associated with *increased* inflation and a *depreciated* exchange rate). Davoodi, Dixit, Pinter (2012) adopted a different approach, considering both reserve money and a treasury bill rate as policy variables in five EAC countries. Their findings were mixed. For Burundi, both base money and t-bill rate innovations moved output and prices in the expected directions, but the effects on the price level were never statistically significant, and those on output were seldom so. For Kenya, statistically significant effects in the expected direction were obtained only for the price level at horizons of 7-14 months when the interest rate was used as the policy variable, but for neither variable with base money as the policy variable. Rwanda produced the opposite result: statistically effects on output over an 8-12 month horizon with the monetary base as the policy variable, but no statistically significant effects on prices, and no effects on either variable with an interest rate instrument. No statistically significant effects were obtained for Tanzania with either policy instrument. Finally, for Uganda, the only discernible effects were on output with the base as the instrument and over a very short (2-4 month) horizon. By contrast, using an alternative recursive identification scheme, Montiel et. al. (2012) used the monetary base as the policy instrument for Tanzania and found small but statistically significant effects on the price level over short horizons, but no effect on output.

[15] The use of Generalized Impulse Responses (GIR) to compute IRFs involves shocking the innovations in the reduced-form equations for the other variables in the system at the same time as that in the equation for the money policy variable, by an amount that is proportional to the correlation between the relevant reduced-form residuals. This method avoids imposing *a priori* identifying restrictions on the contemporaneous innovations, but at the cost of yielding IRFs that are difficult to interpret structurally.

These weak results do not appear to be driven by the recursive identification strategy. Panel B of Table 2 reports the results of several studies for sub-Saharan Africa that employed structural methods. Cheng (2006) found similar results with a structural identification scheme as he had previously found with a recursive scheme: policy-driven interest rates had a considerable impact on the price level and the exchange rate in Kenya, but not on real output. Finally, Ngalawa (2009) examined the experience of Malawi using a seven-variable structural VAR, similar to one of the approaches in Cheng (2006), but augmented with bank loans and reserve money.[16] Ngalawa conducted his estimations using several restricted models in addition to the seven-variable model, as well as separately for a sample that spanned Malawi's 1994 switch from a fixed to a floating exchange rate and a post-1994 sample. Focusing on the full model and the post-1994 sample, he found that changes in the bank rate affected bank lending, real output, and the price level in the theoretically-expected direction, but none of those impulse responses turned out to be statistically significant. Mugume (2011) found statistically insignificant effects of monetary policy shocks on output and the price level in Uganda. Finally, Montiel et. al. (2012) found no statistically significant effects of monetary policy innovations on either prices or output in Tanzania, using both a structural identification scheme and the monetary base as the policy variable.

Overall, then, the studies reviewed in this section provide very weak evidence at best for the effectiveness of monetary transmission in sub-Saharan Africa, whether an interest rate or the monetary base is considered to be the policy variable and whether identification of the monetary policy shock is achieved through recursive or structural means.

V. TRANSITION ECONOMIES IN CENTRAL AND EASTERN EUROPE (CEE)

While low-income countries (LICs) with very poor institutional environments are heavily represented in sub-Saharan Africa, the transition economies in central and Eastern Europe (CEE) are at the other end of the developing-country income and institutional spectrum, with most of these countries having substantially higher levels of income per capita than sub-Saharan African LICs, and several of them having recently been granted accession to the EU. Table 3 reports the relevant characteristics of these economies. In general, like LICs in sub-Saharan Africa, compared with advanced economies these countries are less integrated with international financial markets, intervene more actively in foreign exchange markets, have less developed domestic bond and stock markets, have smaller formal domestic financial sectors, and have less competitive banking systems. However, while the institutional environment in these countries is less favorable than that in advanced economies, it is significantly more favorable than that in

[16] In Ngalawa's identification scheme, real output does not respond contemporaneously to any other variables in the system, the price level responds only to real GDP, bank loans respond to all the other variables in the system, the exchange rate responds contemporaneously only to real output and the price level, broad money responds to real output, the price level and the bank rate (making this equation interpretable as a money demand function), the bank rate responds contemporaneously only to the exchange rate, and reserve money responds to all variables except real GDP and the price level.

sub-Saharan African LICs (compare the governance indicators at the bottom of Table 3 with those in Table 1).

Monetary transmission has been studied extensively in these economies, and in addition to studies of individual countries, there are several multi-country studies of both steps in the transmission process (from policy to financial variables and from financial variables to aggregate demand). However, relatively few of the countries in this region qualify as low-income countries, so the number of studies that we can draw on for our purposes is small. They are listed in Table 4.

A useful early survey for these economies by Ganev et al. (2002) found some weak evidence (using a variety of methodologies) for transmission from central bank policy rates to commercial bank lending rates in individual country studies covering both high- as well as low-income transition economies in this region, but almost no evidence for the effects of bank lending rates on aggregate demand, suggesting that the first step in monetary transmission has tended to be operative in these economies, but the second has not. This is a recurrent theme for the countries in this region.

Egert and Macdonald (2009) more recently surveyed the literature on monetary transmission in transition economies. The studies they examined were consistent with the view that pass-through from monetary policy rates to money market rates, and from money market rates to retail lending rates, was reasonably complete at the short end of the maturity spectrum in these countries, but transmission to longer-maturity rates was weak. However, support for the bank lending channel and the overall strength of monetary transmission remained limited in these countries by the absence of evidence of significant links between bank lending rates and aggregate demand. According to Egert and Macdonald,

> all kinds of results can be found for a given country. In this sense, the price puzzle, a permanent decline or a temporary fall in the inflation rate after a monetary policy contraction can be obtained for the same country. Also, output may increase, decline permanently or exhibit a humped shape following a monetary policy shock. (p. 312)[17]

The only patterns they were able to discern were that studies that covered the entire transition period and used recursive identification schemes tended to deliver a price puzzle, while those that split the sample, used time-varying coefficients, or relied on more sophisticated

[17] As an illustration of such contrasting results, despite Egert and Macdonald's conclusion that transmission from policy rates to money market rates has been strong in these countries, Lyziak, Przystupa and Wrobel (2008) investigated the link between monetary policy and bank loan supply in Poland, using a 7-variable VAR with two alternative recursive identification schemes that differed with respect to the assumptions made about the information available to monetary policymakers, as well as with respect to the nature of contemporaneous interactions between the exchange rate and the interest rate. They found that the bank lending channel was very weak, primarily because of banks' use of excess reserves to stabilize loan supply in response to monetary policy changes. Benkovskis (2008) obtained a similar result for Latvia.

identification schemes uncovered more conventional results. The suggestion is that the failure to identify evidence of strong monetary transmission in these relatively advanced developing countries may reflect both facts on the ground (the limited development of the domestic financial system in the early transition period) as well as methodological shortcomings in the research.

Focusing specifically among the low-income countries among the CEE economies, findings have been less encouraging. For example, Ganev et. al. (2002) supplemented the survey referred to above with their own estimates. The results were something of a mixed bag. Positive innovations in money market interest rates (the second step in transmission) dampened output in the Slovak Republic, but counterintuitively *increased* output in Lithuania and Estonia.[18] No clear pattern emerged for Bulgaria, Latvia, and Romania. Short-run effects on the inflation rate were negative in Lithuania, but positive in Bulgaria, Romania and the Slovak Republic. Thus, the expected effects of monetary tightening on *both* output and inflation were not obtained for any of the lower-income countries in their study.

Elbourne and de Haan (2009) also conducted a multi-country study for CEE countries. They compared recursive and structural VAR results for five European transition economies, of which only the Slovak Republic fits our definition of a low-income country. They employed a 7-variable system with the recursive ordering (CP, R^G_S, Y, P, M, R, S, where R^G_S is the German call money rate). Their structural version followed Kim and Roubini (2000). The sample period was chosen to correspond to single monetary policy regimes, as judged by the authors. Elbourne and de Haan found the structural identification scheme to give uniformly superior results for all the countries they studied, in the sense that the qualitative effects of monetary policy shocks were more consistent with theory. However, large and theory-consistent effects were found only in the relatively high-income Czech Republic and Poland. Monetary policy effects in the Slovak Republic were small and/or counterintuitive.

Papers devoted to individual country studies for the European transition economies have found mixed results for the link between policy instruments and aggregate demand, often generating price or exchange rate "puzzles"— i.e., counterintuitive responses of these variables to monetary policy. For example, Lang and Krznar (2004) estimated a five-variable VAR for Croatia, including changes in real GDP and in the price level, the ratio of the current account to GDP, the exchange rate, and the ratio of bank excess reserves to total reserves. The last of these was taken to represent the monetary policy variable. Since Croatia engaged in exchange rate targeting over the period of estimation, Lang and Krznar achieved identification for monetary policy by assuming that the excess reserve ratio responded contemporaneously to the exchange rate, but not to innovations in any of the other variables in the VAR. They found that a monetary contraction reduced real GDP in the short run and improved the current account, but counterintuitively *increased* the price level.

[18] We use the term "innovation," rather than "shock," advisedly here, because Ganev et. al. used a GIR methodology to identify the "monetary" innovation.

