

Using Monetary Policy Rules in Emerging Market Economies*

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(Revised)

Abstract: This paper shows that the use of monetary policy rules in emerging market economies has many of the same benefits that have been found in research and in practice in developed economies. For those emerging market economies that do not choose a policy of “permanently” fixing the exchange rate—perhaps through a currency board or dollarization, the only sound monetary policy is one based on the *trinity of a flexible exchange rate, an inflation target, and a monetary policy rule*. However, market conditions in emerging market economies may require modifications of the typical policy rule that has been recommended for economies with more developed financial markets.

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For about ten years now, the use of monetary policy rules to evaluate and describe central bank policy actions has been growing and spreading rapidly. Monetary policy rules are now frequently used and referred to by financial market analysts, by economic researchers in universities, by the staffs of central banks, and by monetary policy makers themselves.¹ Economics textbooks are placing greater emphasis on monetary policy rules as a way to teach students about monetary policy.²

Much of the economic research on policy rules during this period has focused—at least implicitly—on economies with highly developed asset markets, especially markets for debt and foreign exchange. Consider, for example, the type of monetary policy rule that I suggested in the early 1990s—now frequently called the Taylor rule³. That rule was originally designed for the United States—though other researchers soon showed how the same rule—or a modification of it—worked well in other developed economies. The main research tool used to design that rule was an econometric model of seven large economies, and each economy was assumed to have both a fully developed long-term bond market and a foreign exchange market with a high degree of capital mobility.

More recently, monetary policy rules of this type are being considered for use in emerging market economies, which raises the question that I was asked to address at this conference: Are monetary policy rules of this kind useful for policy making in emerging market economies? My answer to this question is “yes,” and I will argue in this paper that policy rules have many of the same advantages in emerging market economies that they have in developed economies. More specifically, for those emerging market economies that do not choose a policy

¹ I have endeavored to collect some of these studies and references on a Monetary Policy Rules Home Page (<http://www.stanford.edu/~johntayl/PolRulLink.htm>), but there is much going on and hard to keep it up to date.

² See Frank and Bernanke (2001), Romer (2000), and Taylor (1995, 2001).

of a “permanently” fixed exchange rate (perhaps through a currency board or a common currency (dollarization)), then the only sound monetary policy is one based on the *trinity*⁴ of a *flexible exchange rate, an inflation target, and a monetary policy rule*. To be sure, certain features of emerging market economies may require modifications of the typical policy rule recommended for economies with more developed financial markets.

The five issues I consider in addressing the question of policy rules in emerging market economies are (1) the appropriate instrument in a monetary policy rule, (2) the appropriate degree of specificity of the rule, (3) the relationship of a monetary policy rule to inflation targeting, (4) the implications of underdeveloped long-term bond markets for the choice of a policy rule, and (5) the role of the exchange rate in a monetary policy rule.

There is still some semantic confusion about the exact meaning of the term “monetary policy rule.” In my view, a monetary policy rule is simply a contingency plan that specifies as clearly as possible the circumstances under which a central bank should change the *instruments* of monetary policy.⁵ For example, the Taylor rule describes the change in the instruments that would accompany an increase in inflation or in real GDP relative to potential GDP. Implicit in this definition, is that the policy rule will in fact be used in the future when those contingencies take place. A policy rule is to be used, and expected to be used, for *many periods into the future*.

³ Taylor (1993)

⁴ In his paper at this conference, Sebastian Edwards referred to another “trinity,” one that is not feasible: a fixed exchange rate, perfect capital mobility, and an independent monetary policy. The alternative trinity defined in this paper is both feasible and desirable.

⁵ By this definition, policy proposals that simply give the target for a variable—such as inflation targeting or nominal GDP targeting—are not policy rules. Nominal GDP targeting states that the central bank should keep nominal GDP growth as close as possible to a constant; this is not a policy rule, because it does not specify how the instruments of policy are to be changed. The terminology can be confusing because, in recent research on policy rules, some researchers have begun to specify that the instrument of policy should react to the to nominal GDP (rather than to inflation and real GDP) and to call this nominal GDP targeting. But nominal GDP targeting does not typically assume a particular reaction of the interest rate to nominal GDP.

1. What Should Be the Policy Instrument in Emerging Market Economies?

In most recent research on policy rules the instrument has been a short-term overnight interest rate, but it is important to point out—especially in a discussion of emerging market economies—that the instrument in a policy rule could be the monetary base, or some other monetary aggregate. In my own early research on policy rules (for example, Taylor (1979)) I used the money supply as the instrument, but since the mid 1980s I have found the interest rate to be a more practical instrument in policy rules for the countries I had examined, including the United States and the other G-7 countries. In contrast, McCallum (1988) has stressed the advantages of policy rules with a monetary aggregate as the instrument, and of course the famous Friedman constant growth rate rule had a monetary aggregate as the instrument.

