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The Design and Effects of Monetary Policy in Sub-Saharan African Countries

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Abstract

Since the 1990s there have been a number of major changes in the design and conduct of monetary policy. In a globalized environment, there is less time to adjust to shocks and greater need to achieve closer convergence of economic performance among trading partners. As a result, a number of developing countries have adopted exchange rate regimes with more flexibility, and thereby greater scope for monetary policy. Notable examples include a number of sub-Saharan African countries moving from fixed exchange-rate regimes to more flexible regimes and the adoption of formal or informal inflation targeting regimes by some of these countries. These changes have triggered considerable debate on how monetary policy should be conducted and the effects it has on the real economy.

Mohsin Khan provides an overview of the current monetary policy debate. He discusses the conventional objectives, targets, and instruments of monetary policy, including an analysis of the monetary transmission process, which looks at the traditional "money" view as well as the credit channel. Khan examines the problems of dynamic inconsistency and inflationary bias, where governments deviate from their stated or target inflation level in order to obtain short-run output gains. The various solutions proposed to overcome the dynamic inconsistency problem lead to another debate on rules versus discretion in monetary policy. Most economists now agree that any rules-based regime permits a margin for discretion, and they reject the idea that rules and discretion are mutually exclusive. As policymakers in many countries throughout the world have gravitated toward an approach based more on rules than on full discretion, a key issue is choosing an appropriate policy target, or nominal anchor. Khan offers a detailed discussion on nominal anchors and current monetary frameworks before moving on to analyze the output effects of monetary policy. He looks at the relationship between the growth of GDP and different monetary aggregates in 20 sub-Saharan African economies and finds empirical support for the hypothesis that credit growth is more closely linked than is money growth to the growth of real GDP in these countries.

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I. INTRODUCTION

There have been several significant changes since the 1990s in the design and conduct of monetary policy around the world, including in developing countries. Two main examples of these changes are: first, the movement by a number of countries, many in sub-Saharan Africa, from fixed exchange rate regimes to more flexibility, which has allowed for greater monetary independence. Second, the adoption of inflation targeting regimes as a framework for conducting monetary policy in several industrial economies, as well as in about 19 emerging market and developing countries to date.[1] The new guidelines resulting from these changes have triggered considerable debate on how monetary policy should be conducted; a debate that as yet is not fully settled.[2] A similar, though less prominent, debate has also been taking place on the output effects of monetary policy, based largely on differing views of the monetary transmission mechanism. The question here has been whether monetary policy impacts output, or GDP, through the textbook "money" channel or through the alternative "credit" channel.[3]

This paper discusses the general aspects of monetary policy, namely its objectives, targets, and instruments. It will address the issue of dynamic inconsistency, which is especially important for low-income countries because of the existence of weak institutions and low credibility of central banks. The basic question is what can be done to handle dynamic inconsistency and inflationary bias in monetary policy that arises because policymakers have an incentive to "fool" the public by generating an inflation "surprise" to achieve a short-term gain in output. Setting up rules, or targets, for money and credit growth, interest rates, the exchange rate, and inflation are all mechanisms designed to try to overcome the dynamic inconsistency problem. In this context, this paper will outline the principal arguments in the rules versus discretion debate to determine if there are significant advantages to be had from adopting a rules-based monetary policy like inflation targeting.

The paper will then examine the output effects of monetary policy in selected sub-Saharan African countries. In these countries, the traditional monetary transmission process working through the

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1. In Africa, South Africa adopted a formal inflation targeting framework in 2000 and Ghana in 2007.

2. The standard reference to modern monetary analysis is Woodford (2003). A recent survey by Chari and Kehoe (2006) also provides a very useful description of where things stand with respect to the new developments in the design of monetary policy.

3. Ben Bernanke, the current chairman of the Federal Reserve Board, has been a major proponent of the credit channel. See, for example, Bernanke and Blinder (1988), Bernanke and Gertler (1995), and Bernanke, Gertler, and Gilchrist (1999).

interest-rate channel and the demand for money has been found to have limited applicability because of underdeveloped financial systems and weak interest-rate responsiveness of aggregate spending (consumption and investment). The credit channel, with monetary policy working through the asset side of the balance sheet of banks, seems to be more relevant for such countries. Using data for a set of sub-Saharan African countries, empirical analysis is undertaken to test for the effects of changes in bank credit on output fluctuations.

The paper is organized as follows. Section II provides a general background to monetary policy objectives, targets, and instruments. The issue of dynamic inconsistency and inflationary bias in monetary policy is covered in section III. The discussion in section IV focuses on rules versus discretion in the operation of monetary policy. Section V outlines the evolution of different monetary frameworks in the context of the need for a nominal anchor. Section VI discusses the empirical relationship between bank credit and GDP for a sample of 20 sub-Saharan African economies. Section VII offers some concluding remarks.