VI. TRANSITION ECONOMIES IN CENTRAL ASIA (CEE)

The transition economies in central Asia tend to have lower income levels and weaker institutions than those in central Europe. As in sub-Saharan Africa, low-income countries predominate in this region. The relevant characteristics of these economies are provided in Table 5. For our purposes the key observation is that these resemble quite closely those in sub-Saharan Africa. In particular, these economies are characterized by low degrees of international financial integration – indeed, lower than in sub-Saharan Africa – and heavy foreign exchange market intervention. Like LICs in sub-Saharan Africa, these economies have poorly developed domestic securities markets, and their stock markets are much smaller than those in sub-Saharan Africa, though their stocks tend to be more actively traded. In other respects, the financial structures in these economies resemble those in sub-Saharan Africa, with a very small formal financial sector relative to the transition economies in central and Eastern Europe, a concentrated banking system, and a very poor institutional environment.

Though various studies have examined transition economies in central Asia, there appear to be no region-wide surveys comparable to those available for central and Eastern Europe, and few multi-country studies. Several available studies are described in Table 6.

A recent multi-country study is by Isakova (2008). She looked at the reduced-form effects of policy changes on indicators of aggregate demand in Kazakhstan, the Kyrgyz Republic, and Tajikistan, using a 5-variable VAR of the form (Y, P, M, R, S) and a recursive identification following this ordering. Consistent with results for the transition economies in central and Eastern Europe, even though changes in policy rates were found to have been effectively passed through to money market interest rates, weak responses of prices and output to innovations in the policy rate suggested that the bank lending channel has been weak in these countries.

For Georgia, Bakradze and Billmeier (2007) estimated a five-variable VAR (Y, P, M, FX, S), where FX is the stock of foreign exchange reserves, over 1999Q1 to 2006Q4. Their monetary policy variable (M) was currency in circulation, and their identification followed the recursive ordering listed above. They were able to find positive and statistically significanteffects of monetary policy shocks on output only for the first two quarters, and did not find statistically significant effects on the price level. Samkharadze (2008), on the other hand, found more positive results for Georgia -- specifically, significant effects of shocks to monetary aggregates on both prices and output over a short time horizon. Samkharadze's study differed from that of Bakradze and Billmeier (2007) in three respects – the use of monthly data, application to a slightly more recent time period, and employing both recursive and structural identification schemes. However, the effects of monetary policy on aggregate demand that Samkharadze found do not provide strong support for an operative bank lending channel in Georgia, since they did not seem to have been transmitted through the banking system, but rather through the volume of currency in circulation.

VII. The Middle East and North Africa (MENA)

On average, the transmission-relevant characteristics of LICs in the Middle East and North Africa are comparable to those in sub-Saharan Africa and central Asia. As in those two regions, the average low-income country in this region has a relatively closed capital account, a relatively fixed exchange rate, poorly developed domestic securities markets (though stock markets in this region tend to be larger and to trade more actively than those considered previously), a small formal financial sector (larger than in sub-Saharan Africa and central Asia, but smaller than in central Europe), and a banking system that both is not very competitive and operates in very poor institutional environment (see the second column in Table 7). However, several low-income countries in the region exhibit somewhat more favorable characteristics. Bahrain, for example, has a well-developed stock market and a relatively large banking sector, and the institutional environments not just in Bahrain, but also in Oman and Tunisia, appear to be significantly more favorable than in the representative LIC in the region.

Table 8 lists the available studies on monetary transmission in Middle Eastern and North African (MENA) low-income countries. Beginning once again with multi-country studies, Ziaei (2009) found a negative association between policy rates and bank lending in cointegrating vectors estimated by dynamic least squares (DOLS) for ten MENA countries. He concluded that changes in policy rates moved bank lending in the opposite direction to the change in the policy rate in these countries, at least in the short run, consistent with the first link in the bank lending channel. However, he did not address the second step in the transmission channel from bank lending to aggregate demand. Neaime (2008) used four-variable VARs (Y, P, S, R) to investigate this second step for both Lebanon and Tunisia, as well as for some emerging-market economies in the region, using a recursive approach to identification. While the point estimates in the IRFs were generally in the expected direction, statistically significant effects of monetary shocks on prices and output in the expected direction were not present in either country.

Boughrara (2008) used a four-variable VAR system to examine monetary transmission in Tunisia and Morocco. He identified monetary policy innovations using a Bernanke-Blinder type of recursive identification scheme in which macro outcome variables (Y and P) were ordered first, followed by "transmission" variables (either the exchange rate, the money stock, or a stock market index, entered separately). The monetary policy variable (a money-market rate) was ordered last, on the Bernanke-Blinder assumption that policy reacts contemporaneously to all the macro variables in the system, but does not contemporaneously affect any of them. Boughrara supplemented this with a Ramey (1993) approach to identifying the role of the bank lending channel – i.e., he contrasted the impulse response functions (IRFs) of prices and output to a monetary policy shock when bank loans were treated as an endogenous variable in the VAR to the responses of the same variables when bank lending was treated as exogenous.

Boughara derived several results that are of interest for our purposes. First, he found no effects of monetary policy innovations on either the exchange rate or asset prices in either country, as would be expected from the heavily-managed exchange rates and small asset markets in these

countries, especially in Tunisia. Second, he found significant differences between the two sets of IRFs (with loans endogenous and exogenous) in Morocco, but less so in Tunisia.[19] Third, he tested for the bank lending channel by running a recursive VAR with the ordering (P, Y, M, R, L, R_L), where L is the stock of loans and R_L is the bank lending rate. He argued that for the bank lending channel to be operative, a monetary contraction would have to be associated (in the impulse response functions) with a contraction in real output as well as a contraction in bank lending and an increase in lending rates. He found that such a pattern did hold for Morocco, but – surprisingly – only in the long run (after 12 quarters) even though output responded in the expected direction after one year. For Tunisia, the emergence of the expected pattern was more immediate. Boughara's results thus provide stronger support for the lending channel in Tunisia than in Morocco. Note that bank concentration is actually smaller in Tunisia than in Morocco and several of the indicators of institutional quality that are most pertinent to the costs of financial intermediation (e.g., government effectiveness, regulatory quality, rule of law, and control of corruption) are stronger in Tunisia than in Morocco.

Turning to studies for individual countries, Moursi, Mossallamy, and Zakareya (2007) examined monetary transmission in Egypt using a variant of the Bernanke-Mihov (1998) semi-structural six-variable (Y, P, CP, TR, UR, R, where TR and UR denote total and unborrowed reserves respectively) VAR approach to identify monetary policy shocks (they used the three-month deposit rate instead of the federal funds rate). They found that, while their estimated monetary policy shock variable accorded well with a priori beliefs about episodes of monetary tightening in Egypt, the effects of this variable on real output and prices proved to be either ambiguous or negligible. Interestingly, effects on the IRF of real output continued to be negligible even when the signs of the IRFs for the deposit rate, unborrowed reserves, and the price level were constrained to satisfy theoretical priors following an approach due to Uhlig (2005). They concluded that "monetary policy shocks in Egypt have virtually no real effect" (page 26).

Al-Mashat and Billmeier (2007) built on the Moursi, Mossallamy, and Zakareya (MMZ) analysis for Egypt by using their measure of the intermediate target of monetary policy in a VAR with the form (Y, P, R_{MMZ} , S), with the international oil price and the US Federal Funds rate included as exogenous variables in the VAR. R_{MMZ} was the monetary policy indicator constructed by MMZ. They achieved identification through the recursive ordering (Y, P, R_{MMZ} , S) among the endogenous variables. Consistent with MMZ, real output showed little response to a monetary policy shock in the short run in their baseline results, and while the response of the price level was in the right direction, neither effect proved to be statistically significant over any horizon. The results were robust to the use of a monetary aggregate as the intermediate target, as well as to reversing the positions of the monetary policy indicator and the exchange rate in the causal ordering.

To investigate the bank lending channel more closely, Al-Mashat and Billmeier estimated several expanded systems. The first was of the form (Y, P, R_L, R_D, R, S), where R_D is the

[19] Unfortunately, he did not construct confidence intervals for the IRFs, so these conclusions were based on comparisons of pint estimates.

deposit rate. For this version, they found that while both bank interest rates moved in the appropriate direction in response to a monetary policy shock, only the change in the deposit rate proved to be statistically significant in the relevant IRF.[20] Secondly, they experimented with various credit aggregates in the position between the price level and the monetary policy indicator. They found that for total credit, output and price responses mimicked those of their baseline specification. When credit to the private and public sectors were disaggregated and a Ramey (1993) approach was used to measure the strength of the credit channel, they found the puzzling result that credit to the public sector had a larger impact than that to the private sector.[21]

Poddar, Sab, and Khashatryan (2007) derived almost identical results for Jordan. They used a three-variable VAR with a recursive ordering {Y, FX, $R_S - R_S^{US}$), where FX is the stock of foreign exchange reserves, $R_S - R_S^{US}$ is the differential between Jordanian and US interest rates, taken to be the monetary policy variable. Real output responses to monetary policy shocks were found to be small and statistically insignificant. To examine the role of various channels of transmission, they augmented their basic specification by inserting the real lending rate R_L, real credit L, a stock price index STK, and the exchange rate S one at a time at various places in the ordering. Contractionary monetary policy shocks tended to increase the lending rate, but to have essentially no effect on real output in any of these specifications. They concluded that there was little evidence in support of any of the standard monetary transmission channels for Jordan.