The choice between a policy rule with the interest rate as the instrument and a policy rule with the money base (or some other monetary aggregate) as the instrument is essentially⁶ the same choice originally pointed out by Poole (1970). If there is too much uncertainty in measuring the real interest rate or if there are relatively big shocks to investment or net exports, then a monetary aggregate is the preferred instrument; the same is true if it is difficult to measure the equilibrium real interest rate. In contrast, if velocity shocks are big then the interest rate is the better instrument. In my view, the preference for the interest rate instrument in most recent work on policy rules primarily reflects velocity uncertainty. But clearly there are circumstances where real interest rate measurement is difficult and where the over night nominal interest rate is not a very good guide. Such circumstances may very well be present in emerging market economies. For example, in a situation of a high inflation rate, the real interest rate is hard to

⁶ It is more difficult than Poole (1970) because one also has to look at the response coefficients. For example, if you choose an interest rate instrument then you might not want to mimic the dynamic response to the interest rate that would occur with a fixed money growth rule.

measure, and risk premia can be high and variable. Also in a high growth emerging economy, the equilibrium real interest rate may be difficult to determine and measure. With an interest rate rule, uncertainty about the equilibrium real interest rate translates into policy errors. Thus, policy makers in emerging market economies might want to give greater consideration to policy rules with monetary aggregates, even if rules with the interest rate become the preferred choice.

2. A Framework or a Mechanical Formula: How Specific Should a Policy Rule Be?

A frequently heard criticism of monetary policy rules is that policy makers cannot—or will not—use the rules mechanically. Such criticism is misplaced: No one is saying—at least to my knowledge—that the proposed policy rules should be used mechanically. It is true that in econometric policy evaluation research, policy rules are always written down in the form of a specific mathematical equation. For example, the monetary policy rule that I suggested for the Federal Reserve (Taylor (1993)) can be written down in such a mathematical form. In mathematical form, monetary policy rules can be evaluated by economists using mathematical models of the economy and by econometricians using statistical methods to compare policies in different periods or countries. However, just because monetary policy rules can be written down as a mechanical-looking mathematical equation does not imply that central banks should follow them mechanically.

To the contrary, most proposals for monetary policy rules suggest that the rules be used as guidelines, or general policy frameworks, and this applies to emerging market economies as well as to developed economies. Because some discretion is needed to implement the policy rule, the mathematical form becomes an approximation, much like the simplifying assumptions that underlie the models that are used for policy evaluation. Consider again the example of the

rule that I suggested in Taylor (1993). The mathematical formula for that rule suggests a very specific policy for the central bank; it calls for the quarterly average U.S. federal funds rate to rise by 1.5 times any increase in the four-quarter average inflation rate plus .5 times any increase in the output gap. But, despite the mathematical form, I proposed this rule in the early 1990s as a *benchmark or guideline* for assessing interest rate decisions. At a minimum, discretion is needed to assess monthly data on commodity prices, employment, industrial production and other variables, in order to estimate (or predict) the current quarterly inflation rate and the output gap.

Moreover, there will, on occasion, be a need to change the interest rate because of some special factor that cannot be included in the policy rule. Liquidity crises in financial markets will usually require such discretion. The 1987 stock market break in the United States is one example. Before the stock market break of 1987, the Fed was increasing the federal funds rate, apparently because inflation and the output gap were increasing. But when liquidity became a concern after the break in the market, the Fed lowered the interest rate and thereby provided more liquidity. After the liquidity concerns dissipated, the Fed returned to its tightening mode. By doing so it was able to contain the rise in inflation much earlier than in similar periods in the 1970s. It is important to point out that such discretionary actions are relative to the benchmark policy rule—the Taylor rule in this example. Hence, even with these discretionary actions the policy rule has substantive content for the decisions.

But one can depart so far from specificity that the policy rule ceases to be meaningful. Consider the classic central bank policy of “leaning against the wind.” Under such a policy the central bank takes actions to counteract “against extremes either of inflation or deflation” (Annual Report of the Federal Reserve, 1923). Is that a monetary policy rule? It is true that

leaning against the wind is a policy of changing the instruments when inflationary pressures change, and this sounds like a contingency plan, and thus like a policy rule. But the policy is not specific at all. It is not specific about what the wind is, how one measures it, or how much one leans against it. Only by being specific about which variables that the central bank reacts to (the inflation rate, real GDP, the exchange rate, and so on), and about the size of the reaction to these variables, does such a policy become a meaningful policy rule.

The need for greater specificity than “leaning against the wind” is practically important. Theoretical and empirical research has shown that the size of the interest rate responses in policy rules matter greatly for economic performance. Changing the interest rate by more than one for one with the inflation rate is an essential property of a good monetary policy rule. A response that is smaller than one-to-one can result in very poor performance. For example, the response of the interest rate to the inflation rate was less than one during the high inflation period of the late 1960s and 1970s in the United States and greater than one in the more stable period of the 1980s and 1990s.