II. MONETARY POLICY OBJECTIVES, TARGETS, AND INSTRUMENTS

Monetary policy *objectives* have traditionally included price stability, promoting growth, achieving full employment, smoothing the business cycle, preventing financial crises, and stabilizing long-term interest rates and the real exchange rate. Although some objectives are consistent with each other, others are not; for example, the objective of price stability often conflicts with the objectives of interest rate stability and higher short-run employment. Countries may assign these objectives equal weights or, as many countries have done in recent years, place greater emphasis on the objective of low inflation. This recent shift has been triggered by strong empirical evidence that high inflation (and its associated high variability) distorts the decision making of private agents with regard to investment, savings, and production, and ultimately leads to slower economic growth.[4]

Monetary policy *targets,* as distinct from objectives, are proximate goals. They are not objectives in and of themselves, but if attained will work directly toward achieving the longer-term objectives of policy. Monetary policy targets are classified as either operating targets or intermediate targets. Intermediate targets are variables that affect the ultimate objectives of monetary policy, but are not controlled directly by the central bank. They include various monetary aggregates and long-term interest rates. In contrast, operating targets are tactical goals that the central bank can influence in the short run. Although central banks cannot use monetary policy instruments directly to affect intermediate targets, they can use them to affect operating targets, such as reserve money and short-term interest rates, which influence the intermediate targets. Monetary *instruments* that affect operating targets are generally classified as either

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4. See for example, Fischer (1993) and Khan and Senhadji (2001).

direct or indirect. Direct instruments function according to regulations (granted to the central bank) that directly affect either the interest rate or the volume of credit, for example, administratively set interest rate ceilings, individual bank credit ceilings, and directed lending. Direct instruments become increasingly ineffective as money and financial markets develop; besides, they create distortions, including financial repression, and promote financial disintermediation, and fiscal dominance.

Indirect instruments are also termed "market-based instruments," since their use affects the market-determined price of bank reserves as the central bank engages in transactions with both financial and nonfinancial institutions. There are three main types of indirect instruments—open-market operations, central bank lending policies, and reserve requirements—that are used to inject and absorb liquidity. Other indirect instruments include central bank auctions of treasury bills or central bank obligations, and central bank auctions of central bank credit. The first is similar in some respects to open market operations, and the second is similar to central bank lending. Open market operations and central bank lending operate by affecting the level of reserve money, whereas reserve requirements are set and changed according to regulation and thus contain an element of direct control. However, since the effect of changes in reserve requirements is a function of the demand for reserve money, they can be classified as an indirect policy instrument. Changes in reserve requirements generally will not change the aggregate level of reserve money, but since they affect the money multiplier, they will have an influence on the overall stock of money.

The monetary transmission process links monetary policy actions to the ultimate objectives of policy. Analysis of the transmission process in monetary policy has traditionally focused on monetary aggregates. This focus has been termed the "money" view of the transmission mechanism, whereby short-term money market interest rates are determined by the supply and demand for money and changes in these rates affect longer-term rates, which then affect spending and output. Monetary policy operates by affecting bank deposits and thus the liability side of commercial banks' balance sheets. In recent years, however, changing financial market structures and developments in the theory of imperfect information (as applied to financial markets) have shifted the focus to the role of credit markets in the transmission of monetary policy, and the view that the availability of credit can have significant effects on real economic activity is now fairly widely accepted.

In many instances credit may serve as a superior intermediate variable for monetary policy, as well as a leading indicator for economic activity. Bernanke and Blinder (1988) show that if one considers the impact of monetary policy on the ability of the banking system to lend, credit succeeds as an intermediate variable where monetary aggregates fail, specifically when demand for money is unstable, as is the case when a country is undergoing a process of financial development. Thus, in these circumstances policymakers may get a clearer picture of inflation or longer-term economic growth by observing credit

rather than monetary aggregates. The credit view of monetary policy suggests that the tightening of monetary policy will force banks to reduce their loans and securities. To the extent that banks reduce their loans, spending by the recipients of bank loans would decline as borrowers become unable to substitute nonbank borrowing for the decline in bank credit, as is assumed in the money view. The resulting decline in aggregate demand would be greater than can be attributed to the money channel alone.