VIII. ASIA-PACIFIC

Table 9 describes financial characteristics of LICs in Asia and the Pacific. Countries in this region display the familiar pattern observed elsewhere. Among the individual countries listed in the table, India stands out as having the largest public bond market as well as the most developed stock market, the largest banking sector, and the most favorable institutional environment. Yet in all of these respects it falls significantly short of the average level of financial development of the advanced countries, and it both remains much less integrated with international financial markets and maintains a less flexible exchange rate than do the advanced economies.

Studies on the effectiveness of monetary transmission for LICs in this region are scarce. Table 10 reports the results of studies for Pakistan, India, Fiji, and Papua New Guinea.

An early study for Pakistan is by Agha et al (2005). They investigated monetary transmission in Pakistan by implementing the Ramey (1993) approach in the context of a four-variable recursive VAR with the ordering (Y, P, X, R_S), where X was alternatively the stock of real bank credit, a stock price index, and the real exchange rate. They also implemented a version of their system

[20] They do not report how this modification affected real output and price level responses to monetary policy shocks.

[21] While this appears to be inconsistent with the theoretical role of the credit channel, it may be rationalized in terms of the large role of public enterprises in the Egyptian economy. Al-Mashat and Billmeier do not emphasize this point, however.

with all three of these variables included. In their baseline results (excluding X), they found a negative output response to a monetary contraction. However, they did not report confidence bands, so the statistical significance of this response is hard to assess. In addition, their baseline results featured a "price puzzle." Including real bank credit in the model dampened the response of real output to a monetary policy shock, but comparing the response of real output to a change in monetary policy when bank credit is allowed to respond endogenously and when it is not, they detected a notable difference, at least after six months. Again, however, the absence of confidence bands makes it impossible to determine whether either the response of output, or the impact of the credit channel is statistically significant. Subsequently, Alam and Waheed (2006) also used recursive VARs (with three variables in their case, ordered Y, P, R_S) to examine monetary transmission in Pakistan, both at the aggregate and sectoral level. They did report confidence bands, and found that, while the response of aggregate output to a monetary policy shock had the right sign, it was small and statistically insignificant. Statistically significant effects over any horizon were found only for manufacturing and wholesale and retail trade. Inclusion of the nominal exchange rate in the system did not alter these results, and the results were also little changed by restricting the sample to the period following important financial sector reforms in Pakistan.

Mallick (2009) investigated monetary transmission in India using a five-variable VAR. He applied both recursive and structural identification schemes. With the recursive ordering (Y, P, R_S , R_{LT}, S), where R_{LT} is a long-term interest rate, a contractionary monetary policy shock (in the form of a positive innovation in R_S) was associated with a weak but statistically significant reduction in real output in the second and third quarters after the shock. However, the effects on the price level were counterintuitively *positive.* Monetary policy shocks accounted for a small part of the forecast error variance in real output, leading Mallick to conclude that demand shocks have been of "relatively limited importance" in India (page 21). Using a structural Sims-Zha identification scheme, Mallick found no statistically significant effect on real output, but once again a "price puzzle," in the form of a positive price level response to a contractionary monetary policy shock.

Finally, Ahmad (2008) used a VAR framework with a recursive Sims ordering for Fiji and Papua New Guinea. He does not report impulse response functions, but instead evaluates the importance of the bank lending channel by computing variance decompositions to assess the relative contributions of bank-related variables (reserves, deposits, lending) to explain the variation in real output in these two countries. He finds that innovations in bank reserves and deposits played an important role in explaining output variation in Fiji, while bank loans were dominant in Papua New Guinea. In the absence of tests of statistical significance, however, these results are obviously hard to interpret.

IX. Latin America and the Caribbean

Our final region is Latin America and the Caribbean. The LICs in this region tend to be more integrated with international financial markets than those considered before, and since on

average their exchange rate regimes are, if anything, somewhat less flexible than in other regions, macroeconomic factors are less conducive to monetary policy effectiveness. While stock markets tend to be larger in this region, stocks are less actively traded. Banking systems tend to be larger, but banks operate with significantly larger net interest margins than in other regions, even though concentration ratios are not very different from those elsewhere. By comparison with other geographic regions, the institutional context for the financial sector is relatively favorable, though less so than in central and Eastern Europe and far less so in the advanced economies. Table 11 provides an overview.

Research on the effectiveness of monetary transmission in Latin America and the Caribbean (Table 12) has reached somewhat contradictory conclusions. Kendall (2001) provides a multi-country study for six Caribbean countries. He examined the first stage of transmission from monetary policy (in the form of changes in discount rates, required reserve ratios, and short-term Treasury bill rates) to bank lending rates in the Bahamas, Barbados, Belize, Guyana, Jamaica, and Trinidad. To do so, he used six-variable VARs, with recursive identification ordered as (R_{TB}^{US}, R_L, R_D, rr, R, R_{TB}), where R_{TB}^{US} is the US Treasury Bill rate, rr is the domestic reserve ratio, R_S is the discount rate, and R_{TB} is the domestic Treasury bill rate. He also considered an alternative ordering in which the lending rate was placed last. Kendall found that responses of lending rates were highly heterogeneous in these countries, both with respect to magnitude as well as duration.[22] Positive shocks to the discount rate had weak and rapidly-dissipating effects on bank lending rates, while positive shocks to the required reserve ratio surprisingly had *negative* effects on bank lending rates in all countries but Trinidad and Barbados.

Few country-specific papers are available for low-income countries in this region. In an early paper, Robinson and Robinson (1997) explored transmission in Jamaica using an 8-variable recursive VAR of the form (R_S, R_{TB}, M0, L, M3, S, P, Y), where R_S is the repo rate, M0 is the monetary base, and M3 is broad money. Impulse responses suggested a *positive* short-run response of real activity to monetary tightening (in the form of an increase in the repo rate), as well as a sustained price puzzle. They did not report confidence intervals for these IRFs. Duran-Viquez and Esquivel-Monge (2008) considered the effect of policy interest rates on commercial bank loan and deposit rates in Costa Rica (the first stage in the bank lending channel). They found that the policy rate Granger-caused both bank deposit as well as lending rates. Using a vector error-correction (VECM) approach, they found that pass-through from policy rates to both deposit and loan rates was essentially full in the long run (though the point estimates for the lending rate were larger than for the deposit rate) in Costa Rica, in contrast with the results reported above for the Caribbean economies. Pass-through rates were larger for private than for government-owned banks. Duran-Viquez and Esquivel-Monge did not investigate the effects of bank lending rates on aggregate economic activity.

[22] He did not report confidence intervals, however.

As in other regions, studies employing structural identification techniques are scarce. Ramlogan (2007) examined monetary transmission in Trinidad using a six-variable VAR of the form (G, D, L, PY, P, rr) where G is government spending, D and L refer respectively to deposits and loans in the banking system, PY is nominal GDP, and RR is required reserves. She employed her own structural identification scheme. In this scheme G is taken as exogenous, the stock of deposits as affected by all variables except the volume of lending, the stock of loans as contemporaneously unresponsive to government spending shocks or shocks to deposits, nominal income as responding to all variables except required reserves, the price level as affected by shocks to nominal income, and required reserves as affected by all variables except the stocks of deposits and loans. Required reserves were considered to be the monetary policy variable. Ramlogan found that monetary tightening (an increase in required reserves) resulted in a contraction in bank credit that was accompanied by slower growth and lower inflation, but she did not report confidence intervals for the IRFs.

X. SUMMARY AND CONCLUSIONS

It is very hard to come away from this review of the evidence with much confidence in the strength of monetary transmission in low-income countries. We failed to uncover *any* instances in which more than one careful study confirmed results for the effects of monetary shocks on aggregate demand that are similar to the consensus effects in the United States or other advanced countries. The question is how to interpret this state of affairs. As suggested by Egert and Macdonald (2009) (for the case of transition economies in central and Eastern Europe), it is likely to reflect some combination of the facts on the ground and shortcomings in the empirical methods that have been applied to this issue. For the reasons we indicated in the introduction, it is vitally important to determine the contributions of each of these factors.

There is no doubt that methodological shortcomings abound in this literature. For example:

- Open-economy considerations are not always included in the estimated VAR systems. There is substantial evidence that policymakers in developing countries react to external variables. The "fear of floating" literature, for example, suggests an important role for the exchange rate in the monetary authorities' reaction functions. More generally, in an open-economy context, the interaction between monetary and exchange rate policy cannot be ignored. The frequent cases in which this is done suggest that the monetary policy shock is often misspecified in these papers.

- Few – if any – papers base their specification of the behavior of the monetary authorities on independent evidence about how monetary policy has actually been conducted in the relevant country. In general, identification assumptions concerning the information available to the monetary authorities and lags in policy effects appear to be largely arbitrary or taken from the industrial-country literature.

- While there are exceptions, surprisingly little attention has been paid to within-sample changes in factors that could affect the workings of the transmission mechanism, such as financial reforms, the exchange rate regime, and capital account restrictions.

Distinguishing between the "facts on the ground" and "methodological deficiencies" interpretations of the absence of evidence for strong monetary transmission will therefore have to await studies on individual countries that pay careful attention to factors such as these. One objective of this paper is to motivate such studies.

We suspect, however, that "facts on the ground" may indeed be an important part of the story. The failure of a wide range of empirical approaches to yield consistent and convincing evidence of effective monetary transmission in low-income countries, and that the strongest evidence for effective monetary transmission has arisen for relatively prosperous and more institutionally-developed countries such as some Central and Eastern European transition economies (at least in the later stages of their transition) and countries such as Morocco and Tunisia, make us doubt whether methodological shortcomings are the whole story. If this conjecture is correct, the stabilization challenge in developing countries is acute indeed, and identifying the means of enhancing the effectiveness of monetary policy in such countries is an important challenge.[23] Testing this conjecture therefore deserves a prominent place in the research agenda on stabilization policies in developing countries.

[23] We have explored some of the policy implications of the validity of this conjecture elsewhere (see Mishra, Montiel, and Spilimbergo, forthcoming).

Appendix. Institutional Quality, Bank Competition, and the Effectiveness of the Bank lending Channel

Consider a representative commercial bank that manages a portfolio consisting of loans (L), government securities (B), as well as reserves (R), and finances it by issuing deposits (D) and obtaining central bank credit (C). The bank's demand for central bank credit is therefore given by:

$$C = L + B + R - D \tag{1}$$

To capture the role of imperfect competition in the banking sector, assume that the bank has market power in both the loan and deposit markets, so it faces a demand for loans given by:

$$L = L(i_L),\ L' < 0, \tag{2a}$$

and a supply of deposits:

$$D = D(i_D),\ D' > 0, \tag{2b}$$

where i_L and i_D are respectively the loan and deposit rates set by the bank. However, the bank has no market power in the market for government securities, where it faces the market interest rate i_B. As is well known, credit market frictions (asymmetric information and costly contract enforcement) make lending a costly activity and justify the existence of banks. To capture this phenomenon, costs of intermediation are taken to be an increasing and convex function of the volume of loans intermediated:

$$c = c(L), \text{ with } c' > 0,\ c'' > 0 \tag{3}$$

The more unfavorable the domestic institutional environment is for financial intermediation, the more rapidly these costs increase with the volume of funds being intermediated – i.e., when the institutional environment is very unfavorable, as in the case of many developing countries, we should expect $c'' >> 0$. The idea is that in such an environment, lending becomes more costly as banks expand beyond their traditional customers that they know well, and that this effect is stronger in countries with weak institutional settings.

The "lemons" problem associated with asymmetric information about loan quality makes bank loans illiquid, and the absence of a secondary market for government securities makes those instruments illiquid as well. The bank therefore values reserves because they provide the only available liquid buffer against unanticipated deposit withdrawals (for simplicity, we assume that there are no required reserves). This "liquidity premium," which we denote ρ, is a decreasing and convex function of the ratio of reserves to deposits, i.e.:

$$\rho = \rho(R/D), \text{ with } \rho' < 0 \text{ and } \rho'' > 0. \tag{4}$$

The central bank charges the interest rate i_C for credit extended to commercial banks, but rations this credit among individual commercial banks. Thus each bank faces the constraint:

$$C \leq C_{bar}, \tag{5}$$

with C_{bar} denoting the maximum amount of central bank credit available to this bank.

Under these conditions, the bank's problem is to set its lending and deposit rates, and to choose its holdings of government securities and reserves, so as to maximize profits, subject to its balance sheet constraint (1) and the supply of central bank credit (5). In other words, its problem is to:

$$Max\ \pi\ (i_L,\ i_D,\ B,\ R) = i_L L(i_L) + i_B B + \rho(R/D)R - c(L) - i_D D(i_D) - i_C C$$

subject to (1) and (5), as well as to nonnegativity constraints on its balance sheet variables. We will assume that the nonnegativity constraints are not binding, but that the central bank's credit constraint (5) is. Under these assumptions, the first-order conditions are given by:

$$L + i_L L' - c'L' - i_C L' - \lambda L' = 0 \tag{6a}$$

$$- \rho э(K.B)^2 B э - B - ш_B B э + ш_C B э + \lambda B э = 0 \tag{6и}$$

$$i_B - i_C - \lambda = 0 \tag{6c}$$

$$\rho + \rho' R/D - i_C - \lambda = 0 \tag{6d}$$

Notice from (6c) that for the central bank credit constraint to be binding (i.e., for $\lambda > 0$), we must have $i_B > i_C$. The intuition is straightforward: as long as the return on government securities exceeds the interest rate on bank credit, the bank would always prefer to borrow additional amounts from the central bank in order to purchase more government securities. We assume that the condition $i_B > i_C$ holds. Notice also from (6c) that $i_C + \lambda = i_B$. Substituting this expression in (6d) yields the bank's demand for reserves as a function of its deposit base and the interest rate on government securities:

$$R = h(i_B)D, \text{ where } h' = 1/\rho'(1 - \eta) < 0.^{24} \tag{7}$$

From (6a) and (6c) we can express the optimal lending rate as:

$$i_L = (1 - 1/\xi_L)^{-1} (i_B + c'(L)), \tag{8}$$

where $\xi_L = - L'i_L/L > 1$ is the elasticity of loan demand. This equation expresses the loan interest rate as a markup $(1 - 1/\xi_L)^{-1} > 1$ over the marginal cost of loanable funds, where the latter is

[24] $\eta = - (\rho'R/D)/\rho > 0$ is the elasticity of the liquidity premium with respect to the reserve/deposit ratio. For an interior solution, we must have $0 < \eta < 1$, which implies $1/\rho'(1 - \eta) < 0$.

given by the foregone return on government securities plus marginal intermediation costs. This markup is larger the less competitive the banking environment – i.e., the less elastic the demand for loans facing an individual bank. Finally, using (6c), (6d) and (7) in (6b), the deposit rate is given by:

$$i_D = (1 + 1/\xi_D)^{-1} [i_B (1 - h) + \rho h], \tag{9}$$

where ξ_D is the deposit supply elasticity.

Our primary concern is with the "pass-through" from the interest rate on government securities, which is the policy rate determined by the central bank, and commercial banks' lending rates.[25] To see how this pass-through is affected by imperfect competition in the banking sector and a poor institutional environment, consider the simple case in which the loan demand curve is linear – i.e., $L = \alpha_0 - \alpha_1 i_L$ and lending costs are given by:

$$c(L) = 0 \text{ for } L \leq L^*$$

$$= g(L) \text{ for } L \geq L^*, \text{ with } g' > 0 \text{ and } g'' > 0.$$

The assumption is that in the dualistic production environment that tends to characterize many LICs, with a few large, well-capitalized and transparent firms and a large number of small, poorly capitalized and opaque ones, banks face minimal screening, monitoring, and contract enforcement costs when lending to the former, but steeply rising costs when extending loans beyond their favored borrowers (i.e., beyond some threshold L^*). In this case, the elasticity of loan demand is given by $\xi_L = (\alpha_0/L - 1)$. Substituting this expression in equation (8) and differentiating we can derive:

$$di_L/di_B = \frac{1}{2 + \alpha_1 g''} > 0 \tag{10}$$

for $L \geq L^*$. The key point for our purposes is that this "pass-through" coefficient is a decreasing function of both α_1 and g''. Since α_1 is an (inverse) indicator of the degree of monopoly power in the banking system, this result indicates that the greater the degree of monopoly power in the banking system and the more rapidly the marginal (screening, monitoring, and contract enforcement) costs rise with the volume of loans, the smaller the impact of the central bank's policy rate on banks' lending rates. What this means is that when the banking system is uncompetitive and the institutional environment for finance is deficient, banks are less likely to adjust their lending rates in response to changes in the central bank's policy rate. Similarly, since $dL/di_B = (dL/di_L)(di_L/di_B)$, we have:

[25] Notice that i_C does not serve as the policy rate. This follows from the assumption that the central bank credit constraint is binding -- i.e. it does not extend unlimited amounts of credit at this rate.

$$dL/di_B = \frac{-1}{2/\alpha_1 + g''} < 0 \qquad (11)$$

Thus, when banks' monopoly power is strong (so α_1 is small) and intermediation costs are steeply increasing with the volume of bank lending (so g'' is large), changes in the central bank's policy rate will have weak effects on the volume of bank lending.

Moreover, since equations (2a) and (8) imply that the lending rate depends only on i_B, any other central bank action, such as changes in the supply of credit to banks or in the discount rate, would also leave the lending rate unchanged so long as such actions do not change the policy rate i_B. Finally, it is easy to see that it is not just the strength of the pass-through effect and the sensitivity of bank lending to the central bank's policy rate that are at issue here, but also the reliability of these effects. The reason is that any factor that unexpectedly alters the shape of commercial banks' intermediation cost curve (including changes in the stability of the domestic macroeconomic environment, in the policy regime, or in the institutional framework governing financial intermediation) will also affect the extent of pass-through from the policy rate to bank lending rates, as well as the effects of the policy rate on the volume of bank loans, by changing g''.