The existence of a credit channel in the monetary transmission mechanism would imply that a credit variable could be used as an intermediate target of monetary policy. To be useful, this variable would have to satisfy the standard criteria—it would have to show a reasonably strong relationship with both the objective variable and the operating target variable of monetary policy. In practice, most central banks that use indirect monetary instruments have been unable to exercise a high degree of control on credit aggregates in the short term, and monetary aggregates have been deemed more popular as intermediate variables, although some central banks have decided that no financial aggregate can serve adequately as an intermediate target. Monetary policy, however, must still be conducted so that it anchors expectations and removes potential inflation bias. Therefore, some central banks have decided to base monetary policy decisions on a variety of indicator variables, among which are various credit aggregates. Although money market interest rates are usually considered an important indicator of market conditions, the transmission of monetary policy through both money and credit channel suggests that the spread between loan rates and money market rates may be a better indicator of the impact of monetary policy actions on private sector spending. As will be discussed later in more detail, several studies have found evidence that the credit channel, as measured by interest rate spreads or by the ratio of bank credit to nonbank finance, is considered a good predictor of future movements in investment and output.

III. DYNAMIC INCONSISTENCY AND INFLATIONARY BIAS

While both theoretical and empirical studies have demonstrated the fallacy of a long-run relationship between wage inflation and unemployment, under certain circumstances a short-run trade-off between these variables may be found. The existence of this short-run Phillips curve is widely believed to be associated with the presence of sticky wages and prices. The possibility that an expansionary monetary policy may increase output and employment in the short run leads to one aspect of what has been termed the "problem of dynamic inconsistency," developed principally by Kydland and Prescott (1977) and Calvo (1978).[5]

Dynamic inconsistency refers to the difference between the optimal policies that a central bank announces it would carry out, and the policies that the central bank would carry out after the public had made decisions on the basis of its expectations. If the central bank announces that it will target a

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5. For a good summary of the time inconsistency problem, see Chari and Kehoe (2006).

particular rate of inflation, and the public engages in contracts based on that announcement, the central bank will have an incentive to renege on its promise and try to achieve higher output by producing surprise inflation. But the public will then know this, and will adjust its inflationary expectations upward, thereby limiting the desired output gain. In fact, output may not rise at all, depending on whether underlying wage and price rigidities prevent complete wage and price adjustments. Another way of putting this idea is to say that policymakers unconstrained by rules have an incentive to "cheat" the private sector in order to spur an output gain. However, since rational agents account for the incentive of policymakers to produce surprise inflation, they will adjust their behavior accordingly, creating an economy with an inflationary bias.

The government's incentive to inflate might result from considerations other than unemployment. For instance, it might result from budgetary considerations. If the government finances part of its expenditures with revenues from money creation or a reduction in the real value of its liabilities, it has an incentive to announce a low rate inflation, inducing high demand for real balances, and then to choose a higher rate of inflation later on. Knowing the government's incentive to inflate, the public and investors distrust the government, minimize their cash balances, and purchase only indexed debt.

Dynamic inconsistency can also imply difficulties in bringing down inflation in disinflation plans. After the private sector sets nominal contracts, the government tries to disinflate less than promised to obtain some output growth. The government announces a low inflation rate and expects the public to believe it. However, the announcement of low inflation by the government is not credible. The public knows that the government has an incentive to renege on its promises after the public sets its expectations, and therefore does not believe in the disinflation announcement.

A number of countries have successfully resorted to pegging the exchange rate in order to overcome the dynamic inconsistency problem, but it must be emphasized that this mechanism is also not exempted completely from a similar dynamic inconsistency problem. By pegging the exchange rate, the government wants to reduce inflation by importing credibility from abroad, that is, from a lower inflation country. However, the public knows that the government has an incentive to renege on its promises and devalue the currency to depreciate the real exchange rate and stimulate exports and the domestic output. The public will therefore not believe in the disinflation plan and inflation will not decrease as much as the government would like after the introduction of the pegged exchange rate system.

One could therefore ask the following question: Are countries condemned to an equilibrium with high inflation rates, where the public distrusts the government because of its incentive to renege? Of course, there are institutional reforms that countries can adopt to lower inflationary expectations and still keep some flexibility to counteract shocks in the economy. Chari and Kehoe (2006) propose two possible ways of alleviating the dynamic inconsistency problem and the consequent inflationary bias. One option

is to pass legislation that would require the monetary and/or fiscal authority to abide by a clear set of rules. The second option is to tie the hands of the government by delegating policy to an independent authority. This brings the issue of rules versus discretion in the operation of monetary policy into the picture.

IV. RULES VERSUS DISCRETION

Most economists and central bankers now agree that central banks cannot act in a completely discretionary manner. Some kind of guideline or rule is essential for good policy, and acting without a rule may have adverse consequences. This consensus emerges from a long debate among economists regarding the relative merits of rules versus discretion in the conduct of monetary policy.[6]

However, there is still disagreement on whether rules and discretion are mutually exclusive. At a narrow extreme, a rule may be thought of as a preset policy, independent of contemporaneous circumstances, neither permitting nor requiring judgment or discretion over time. An example of such a policy might be Milton Friedman's (1960) proposal for constant money growth. Any deviation from a rule like this is by definition discretionary policy. At the other extreme, some like Ralph Bryant, Peter Hooper, and Catherine Mann (1993) provide perhaps the broadest interpretation of a rule: they suggest that *all* monetary regimes can be described as a system of rules, even ones with discretionary elements.