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Table 1. Financial Environment Across Countries, Sub-Saharan Africa

	Indicator	**All Advanced**	LICs in SSA	Botswana	Ghana	Kenya	Lesotho	Malawi	Namibia	Nigeria	Sierra Leone	South Africa	Tanzania	Uganda	Zambia
A. Macro indicators	*De facto* financial integration	**4.40**	0.84	0.72	1.04	0.32		0.46		1.19		1.31	0.62	0.48	1.16
	Exchange rate regime	**1 or 4**	1.82	3	2	2	1	2	1	3	4	4	2	2	4
B. Securities market development	Private bond market capitalization/ GDP	**0.51**										0.13			
	Public bond market capitalization/GDP	**0.46**										0.32			
	Securities market index	**0.67**	0.51		0.67	0.67				1.00		0.67	0.67	0.33	
C. Stock market development	Stock market capitalization / GDP	**2.12**	0.19	0.24	0.20	0.28		0.07	0.07	0.15		2.12	0.04	0.01	0.10
	Stock market total value traded / GDP	**0.83**	0.01	0.00	0.01	0.03		0.00	0.00	0.02		0.83	0.00	0.00	0.00
	Stock market turnover ratio	**0.35**	0.04	0.02	0.04	0.08		0.03	0.02	0.10		0.35	0.02	0.03	0.01
	Number of listed comp per 10k population	**0.08**	0.05	0.10	0.01	0.01		0.01	0.06	0.02		0.08	0.00	0.00	0.01
D. Size of banking sector	Deposit money bank assets / GDP	**1.24**	0.19	0.21	0.25	0.33	0.13	0.11		0.17	0.10	0.72	0.11	0.13	0.14
	Other fin. Inst. assets / GDP	**0.55**	0.04			0.02		0.07				1.04			
E. Bank competition	Net Interest margin	**0.02**	0.08	0.05	0.10	0.07	0.04	0.12	0.05	0.06	0.12	0.07	0.06	0.12	0.10
	Bank concentration	**0.67**	0.76	0.78	0.77	0.50	1.00	0.88	0.78	0.44	0.86	0.92	0.59	0.62	0.59
	Entry barriers/pro-competition measures index	**1.00**	0.90		0.67	1.00				1.00		1.00	1.00	1.00	
F. Governance Indicators 2008	Voice and accountability	**1.08**	-0.50	0.55	0.48	-0.16	0.04	-0.18	0.57	-0.60	-0.28	0.68	-0.09	-0.47	-0.09
	Political stability & absence of violence/terrorism	**0.92**	-0.47	0.96	0.06	-1.25	-0.03	0.05	0.96	-2.01	-0.23	-0.04	0.01	-0.88	0.29
	Government effectiveness	**1.44**	-0.78	0.67	-0.08	-0.60	-0.31	-0.65	0.31	-0.98	-1.13	0.75	-0.45	-0.51	-0.66
	Regulatory quality	**1.34**	-0.65	0.52	0.08	-0.07	-0.63	-0.39	0.13	-0.62	-0.86	0.63	-0.39	-0.08	-0.33
	Rule of law	**1.47**	-0.71	0.64	-0.10	-0.98	-0.30	-0.29	0.36	-1.12	-1.03	0.12	-0.28	-0.51	-0.50
	Control of corruption	**1.54**	-0.63	1.00	-0.06	-1.01	0.04	-0.59	0.59	-0.92	-1.07	0.30	-0.51	-0.79	-0.48

Notes. All data are for 2005, unless otherwise mentioned. Columns (1)-(2) show averages for all advanced countries and for low-income countries (LICs) within the region. Columns (3) and on show the values of the variables at the country-level, wherever available for the countries we survey in the text. Higher values of the measure of international financial integration indicate higher degree of integration. Higher values of the exchange rate regime indicator indicate more flexible exchange rate regimes. Securities market index relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. Entry barriers/pro-competition measures index measures competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks. Higher values of the securities market index, as well as of entry barriers/pro-competition index, indicate greater degree of deregulation. Governance indicators are increasing in the level of governance.
Sources: the financial integration measure is from Dhungana (2008); the exchange rate regime indicator is from the IMF; the securities market and entry barriers/ pro-competition indices are from IMF (2008); the remaining indicators in rows B-E are from Beck, Demirguc-Kunt and Levine (2009); governance Indicators (2008), are taken from Kaufman, Kraay and Mastruzzi (2009).

Table 2. Monetary Transmission in Sub-Saharan Africa

A. Recursive Identification					
Authors	**Country and sample period**	**VAR***	**Policy variable**	**Identification**	**Main findings**
Uanguta and Ikhide (2002)	Namibia, 1990M1 to 1999M12.	IP, P, L, R_L, R_S^{SA}, M2	R_S^{SA}	Peersman-Smets	Shocks to R_S^{SA} rate are transmitted to lending rates and private investment in Namibia.
Abradu-Otoo, Amoah, and Bawumia (2003)	Ghana, 1969Q1 to 2002Q4.	P, Y, , L, M2, R_{TB}, RER	M2, R_{TB}	GIR	No statistically significant effects with either the T-bill rate or M2 as the policy variable, several puzzles.
Saxegaard (2006)	CEMAC countries, Nigeria and Uganda, 1990Q1 to 2004Q4.	Y, ΔP, S, M0	M0	Bernanke-Blinder	Threshold vector autoregressions (TVAR); a M0 shock has weaker effects on Y and ΔP when bank liquidity is high in Nigeria and Uganda, no effect in CEMAC.
Cheng (2006)	Kenya, 1997M1 to 2005M6.	Y, P, M3, R_S, S	R_S	Peersman-Smets	Shocks to R_S have significant effects on P and S, but not on Y.
Lungu (2008)	Botswana, Malawi, Namibia, South Africa and Zambia, 1990M1 to 2006M12	Y, M2, M0, P, R_S, L, R_L, R_D	R_S	Peersman-Smets	Mixed evidence. While R_L and R_D respond to innovations in R_S, the impact on P, Y and L is limited.
Ogunkula and Tarawalie (2008)	Sierra Leone, 1990Q1 to 2006Q2	P, Y, R, L, S, R_S	R_S	Bernanke-Blinder	Shocks to R_S are transmitted to Y, R, L, and S as expected. However, permanent effects on all variables, price puzzle, and no confidence intervals for IRFs.
Buigut (2009)	Kenya, Tanzania and Uganda, 1984 (1985 for Uganda) to 2005 (2006 for Kenya)	Y, ΔP, R_S	R_S	Bernanke-Blinder	The effects of an R_S shock on Y and ΔP are not significant.
Ramcharan (2010)	Botswana, Lesotho, Namibia, and Malawi, 2001M1 to 2008M12	P, R_S^{SA}	R_S^{SA}	Forecast-based	Shocks to R_S^{SA} have no statistically significant effects on P.

Davoodi, Dixit, Pinter (2012)	Burundi, Kenya, Rwanda, Tanzania, Uganda, 2000:M1 to 2010:M12	Y, P, M0, R_S, L, S	M0, R_S	Peersman-Smets	Mixed results, but no consistent statistically significant effects on Y and P with either policy instrument for any country.
Montiel, Adam, Mbowe, O'Connell (2012)	Tanzania, 2001:M12 to 2010:M12	S, M2, MO, R_L, P, Y	M0	Montiel et. al.	Small, but statistically significant effect on P over a six-month horizon, no significant effect on Y.
B. Structural Identification					
Cheng (2006)	Kenya, 1997:M1 to 2005:M6.	Y, P, M3, R_S, S	R_S	Sims-Zha	Shocks to R_S have significant effects on P and S, but not on Y.
Ngalawa (2009)	Malawi, 1988:M1 to 2005:M12	Y, P, M0, M3, L, R_S, S	R_S	Sims-Zha	Shocks to R_S affect L, Y, and P in the theoretically-expected direction, but none of IRFs are statistically significant. .
Mugume (2011)	Uganda, 1999:Q1, 2009:Q1	Y, P, M2, R_{TB}, S	R_{TB}	Sims-Zha	Effects on Y oscillate, while those on P are in the right direction. Y effects are significant for only one quarter, P effects never significant.
Montiel, Adam, Mbowe, O'Connell (2012)	Tanzania, 2001:M12 to 2010:M12	Y, P, M0, M2, R_L, S	M0	Montiel et. al.	Effects on Y and P are in the right direction, but very small and statistically insignificant.

* The symbols in this column represent the following: Y = real output, P = the domestic price level, M0 = base money, M2, M3 = alternative measures of broad money, L = bank lending to the private sector, R_L = bank lending rate, R_D = deposit rate, R_{TB} = T-bill rate, R_S = central bank policy rate, S= nominal exchange rate, RER = real exchange rate, IP = private investment.. the superscript "SA" indicates that the policy rate in question is that of the South African Reserve Bank.

Table 3. Financial Environment Across Countries, Central and Eastern Europe

	Indicator	**All Advanced**	LICs in CEE	Bulgaria	Croatia	Estonia	Latvia	Lithuania	Romania	Slovak Republic
A. Macro indicators	*De facto* financial integration	**4.40**	0.66						0.66	
	Exchange rate regime	**1 or 4**	1.82	1	2	1	2	2	3	2
B. Securities market development	Private bond market capitalization/ GDP	**0.51**	0.00		0.00					0.00
	Public bond market capitalization/GDP	**0.46**	0.22		0.17					0.28
	Securities market index	**0.67**	0.72	0.33		1.00	1.00	1.00	1.00	
C. Stock market development	Stock market capitalization / GDP	**2.12**	0.22	0.15	0.31	0.35	0.13	0.29	0.16	0.09
	Stock market total value traded / GDP	**0.83**	0.05	0.05	0.02	0.18	0.01	0.03	0.03	0.00
	Stock market turnover ratio	**0.35**	0.18	0.27	0.06	0.71	0.04	0.09	0.17	0.02
	Number of listed comp per 10k population	**0.08**	0.45	0.43	0.33	0.11	0.20	0.13	1.73	0.39
D. Size of banking sector	Deposit money bank assets / GDP	**1.24**	0.48	0.44	0.70	0.64	0.58	0.38	0.18	0.51
	Other fin. Inst. assets / GDP	**0.55**								
E. Bank competition	Net Interest margin	**0.02**	0.04	0.05	0.04	0.03	0.03	0.02	0.05	0.02
	Bank concentration	**0.67**	0.67	0.40	0.64	0.98	0.57	0.78	0.65	0.72
	Entry barriers/pro-competition measures index	**1.00**	1.00	1.00		1.00	1.00	1.00	1.00	
F. Governance Indicators 2008	Voice and accountability	**1.08**	0.55	0.60	0.48	1.03	0.86	0.85	0.48	0.89
	Political stability & absence of violence/terrorism	**0.92**	0.28	0.39	0.57	0.57	0.40	0.73	0.30	0.92
	Government effectiveness	**1.44**	0.24	0.10	0.52	1.15	0.56	0.64	-0.14	0.76
	Regulatory quality	**1.34**	0.64	0.75	0.50	1.47	1.07	1.14	0.53	1.14
	Rule of law	**1.47**	0.14	-0.12	0.08	1.05	0.73	0.58	-0.05	0.52
	Control of corruption	**1.54**	0.08	-0.17	0.12	0.94	0.29	0.18	-0.06	0.43

Notes. All data are for 2005, unless otherwise mentioned. Columns (1)-(2) show averages for all advanced countries and for low-income countries (LICs) within the region. Columns (3) and on show the values of the variables at the country-level, wherever available for the countries we survey in the text. Higher values of the measure of international financial integration indicate higher degree of integration. Higher values of the exchange rate regime indicator indicate more flexible exchange rate regimes. Securities market index relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. Entry barriers/pro-competition measures index measures competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks. Higher values of the securities market index, as well as of entry barriers/pro-competition index, indicate greater degree of deregulation. Governance indicators are increasing in the level of governance.
Sources: the financial integration measure is from Dhungana (2008); the exchange rate regime indicator is from the IMF; the securities market and entry barriers/ pro-competition indices are from IMF (2008); the remaining indicators in rows B-E are from Beck, Demirguc-Kunt and Levine (2009); governance Indicators (2008), are taken from Kaufman, Kraay and Mastruzzi (2009).

Table 4. Monetary Transmission in Central and Eastern Europe

A. Recursive Identification					
Authors	**Country and sample period**	**VAR***	**Policy variable**	**Identification**	**Main findings**
Ganev et. al. (2002)	Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovak Republic, 1995:M1 to 2000:M12.	Y, ΔP^C , R_S, S	R_S	GIR	Monetary contraction reduces output only in the Slovak Rep., reduces ΔP^C only in Lithuania. No consistent effect on output and prices in any country.
Lang and Krznar (2004)	Croatia, 1999:M6 to 2003:M12	ΔY, ΔP, CA/Y, S, ERES/TRES	ERES/TRES	Bernanke-Blinder	Monetary contraction reduces Y in the short run and improves CA/Y, but counter-intuitively increases P.
Elbourne and de Haan (2009)	Slovak Republic, 1998:M10 to 2004:M7	CP, R^G_S, Y, P, M, R_S , S	R_S	Peersman-Smets	Counterintuitive effect on Y, no statistically significant effect on P.
B. Structural Identification					
Elbourne and de Haan (2009)	Slovak Republic, 1998:M10 to 2004:M7	CP, R^G_S, Y, P, M, R_S , S	R_S	Kim-Roubini	Negative effect of monetary contraction on P, but positive (insignificant) effect on Y.

* The symbols in this column represent the following: Y = real output, P = the domestic price level, $_{\Delta PC}$ = core inflation, M = monetary aggregate, R_S = central bank policy rate, S= nominal exchange rate, CA = current account, ERES = bank excess reserves, TRES = bank total reserves. The superscript "G" indicates that the policy rate in question is that of the Bundesbank.

Table 5. Financial Environment Across Countries, Central Asia

	Indicator	**All Advanced**	LICs in CIS	Armenia	Georgia	Kazakhstan	Kyrgyz Republic	Tajikistan
A. Macro indicators	*De facto* financial integration	**4.40**	0.64		0.64			
	Exchange rate regime	**1 or 4**	1.80	2	2	2	2	2
B. Securities market development	Private bond market capitalization/ GDP	**0.51**						
	Public bond market capitalization/GDP	**0.46**						
	Securities market index	**0.67**	0.52		0.67	0.67	0.33	
C. Stock market development	Stock market capitalization / GDP	**2.12**	0.06	0.01	0.04	0.13	0.02	
	Stock market total value traded / GDP	**0.83**	0.01	0.00	0.01	0.02	0.01	
	Stock market turnover ratio	**0.35**	0.24	0.03	0.11	0.10	0.31	
	Number of listed comp per 10k population	**0.08**	0.42	0.66	0.57	0.04	0.02	
D. Size of banking sector	Deposit money bank assets / GDP	**1.24**	0.20	0.09	0.12	0.30	0.08	
	Other fin. Inst. assets / GDP	**0.55**						
E. Bank competition	Net Interest margin	**0.02**	0.06	0.06	0.08	0.05	0.06	
	Bank concentration	**0.67**	0.69	0.69	0.75	0.66	0.80	
	Entry barriers/pro-competition measures index	**1.00**	0.90		1.00	0.33	1.00	
F. Governance Indicators 2008	Voice and accountability	**1.08**	-0.90	-0.66	-0.25	-1.01	-0.72	-1.32
	Political stability & absence of violence/terrorism	**0.92**	-0.22	0.01	-1.00	0.51	-0.68	-0.74
	Government effectiveness	**1.44**	-0.63	-0.07	0.18	-0.47	-0.70	-0.88
	Regulatory quality	**1.34**	-0.55	0.32	0.59	-0.37	-0.32	-0.97
	Rule of law	**1.47**	-0.81	-0.36	-0.34	-0.78	-1.26	-1.12
	Control of corruption	**1.54**	-0.83	-0.54	-0.23	-0.95	-1.06	-0.99

Notes. All data are for 2005, unless otherwise mentioned. Columns (1)-(2) show averages for all advanced countries and for low-income countries (LICs) within the region. Columns (3) and on show the values of the variables at the country-level, wherever available for the countries we survey in the text. Higher values of the measure of international financial integration indicate higher degree of integration. Higher values of the exchange rate regime indicator indicate more flexible exchange rate regimes. Securities market index relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. Entry barriers/pro-competition measures index measures competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks. Higher values of the securities market index, as well as of entry barriers/pro-competition index, indicate greater degree of deregulation. Governance indicators are increasing in the level of governance.
Sources: the financial integration measure is from Dhungana (2008); the exchange rate regime indicator is from the IMF; the securities market and entry barriers/ pro-competition indices are from IMF (2008); the remaining indicators in rows B-E are from Beck, Demirguc-Kunt and Levine (2009); governance Indicators (2008), are taken from Kaufman, Kraay and Mastruzzi (2009).