However, the distinction between rules and discretion that most use probably lies between these two extremes. Under the narrowest example, such as Friedman's, there is no human intervention. This is highly implausible and rarely seen. Bennett McCallum (2000 and 2004), a strong advocate of rules-based monetary policy, notes that "...even the most enthusiastic promoters of rules-based policymaking do not contemplate that central banks would turn the selection of instruments over to a clerk/calculator."

Instead McCallum (2000 and 2004) and John Taylor (1993) have suggested that, to be rules based, a monetary regime must satisfy certain minimum criteria. It is not sufficient for policy to be nonrandom. Even under a discretionary regime, the central bank has policy goals and does not conduct policy randomly. However, under a discretionary regime, while policymakers may have an objective function, they nonetheless operate on a period-by-period basis. Decisions are based on current conditions while past experiences are treated as irrelevant bygones. By contrast, for a regime to consist of rules that reduce inflationary bias, policymakers must have a longer-run vision. McCallum (2000 and 2004) calls this a "timeless perspective" under which monetary policy is conducted without consideration of current macroeconomic conditions, but rather is based on a longer-term view of the desired evolution of key variables, such as inflation, over time.

According to the proponents of rules, the main advantage of such a "timeless perspective" would

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6. See, for example, Woodford (2003), chapter 1, for a comprehensive discussion of this debate.

be to prevent policymakers from deviating from a social optimum—needlessly increasing inflation and monetary volatility—in order to pursue a short-term goal. However, even with a nonrandom objective function and a long-term rule, there is no guarantee that the authority will pursue a socially optimal policy. Instead, as Barro and Gordon (1983) show, whether or not the authority pursues socially optimal policy depends on both the precise nature of the objective function and certain assumptions regarding market participants. In the Barro-Gordon framework, the authorities explicitly aim to reduce unemployment below its natural rate. Rationally, market participants incorporate such behavior into their expectations. Accordingly, inflation will exceed the socially optimal rate. As one can see, this is simply a restatement of the principle of dynamic inconsistency.

Traditionally, economists have focused on two main kinds of instrument rules:

- Money growth rules (advocated by McCallum 2000 and 2004) are extensions of Friedman's proposal but have been extended to include feedback elements as a way to correct past mistakes or to gradually adjust to permanent shifts in velocity.
- Interest rate rules (advocated by Taylor 1993) also include feedback elements: the central bank raises interest rates when expected inflation rises but also reduces interest rates when unemployment rises above an undesirable level.

Which of these target rules should be more successful in restraining inflation, preventing unnecessary business cycle fluctuations, or encouraging growth over the long term remains an unsettled question.[7] More recently, economists have come to agree that rules may apply to targets as well as instruments. Examples of target rules include both exchange rate management regimes and inflation-targeting regimes.

Finally, most economists now agree that any rules-based regimes still permit a margin for discretion, and have come to reject the idea that rules and discretion are diametrically opposed. Instead, "rules" and "discretion" may be complements. The more well-defined the rule, the more effectively and more judiciously can discretionary policy be applied when needed.

V. THE NEED FOR A NOMINAL ANCHOR: EVOLUTION OF MONETARY FRAMEWORKS

As policymakers in many countries throughout the world have gravitated toward an approach based more on rules than on full discretion, the issue of choosing an appropriate target for policy has become key. In a rules-based policy, the target serves as a communication tool with the public, as it reveals policymakers' intentions and priorities, and indicates whether a policy action—for example, a change in the short-term

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7. Geraats (2007) also questions whether a rule by itself is sufficient. If inflationary bias arises because of the inability of policymakers to commit themselves, then this bias should vanish if there is a rule to which the central bank commits itself. However, commitment is not sufficient to eliminate inflationary bias when there is asymmetric information about economic shocks that are not reflected in the policy instrument. Transparency, therefore, is crucial in ensuring that both the policymaker and the public have the same information.

interest rate or intervention in the foreign exchange market—will be required. In turn, to the extent that the public observes and understands this target, it establishes a "nominal anchor" for agents' expectations, thus helping to achieve and maintain price stability.

Nominal anchors can either be price or quantity based. The list of possible price anchors is relatively extensive, encompassing the exchange rate, the price of gold, the composite price of a basket of relevant commodities for a country, and, finally, the inflation rate. On the other hand, discussion of quantity anchors tends to focus on two major candidates: monetary (and credit) aggregates and to a lesser extent, nominal income. Effectiveness of the anchor chosen will rely, among other things, on renouncing all other anchors. For example, policymakers cannot credibly adopt one price anchor, such as the exchange rate, and commit to maintaining another price or quantity anchor.

In practice, countries adopting rules-based frameworks in recent years have chosen either monetary or exchange rate targets as their nominal anchors. Although it is possible to operate within a relatively wide range of intermediate arrangements, it is apparent that more reliance on explicit monetary or inflation targets requires allowing a greater degree of flexibility in the exchange rate and, likewise, adherence to an exchange rate target or peg leads to greater volatility in monetary aggregates and inflation.

When one observes which exchange rate arrangements have been chosen by countries in recent years, it seems to be the case that intermediate regimes are losing ground to the extremes, those arrangements possessing either greater fixity or greater flexibility of the exchange rate. Fischer (2001) analyzed the official or "de jure" classifications of the exchange rate arrangements of IMF member countries, and reported that the portion following intermediate regimes fell from 62 percent to 34 percent between 1991 and 1999, while that of hard pegs grew from 16 percent to 24 percent and that of floating regimes grew from 23 percent to 42 percent. Observations such as this have led many economists to conclude that there has been a "hollowing of the middle," or a disappearance of intermediate regimes throughout the world.

However, further analysis reveals that intermediate regimes, or the gray area lying between the extremes, have not been abandoned entirely by most countries. When one departs from an examination of "de jure" classifications and instead focuses one's attention on the actual behavior of policy, markedly different conclusions arise. For instance, Levy Yeyati and Sturzenegger (2000 and 2001) constructed "de facto" classifications of countries by their degree of intervention in exchange markets, essentially by measuring the volatility of international reserves relative to that of the exchange rate. Using this type of measure, they find that although regimes officially classified as intermediate clearly lost ground between the mid-1970s and the end of the 1990s, the same could not be said of actual behavior, as the percentage of "de facto" intermediate regimes during this period remained essentially unchanged. Similarly, Hernández and Montiel (2001) contrast "de facto" and "de jure" measures to analyze postcrisis exchange

rate policies in several Asian countries. They find that, although greater flexibility in the exchange rate was often introduced and announced, intervention was not abandoned altogether and a considerable amount of exchange rate smoothing took place. This type of behavior, when policymakers announce a move to greater exchange flexibility yet continue to intervene actively in the foreign exchange market, appears to be a common feature in many developing countries. Calvo and Reinhart (2000 and 2002) have examined this phenomenon closely, labeling it "fear of floating," and have argued that it is a natural response to the unique conditions facing emerging economies. They show that a typical developing country with a floating exchange rate tends to intervene far more aggressively than industrial countries, allowing less variability in the exchange rate and much greater variability in interest rates. There is good reason for this, they argue, as the developing country is justifiably wary of the costly effects of large depreciations—loss of access to international capital markets, a high pass-through from exchange rates to inflation, detrimental impact on trade, and loss of policy credibility—and on the other side equally concerned with the Dutch disease-type consequences of real appreciations.

Thus, developing countries recently have either opted for hard pegs—for example, currency boards or outright adoption of another country's currency—or for more flexible regimes, albeit with a significant degree of intervention and smoothing of exchange rate fluctuations. Choosing a hard peg, or an exchange rate anchor, may have certain advantages: it is relatively easy to implement, provides a readily understood and transparent target for policymakers, and, by leading to greater exchange rate stability, may encourage trade and foreign investment. Furthermore, in contrast to intermediate regimes, it has been shown that, because of its simplicity, a hard peg is more *verifiable* by market participants, that is, it is easier for agents to assess whether the target is being achieved ex post. In this manner, a hard peg may permit a more rapid convergence of agents' expectations to the desired long-run level targeted by policymakers. For these reasons, experience has shown that adoption of hard pegs has in many instances been successful in stabilizing inflation from historically high levels.

However, other factors weigh in favor of adopting monetary over exchange rate targets—that is, having a more flexible exchange rate regime. Freeing up the exchange rate allows a country the option of pursuing an independent monetary policy, which may then be used countercyclically to minimize fluctuations in real activity. By retaining monetary independence, a country also retains seigniorage revenue as well as a lender-of-last-resort function by which the central bank may be able to provide emergency support to solvent but illiquid banks, which it could not if the economy were, say, dollarized. A more flexible exchange rate could act as an automatic stabilizer in the event of adverse trade shocks, for example, by providing stimulus to demand for nontradables when the market for a country's exports has been hit with a negative shock. Finally, the experience in recent years has shown that fixed exchange rates tend to be particularly vulnerable to speculative attacks, and thus currency crises are more likely when a government commits to a preannounced level for the exchange rate.