Table 6. Monetary Transmission in Central Asia

A. Recursive Identification					
Authors	**Country and sample period**	**VAR***	**Policy variable**	**Identification**	**Main findings**
Dabla-Norris and Floerkemeier (2006)	Armenia, 2000:M5 to 2005:M12	Y, P, R, M, S	R, M	Peersman-Smets	Monetary aggregates affect Y, but not P; repo rates affect P, but not Y.
Bakradze and Billmeier (2007)	Georgia, 1999:Q1 to 2006:Q4	Y, P, M, FX, S	M	Peersman-Smets	Monetary policy shocks have positive and statistically significant effects on Y only for the first two quarters, but no significant effects on P.
Samkharadze (2008)	Georgia, 2002:M6 to 2007:M5	Y, P, R_L, M, S	M	Peersman-Smets	Significant effects of monetary aggregates on P and Y, but no coherent effects of bank lending rates or loan supply on these variables.
Isakova (2008)	Kazakhstan, 1995:M1 to 2006:M12, Kyrgyz Republic, 1995:M9 to 2006:M12, Tajikistan, 2001:M1 to 2006:M12.	Y, P, M, R_S, S	R_S	Peersman-Smets	The bank lending channel has been unimportant even though changes in policy rates are effectively passed through to market interest rates.
Bordon and Weber (2010)	Armenia, 2000:M1 to 2010:M5	Y, P, R_S, M, S	M, R_S	Peersman-Smets	Monetary policy has a statistically significant effect on Y, but not on P, in the full sample. In the pre-2006 (low dollarization) period, it has stronger effects on both Y and P in the expected direction, but the effects on P are not statistically significant.
B. Structural Identification					
Samkharadze (2008)	Georgia, 2002:M6 to 2007:M5	Y, P, M, R_L, S	M	Sims-Zha	Significant effects of monetary aggregates on P and Y, but no coherent effects of bank lending rates or loan supply on these variables.

* The symbols in this column represent the following: Y = real output, P = the domestic price level, M= Monetary aggregate, FX = foreign exchange reserves, R_L = bank lending rate, R_S = central bank policy rate, S= nominal exchange rate..

Table 7. Financial Environment Across Countries, Middle East and North Africa

	Indicator	**All Advanced**	LICs in MENA	Algeria	Bahrain	Egypt	Jordan	Kuwait	Lebanon	Morocco	Oman	Qatar	Tunisia	Turkey
A. Macro indicators	*De facto* financial integration	**4.40**	1.05	0.52		0.63	1.04		2.50	0.89	0.63		1.29	0.94
	Exchange rate regime	**1 or 4**	1.86	2	1	1	1	1	1	2		1	2	4
B. Securities market development	Private bond market capitalization/ GDP	**0.51**	0.00						0.00					0.00
	Public bond market capitalization/GDP	**0.46**	0.85						0.85					0.37
	Securities market index	**0.67**	0.67	0.33		0.67	1.00			0.67			1.00	0.67
C. Stock market development	Stock market capitalization / GDP	**2.12**	0.36		0.97	0.66	2.23	1.19	0.17	0.45	0.35	1.66	0.10	0.27
	Stock market total value traded / GDP	**0.83**	0.05		0.04	0.28	1.89	1.12	0.04	0.07	0.10	0.66	0.02	0.42
	Stock market turnover ratio	**0.35**	0.16		0.04	0.32	0.63	0.72	0.19	0.15	0.21	0.32	0.16	1.25
	Number of listed comp per 10k population	**0.08**	0.23		0.65	0.10	0.37	0.56	0.03	0.02	0.38	0.39	0.05	0.04
D. Size of banking sector	Deposit money bank assets / GDP	**1.24**	0.31	0.33	0.58	0.81	0.96	0.57		0.64	0.33	0.44	0.66	0.40
	Other fin. Inst. assets / GDP	**0.55**	0.06	0.00	0.13			0.06					0.03	
E. Bank competition	Net Interest margin	**0.02**	0.04	0.05	0.02	0.02	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.08
	Bank concentration	**0.67**	0.76	0.91	0.80	0.58	0.85	0.66	0.40	0.66	0.84	0.89	0.45	0.96
	Entry barriers/pro-competition measures index	**1.00**	1.00	1.00		1.00	1.00			0.67			1.00	1.00
F. Governance Indicators 2008	Voice and accountability	**1.08**	-1.23	-1.05	-0.82	-1.19	-0.71	-0.53	-0.40	-0.70	-1.07	-0.77	-1.26	-0.19
	Political stability & absence of violence/terrorism	**0.92**	-0.87	-1.15	-0.18	-0.67	-0.32	0.45	-1.94	-0.47	0.95	1.01	0.29	-0.73
	Government effectiveness	**1.44**	-0.61	-0.50	0.47	-0.37	0.27	0.11	-0.64	-0.09	0.42	0.68	0.35	0.20
	Regulatory quality	**1.34**	-0.58	-0.79	0.88	-0.17	0.34	0.04	-0.20	-0.03	0.65	0.66	0.11	0.22
	Rule of law	**1.47**	-0.58	-0.70	0.66	-0.09	0.49	0.70	-0.73	-0.11	0.82	0.86	0.24	0.09
	Control of corruption	**1.54**	-0.59	-0.44	0.44	-0.67	0.41	0.50	-0.83	-0.26	0.59	1.24	-0.04	0.10

Notes. All data are for 2005, unless otherwise mentioned. Columns (1)-(2) show averages for all advanced countries and for low-income countries (LICs) within the region. Columns (3) and on show the values of the variables at the country-level, wherever available for the countries we survey in the text. Higher values of the measure of international financial integration indicate higher degree of integration. Higher values of the exchange rate regime indicator indicate more flexible exchange rate regimes. Securities market index relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. Entry barriers/pro-competition measures index measures competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks. Higher values of the securities market index, as well as of entry barriers/pro-competition index, indicate greater degree of deregulation. Governance indicators are increasing in the level of governance.
Sources: the financial integration measure is from Dhungana (2008); the exchange rate regime indicator is from the IMF; the securities market and entry barriers/ pro-competition indices are from IMF (2008); the remaining indicators in rows B-E are from Beck, Demirguc-Kunt and Levine (2009); governance Indicators (2008), are taken from Kaufman, Kraay and Mastruzzi (2009).

Table 8. Monetary Transmission in the Middle East and North Africa

A. Recursive Identification					
Authors	**Country and sample period**	**VAR***	**Policy variable**	**Identification**	**Main findings**
Al-Mashat and Billmeier (2007)	Egypt, 1996:M1 to 2005:M6	Y, P, R_{MMZ}, S	R_{MMZ}	Peersman-Smets	The responses of P level and Y to a monetary policy shock are in the right direction, but neither effect is statistically significant over any horizon.
Poddar et al. (2007)	Jordan, 1996:Q1 to 2005:Q1	Y, (FX, R_L, L, STK, S), R_S - R_S^{US}	R_S - R_S^{US}	Bernanke-Blinder	No effect of monetary policy on R_L, STK, L, S, or Y.
Boughrara (2008)	Tunisia, 1989:Q1 to 2005:Q4, Morocco, 1990:Q1 to 2005:Q4	P, Y, (S, M, STK), R_S, L, R_L	R_S	Bernanke-Blinder	Tight monetary policy induces a decrease in the quantity of bank loans. The effects are less pronounced in Tunisia than in Morocco.
Ziaei (2009)	Algeria, Bahrain, Egypt, Kuwait, Lebanon, Morocco, Oman, Qatar, Tunisia, Turkey, 1991:Q4 to 2006:Q4.	L, FA, FL, S, R_S	R_S	Sims	R_S affects L, but no test of whether it affects Y or P, either through L or through any other transmission channel.
Neaime (2008)	Egypt, Jordan, Lebanon, Morocco, Tunisia, 1990:Q1 to 2006:Q4	Y, P, S, R_{TB}	R_{TB}	Bernanke-Blinder	Effects on P and Y are generally in the expected direction, but only statistically significant in non-LIC Morocco.
B. Structural Identification					
Moursi et al. (2007)	Egypt, monthly, 1985 to 2005	Y, P, CP, TR, UR, R	Bernanke-Mihov (R_{MMZ})	Bernanke-Blinder	Estimated monetary policy shocks accord well with *a priori* beliefs about episodes of monetary tightening, but effects on P and Y are either ambiguous or negligible.

* The symbols in this column represent the following: Y = real output, P = the domestic price level, M = monetary aggregate, FA = foreign assets, FL = foreign liabilities, L = bank lending to the private sector, R_L = bank lending rate, R_{TB} = T-bill rate, R_S = central bank policy rate (superscript US refers to the federal funds rate), TR = total reserves, UR = unborrowed reserves, S= nominal exchange rate, STK = stock market index. R_{MMZ} = Moursi et al monetary policy shock.