For those countries that opt for greater exchange rate flexibility, the choice then shifts to what monetary target is more appropriate: monetary aggregates or the inflation rate itself. Targeting monetary aggregates has one appealing advantage: although lowering and then stabilizing inflation is the ultimate objective, policymakers exert much greater control over monetary aggregates such as base money or Ml than they obviously do over the inflation rate. Thus, particularly in the early stages of a targeting regime, it will be much easier for monetary targets to be reached, and credibility will be acquired more rapidly. However, there are two major drawbacks to targeting monetary aggregates. First, monetary aggregates are less easily understood by the public, and thus their informational content is considerably lower than that of the inflation rate. Second, in order to be effective, monetary targets require that a stable, or at least predictable, relationship exist between the aggregate and the rate of inflation or, equivalently, that a stable demand for this monetary aggregate can be found. If this is not the case, then policymakers run the risk of consistently meeting the target for monetary aggregates yet missing the (implicit) inflation target. Thus, although credibility is gained, policymakers will ultimately fail in their goal of lowering and stabilizing the inflation rate. Numerous studies have shown that instability of money demand is particularly common to developing countries undergoing processes of financial liberalization, like those in sub-Saharan Africa, yet even industrialized countries are not immune. As Mishkin and Savastano (2000) note, this type of problem led the German Bundesbank, arguably one of the most successful targeters of monetary aggregates, to miss its monetary targets about half of the time in order to ensure that the (more important) inflation objective was met. Thus, most countries choosing monetary over exchange rate targets in recent years have favored an inflation targeting framework over one that targets a monetary aggregate.

It needs, however, to be stressed that the successful implementation of an inflation-targeting regime requires certain macroeconomic, institutional, and operational conditions. First, the authorities should be fully committed to price stability as the primary goal of monetary policy. This rules out the possibility of targeting at the same time any other variable, including the nominal exchange rate or unemployment (output). A second major condition is central bank independence in the conduct of monetary policy, or what is known as instrument independence, as opposed to goal independence. Once the goal of monetary policy is established either by the central bank, the government, or jointly, the central bank has to be able to choose and manage its instruments to achieve that goal. Instrument independence requires the absence of fiscal dominance and financial sector soundness. A third major condition would be public accountability of the central bank for achieving the goal, and a sufficient degree of transparency in communicating to the public the main aspects of policy design and implementation. Because of these conditions, and also because inflation targeting requires an operational framework to guide the authorities

of conducting monetary policy,[8] as yet only relatively few developing countries have adopted formal inflation targeting, although many are considering it or implementing it informally.

VI. OUTPUT EFFECTS OF MONETARY POLICY

As mentioned earlier, the textbook analysis of the relationship between monetary policy and output can be characterized as follows. Changes in short-term interest rates brought about by the central bank, say, through an open-market operation change the cost of capital, which then changes the rate of fixed investment, housing expenditures, and inventories. The change in aggregate demand then leads to a change in output (GDP).

At the empirical level, however, as pointed out by Bernanke and Gertler (1995), there is a very weak link between the cost of capital and the components of aggregate spending, thereby casting doubt on the conventional textbook description of how monetary policy affects GDP. This finding has led to the development of the credit channel theory, the basic premise of which is the market frictions create a spread between firms' internal and external financing sources, which Bernanke and Gertler (1995) call an "external finance premium." It turns out that changes in this external finance premium can better explain movements in investment and, therefore, overall output, than can interest rates.

Basically in the context of the credit transmission channel, monetary policy affects the supply, or relative pricing (the external finance premium), of loans by banks.[9] As long as banks cannot easily replace lost deposits caused by tighter monetary policy with other sources of funds (such as CDs or equity), there is an increase in their relative cost of funds, a decrease in the supply of loans as bank-dependent borrowers are squeezed out, and an increase in the external finance premium. While there is some empirical evidence supporting the theory, financial deregulation and innovations have weakened the importance of the bank lending channel over time for the United States. Nevertheless, for other countries where banks have fewer alternatives to raise funds other than through deposits, the theory remains valid.

The alternative theories of the monetary transmission mechanism have been empirically applied to developed countries, mainly the United States, where interest rates play a key role in either changing the cost of capital or the external finance premium. Both the money and credit channels assume the existence of well-developed financial markets, so that firms and agents are not dependent exclusively on bank borrowing to finance spending. In developing countries, such as those in sub-Saharan Africa, firms

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8. This framework relies on reasonably well-understood channels between policy instruments and inflation, a methodology to produce inflation forecasts, and a forward-looking operating procedure that derives an optimal policy rule (the central banks reaction function) by which changes in the policy instrument are made depending on deviations of the inflation forecast from the inflation target.

9. This is also referred to as the bank lending channel. The credit channel also works through banks' balance sheets. A rise in interest rates increases the interest rate expense from outstanding short-term debt and decreases asset prices and shrinks the value of collateral pledged against loans.

generally do not have access to external finance so their spending has to come from their own resources or from bank borrowing, and the interest rate plays a limited, if any, role in investment-consumption decisions. A more appropriate framework for these countries would, therefore, seem to be the credit-rationing model developed by Blinder (1987).[10]

The Blinder credit-rationing model is based on a number of assumptions, many of which apply to developing countries with small or nonexistent financial markets. These assumptions are:

- Firms need credit for working capital (and for financing inventories and investment), absent which they will cut back on production.[11]
- There is no commercial paper market so that firms cannot obtain credit from nonbank sources. In other words: there is no substitute for bank loans.[12]
- Banks normally ration credit instead of using the loan rate to clear the market because it is unprofitable for them to do so.
- Interest elasticities of money demand, credit, and investment are low enough not to be considered relevant in the transmission process.

Taking these assumptions at face value—which seems quite reasonable when considering developing countries—the credit-rationing model shows that, in theory, central bank policy can have strong real effects through affecting the supply of credit. Blinder (1987) shows that these real effects directly follow from the regime of credit rationing and do not necessarily depend on the assumed values of interest elasticities or from expectations errors.

Based on the characteristics of sub-Saharan African economies, there should then be a close correlation between the growth of GDP and the growth of credit. These correlations over the period 1991–2007 are reported for 20 sub-Saharan African countries for which data were available in table 1 in both nominal and real terms.[13] Two specific credit variables were used for the correlations—total domestic credit extended by banks, which includes credit both to the government and the private sector, and credit to the private sector.[14]

The results in table 1 show that when nominal variables are considered (columns 1 and 2), the correlation coefficients between the growth of total domestic credit and the growth of nominal GDP range from a high of 0.61 for Zambia to a low of –0.32 for Uganda. However, when the growth of credit to the private sector is considered, the correlation coefficients jump up. This is understandable, since

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10. This model builds on the hypothesis first advanced by Blinder and Stiglitz (1983).

11. Blinder (1987) calls this an "effective supply failure."

12. Realistically, however, larger firms in the economy may have access to other financing either from local capital markets or from abroad.

13. For a few countries the data period was somewhat shorter. For Ethiopia, Gambia, and Ghana the data ended in 2006. For South Africa the series covered 1993–2007.

14. The correlation exercise is the same as the one performed by Bernanke and Blinder (1988) for the United States.

it is credit to the private sector that drives private investment. Credit to the government is essentially for financing the fiscal deficit and may, in fact, be more appropriately termed as fiscal policy. Using the nominal growth of credit to the private sector, the correlation coefficients range between 0.84 for South Africa and –0.33 for Tanzania. The average of the correlation coefficients for the countries in the sample is 0.4, as compared to 0.25 when the growth of total credit was used.

Since the main issue is to identify the effects of monetary policy on output, the correlations were repeated with all variables defined in real terms. These are contained in columns 3 and 4 of table 1. The correlation coefficients between the growth of real total domestic credit and real GDP growth turn out to be somewhat smaller than when nominal variables were used, with Kenya the highest (0.8), and Zambia the lowest (–0.38). There are also more instances of negative correlations observed in this case, and the average across all countries dropped to 0.19. The results for the growth of real private domestic credit turn out to have a similar pattern as when nominal variables were used. The correlation coefficient for Sierra Leone is the largest in the sample (0.8) and in only two cases does the correlation coefficient turn negative (Côte D'Ivoire and Malawi). The average correlation coefficient of 0.38 is almost the same as in the nominal variables case.

Of course, correlations by themselves are not definitive evidence by any means, since they say nothing about causation. Supporting evidence does exist, however, relating the growth of real GDP to credit. There is now a large body of empirical work testing the relationship between financial development and economic growth.[15] These studies, using both cross-section and panel data for different groups of countries, including sub-Saharan African countries, find that cross-country differences in financial development explain a significant portion of the cross-country differences in average growth rates.

It is worthwhile noting that in the more recent studies, credit to the private sector has been favored as a measure of financial development, since by excluding credit to the government, it measures more accurately the role of financial intermediation in channeling funds to the private sector. Khan and Senhadji (2003), for example, specify a growth model with the usual explanatory variables (investment to GDP, population growth, terms of trade, initial per capita income) and then add credit to the private sector (as a share of GDP) as an additional variable. The model is estimated with data for 159 countries (comprising both industrial and developing countries) and generally covering the period 1960–1999, using both a pure cross-section sample and five-year average panels. In the results for both types of estimations of the growth model, the coefficient on private credit was positive and highly significant, indicating a positive relationship between credit and growth. Furthermore, the introduction of private credit into the growth equations significantly improves the fit of the equation. These results are broadly consistent with those obtained by most other empirical studies.