Table 9. Financial Environment Across Countries, Asia and Pacific

	Indicator	**All Advanced**	LICs in Asia	Fiji	India	Pakistan	Papua New Guinea
A. Macro indicators	*De facto* financial integration	**4.40**	0.66	0.97	0.28	0.39	1.55
	Exchange rate regime	**1 or 4**	2.33	3	2	2	2
B. Securities market development	Private bond market capitalization/ GDP	**0.51**			0.01	0.00	
	Public bond market capitalization/GDP	**0.46**			0.32	0.30	
	Securities market index	**0.67**	0.58		1.00	0.67	
C. Stock market development	Stock market capitalization / GDP	**2.12**	0.20	0.19	0.59	0.34	0.63
	Stock market total value traded / GDP	**0.83**	0.01	0.00	0.54	1.29	0.00
	Stock market turnover ratio	**0.35**	0.13	0.01	0.78	3.07	0.01
	Number of listed comp per 10k population	**0.08**	0.07	0.19	0.04	0.04	0.01
D. Size of banking sector	Deposit money bank assets / GDP	**1.24**	0.34	0.41	0.56	0.37	0.24
	Other fin. Inst. assets / GDP	**0.55**	0.12	0.08			
E. Bank competition	Net Interest margin	**0.02**	0.03		0.04	0.04	
	Bank concentration	**0.67**	0.70		0.34	0.45	
	Entry barriers/pro-competition measures index	**1.00**	0.67		0.33	0.00	
F. Governance Indicators 2008	Voice and accountability	**1.08**	-0.53	-0.65	0.45	-1.01	0.09
	Political stability & absence of violence/terrorism	**0.92**	-0.37	-0.05	-0.99	-2.61	-0.55
	Government effectiveness	**1.44**	-0.69	-0.95	-0.03	-0.73	-0.80
	Regulatory quality	**1.34**	-0.87	-0.68	-0.21	-0.47	-0.59
	Rule of law	**1.47**	-0.51	-0.52	0.12	-0.92	-0.94
	Control of corruption	**1.54**	-0.69	-0.31	-0.37	-0.77	-1.13

Notes. All data are for 2005, unless otherwise mentioned. Columns (1)-(2) show averages for all advanced countries and for low-income countries (LICs) within the region. Columns (3) and on show the values of the variables at the country-level, wherever available for the countries we survey in the text. Higher values of the measure of international financial integration indicate higher degree of integration. Higher values of the exchange rate regime indicator indicate more flexible exchange rate regimes. Securities market index relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. Entry barriers/pro-competition measures index measures competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks. Higher values of the securities market index, as well as of entry barriers/pro-competition index, indicate greater degree of deregulation. Governance indicators are increasing in the level of governance.

Sources: the financial integration measure is from Dhungana (2008); the exchange rate regime indicator is from the IMF; the securities market and entry barriers/ pro-competition indices are from IMF (2008); the remaining indicators in rows B-E are from Beck, Demirguc-Kunt and Levine (2009); governance Indicators (2008), are taken from Kaufman, Kraay and Mastruzzi (2009).

Table 10. Monetary Transmission in Asia and the Pacific

A. Recursive Identification					
Authors	**Country and sample period**	**VAR***	**Policy variable**	**Identification**	**Main findings**
Agha et al (2005)	Pakistan,1996:M7 to 2004:M3	Y, P, (L, STK, RER), R_{TB}	R_{TB}	Bernanke-Blinder	A positive shock to R_{TB} reduces Y but *increases* P. No tests of statistical significance reported, however.
Alam and Waheed (2006)	Pakistan, 1973:Q1 to 2003:Q4	Y, P, R_S	R_S	Bernanke-Blinder	The response of Y to a monetary policy shock has the right sign, but it is small and statistically insignificant. Statistically significant effects over any horizon are found only for manufacturing and wholesale and retail trade. The inclusions of the nominal exchange rate in the model as well as the restriction of the sample period following important financial sector reforms do not alter the results.
Ahmad (2008)	Fiji , Papua New Guinea	TR, D, L, S, P, Y	TR	Sims	No IRFs reported. Based on variance decompositions, innovations in bank reserves play an important role in explaining output variation in Fiji, while bank loans are dominant in Papua New Guinea.
Mallick (2009)	India, 1996:Q2 to 2009:Q1	ΔY, ΔP, R_S, R_{LT}, S	R_S	Peersman-Smets	A positive R_S shock has a transitory negative effect on Y, but this is significant only in the second and third quarters. Effects on P are counterintuitive and insignificant.
B. Structural Identification					
Mallick (2009)	India, 1996:Q2 to 2009:Q1	ΔY, ΔP, R_S, R_{LT}, S, ΔL	R_S	Sims-Zha	No statistically significant effect on Y. Counterintuitive positive and significant effect on P.

* The symbols in this column represent the following: Y = real output, P = the domestic price level, M= monetary aggregate, L = bank lending to the private sector, TR= total bank reserves, R_L = bank lending rate, R_D = deposit rate, R_{TB} = T-bill rate, R_S = central bank policy rate, S= nominal exchange rate, RER = real exchange rate, STK = stock market index.

Table 11. Financial Environment Across Countries, Latin America and the Caribbean

	Indicator	**All Advanced**	LICs in LAC	Bahamas	Barbados	Belize	Costa Rica	Guyana	Jamaica	Trinidad and Tobago
A. Macro indicators	*De facto* financial integration	**4.40**	1.20				0.74		1.66	1.55
	Exchange rate regime	**1 or 4**	1.65		1	1	2	2	2	2
B. Securities market development	Private bond market capitalization/ GDP	**0.51**								
	Public bond market capitalization/GDP	**0.46**								
	Securities market index	**0.67**	0.50				0.33		0.67	
C. Stock market development	Stock market capitalization / GDP	**2.12**	0.50		1.78		0.07	0.19	1.43	1.14
	Stock market total value traded / GDP	**0.83**	0.01		0.03		0.00	0.00	0.04	0.04
	Stock market turnover ratio	**0.35**	0.02		0.02		0.02	0.02	0.03	0.04
	Number of listed comp per 10k population	**0.08**	0.26		0.72		0.04	0.15	0.15	0.28
D. Size of banking sector	Deposit money bank assets / GDP	**1.24**	0.50		0.89	0.56	0.40	0.73	0.41	0.32
	Other fin. Inst. assets / GDP	**0.55**	0.06			0.13		0.14		0.10
E. Bank competition	Net Interest margin	**0.02**	0.07			0.08	0.07	0.04	0.06	0.05
	Bank concentration	**0.67**	0.70			0.95	0.60	1.00	0.81	0.88
	Entry barriers/pro-competition measures index	**1.00**	0.87				0.67		0.67	
F. Governance Indicators 2008	Voice and accountability	**1.08**	0.41		1.16	0.74	0.98	0.17	0.61	0.53
	Political stability & absence of violence/terrorism	**0.92**	0.06		1.09	0.25	0.56	-0.56	-0.27	0.08
	Government effectiveness	**1.44**	-0.06		1.48	-0.42	0.39	-0.17	0.09	0.30
	Regulatory quality	**1.34**	-0.04		0.77	-0.40	0.47	-0.55	0.36	0.62
	Rule of law	**1.47**	-0.23		1.28	-0.20	0.44	-0.70	-0.49	-0.25
	Control of corruption	**1.54**	-0.04		1.30	-0.28	0.48	-0.47	-0.53	-0.17

Notes. All data are for 2005, unless otherwise mentioned. Columns (1)-(2) show averages for all advanced countries and for low-income countries (LICs) within the region. Columns (3) and on show the values of the variables at the country-level, wherever available for the countries we survey in the text. Higher values of the measure of international financial integration indicate higher degree of integration. Higher values of the exchange rate regime indicator indicate more flexible exchange rate regimes. Securities market index relates to securities markets and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium- and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (iv) policies to permit access to the domestic stock market by nonresidents. Entry barriers/pro-competition measures index measures competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks. Higher values of the securities market index, as well as of entry barriers/pro-competition index, indicate greater degree of deregulation. Governance indicators are increasing in the level of governance.
Sources: the financial integration measure is from Dhungana (2008); the exchange rate regime indicator is from the IMF; the securities market and entry barriers/ pro-competition indices are from IMF (2008); the remaining indicators in rows B-E are from Beck, Demirguc-Kunt and Levine (2009); governance Indicators (2008), are taken from Kaufman, Kraay and Mastruzzi (2009).

Table 12. Monetary Transmission in Latin America and the Caribbean

A. Recursive Identification					
Authors	**Country and sample period**	**VAR***	**Policy variable**	**Identification**	**Main findings**
Robinson and Robinson (1997)	Jamaica, 1991:M9 to unavailable	R_S, R_{TB}, M0, L, M3, S, P, Y	R_S	Sims	Contractionary monetary policy causes oscillations in Y, with *increase* on impact. Inflation rate falls only in the second month of a 24-month horizon. No confidence intervals reported.
Kendall (2001)	Bahamas, Barbados, Belize, Guyana, Jamaica, and Trinidad, 1991:Q1 to 1998:Q4	R_L, R_D, R_S, R_{TB}, rr	R_S	Sims and Bernanke-Blinder	Very weak and rapidly-dissipating effects of changes in policy rates on R_L. Positive shocks to rr increase lending rates only in Trinidad and Barbados.
Durán-Víquez and Esquivel-Monge (2008)	Costa Rica, 1996:M1 to 2007:M12	R_L, R_D, R_S	R_S	Sims	Complete long-run pass-through of the policy rate to bank deposit and lending rates. On average, loan and deposit rates take 9.4 and 5 months respectively to fully pass a shock of policy rate. No examination of effects on aggregate demand.
B. Structural Identification					
Ramlogan (2007)	Trinidad and Tobago, 1970:Q1 to 2000:Q2	G, D, L, Y, ΔP, rr	rr	Ramlogan	Shocks to required reserves have the expected qualitative effects on lending, output and prices, but no confidence intervals reported.

* The symbols in this column represent the following: Y = real output, P = the domestic price level, M0 = base money, M3 = broad money, L = bank lending to the private sector, R_L = bank lending rate, R_D = deposit rate, R_{TB} = T-bill rate, R_S = central bank policy rate, S= nominal exchange rate, RER = real exchange rate, G = government spending..