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15. See the comprehensive surveys of the literature on the subject by Levine (1997 and 1999).

Another way of testing the relationship between output and credit would be to estimate VARs, controlling for other variables affecting the growth of real GDP, which could include government spending, net exports, terms of trade, and so forth. The major problem encountered in applying this approach to sub-Saharan African countries is that high-frequency (quarterly) data on GDP is not available, except for South Africa, and as a consequence the sample size is too small to yield meaningful results.[16]

In general, based on the somewhat limited empirical evidence, it is possible to reach a cautious conclusion that there is a positive relationship between changes in credit to the private sector and output fluctuations. While there is strong theoretical support for this hypothesis, the empirical evidence at this stage is only suggestive.

VII. CONCLUSIONS

In developing countries, monetary policy has become increasingly important in recent years, even though capital accounts have been progressively liberalized. The reason is that the large movements in global capital during the late 1990s forced many of these countries to abandon fixed or closely managed exchange rate regimes and implement monetary policies to control inflation. Such recent developments have brought to the forefront the now well-known fact in international monetary economics: namely that freely mobile capital, independent monetary policy, and fixed exchange rates form an "impossible trinity," or "trilemma," as it has come to be called. Specifically, it is possible to have any two of these policies, but not all three.

In a globalized capital markets environment, there is less room for divergence of views among market participants about the appropriate stance of exchange rate and monetary policy, less time to adjust to shocks, and greater pressure to achieve closer convergence of economic performance among trading partners. As a result, a number of developing countries have adopted exchange rate regimes with more flexibility—and greater scope for monetary policy.

Traditionally, monetary rules have been based on the behavior of monetary instruments. However, in an environment of large international capital flows with continuing financial innovations and ever more sophisticated asset markets, instrument-based rules—in particular, those based on monetary aggregates—have become more difficult to implement. Accordingly, central banks have increasingly embraced the inflation-targeting approach. In some cases, the approach has helped monetary policy become more coherent, transparent, and credible. And, if supported by proper fiscal measures, the inflation-targeting approach has helped policymakers smoothly guide inflation rates ever lower, while

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16. Initial experiments with vector autoregressions (VARs) were undertaken for some of the sub-Saharan African countries, but the results were plagued by parameter instability resulting from a lack of degrees of freedom.

permitting them some discretion to stabilize output. This regime has become increasingly popular even in developing countries, and so far the results have been promising.

The view that monetary policy affects output through the bank credit channel is increasingly accepted. Recent developments in the global economy have shown emphatically that the freezing up of bank credit has large negative effects on GDP. Therefore, focusing on bank credit appears to be the right way to look at the monetary transmission mechanism. For developing countries, such as those in sub-Saharan Africa, the credit channel seems even more appropriate. Although not completely definitive, empirical evidence does seem to support the hypothesis that changes in monetary policy, via changes in the supply of bank credit, affect output fluctuations in sub-Saharan African countries. Monetary policy is not neutral, at least not in the short run. More generally, central banks can and do play a powerful role in the economy, as the "Great Recession" has so vividly shown over the past two years across the world.

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Table 1   Correlations Between GDP and Credit, 1991–2007

Country	Nominal		Real	
	Domestic Credit	**Private Domestic Credit**	**Domestic Credit**	**Private Domestic Credit**
Burkina Faso	0.4	0.41	0.36	0.41
Cameroon	0.23	0.49	0.43	0.53
Central African Republic	0.45	0.56	0.4	0.39
Chad	0.39	0.55	0.08	0.47
Côte d'Ivoire	0.38	0.06	–0.05	–0.20
Ethiopia	0.42	0.09	0.65	0.33
Gambia	0.53	0.24	0.67	0.24
Ghana	0.26	0.25	0.3	0.09
Kenya	0.51	0.77	0.8	0.68
Madagascar	–0.15	0.42	0.24	0.69
Malawi	0.04	0.18	0.12	–0.23
Mali	0.17	0.23	–0.01	0.25
Mozambique	–0.12	0.46	–0.02	0.19
Niger	0.33	0.19	–0.13	0.51
Nigeria	0.42	0.41	0.19	0.15
Sierra Leone	–0.04	0.81	–0.10	0.8
South Africa	0.47	0.84	0.28	0.69
Tanzania	–0.04	-0.33	–0.03	0.4
Uganda	–0.32	0.74	–0.09	0.78
Zambia	0.61	0.64	–0.38	0.34