Having a reasonably specific policy rule is also an important part of *transparency* in my view. Financial market analysts frequently use monetary policy rules to figure out what monetary policy makers are doing or are going to do. Whether or not the monetary policy is good or not good, they use policy rules to help predict the short-term interest rate. Such a prediction is of course useful for analyzing exchange rates, bond prices, or stock prices. An example of this type of use of policy rules is found in a recent analysis of Bank of England policy by PriceWaterhouseCoopers. In a report published late last year they said “If growth was left unchecked it could lead to an acceleration of inflation to over 4% in 2001. Using a simple Taylor rule, we estimate that interest rates would eventually need to be raised to around 7.5% by

early 2001. In contrast, if the UK recovery stalls next year then inflation is likely to fall further below target. Our Taylor rule simulations suggest that interest rates might then need to be cut to only around 4% by early 2001.” This type of analysis is already beginning to take place in emerging market economies as well, and it will spread if policy rule frameworks become good descriptions of the policy actions.

This example also illustrates the importance of distinguishing between *normative* uses of policy rules—providing a recommendation of a good way to conduct policy, and *positive* uses of policy rules—providing a description of how the central bank actually does set policy. The policy rule that I suggested in the early 1990s was originally meant to be normative rather than positive. I suggested that policymakers look at plots or tables showing the interest rate settings implied by the rule when they made their policy decisions. But clearly a lot of interest in the rule has come from the fact that it has described the actual central bank decisions pretty well.

Most research on policy rules in the last few years has been normative, and I think a term like the “new normative macroeconomics” appropriately describes it. The methodology is very skill and computer intensive, involving simulating different policy rules in estimated forward-looking models of the economy. The policy rule that works best in terms of small fluctuations in inflation, real output, the exchange rate, etc.—is a good policy rule.

Normative and positive uses of policy rules frequently occur together. First, by estimating an actual monetary policy rule and examining economic performance with that rule, one can assess which rules work well and which rules work poorly. There are many such examples of this mixture of positive and normative uses. Empirical studies show that interest rate decisions in the United States can be described by a different—more reactive—policy rule in the 1980s and 1990s than in the late 1960s and 1970s. And economic performance has been better

in the later period than in the earlier period. Another example is the experience of the U.K. in the early 1990s. Before leaving the European Monetary Union in the early 1990s, the policy rule implied by Bank of England decisions was less appropriate for the British economy than the policy that was followed afterwards.

3. Inflation Targeting and Policy Rules

Having an inflation target is essential for good monetary policymaking in cases where a country decides on a flexible exchange rate regime. The inflation target places the nominal anchor on domestic prices in contrast with a fixed exchange rate regime, a currency board, or dollarization. The increased focus on inflation targets in emerging market economies is a welcome development

By a target for the rate of inflation I simply mean the value that one would like to see the actual inflation rate fluctuate around. If the target for inflation were 2 percent, for example, then a decade with inflation equal to 7 percent would not indicate a good policy. Achieving a mean inflation rate of 2 percent with a standard deviation of perhaps 1 percent around the target would represent a good policy. A target for the inflation rate helps prevent monetary policy from taking the inflation rate up and up over time, causing economic instability

Having an inflation target does not necessarily mean that the central bank must announce an explicit numerical value. The target can be implicit or stated indirectly—such as “a rate of inflation that does not interfere with decision-making by firms and consumers.” The Federal Reserve, by stressing the importance of price stability and by discussing what price stability means, effectively has a target for inflation which helps guide its decisions. It is true that a specific numerical inflation target is the *sine qua non* of some inflation targeting proposals, but

less specific goals of price stability, such as used in the United States, have worked well if accompanied by a well understood framework for achieving this goal.

But having a target for the inflation rate is not enough. There are many different policies—including the use of different instruments—that will achieve an inflation target over the long run. Some policies will involve much larger fluctuations in inflation around the target than others. And some policies will lead to larger fluctuations in other variables of concern to policymakers, such as the exchange rate or real output. Thus choosing an inflation target still leaves open most of the important questions about monetary policy decisions. That is where a monetary policy rule comes in. It provides the details about how the inflation target is to be met. Without a good policy rule, the inflation target will never be met, or it will be met with such instability of other variables that it might be abandoned, ending in a painful episode of re-inflation and disinflation. Inflation targeting monetary regimes need a procedure for achieving the inflation target, and a monetary policy rule is one such procedure. Inflation-targeting regimes of all kinds need policy rules.

A good monetary policy rule is one in which the fluctuations of actual inflation around the target inflation rate are small. There also can be targets for other variables, as long as they are not inconsistent with the inflation target in the long run. For output, the target must be the natural rate of output. For the exchange rate, the target for appreciation or depreciation must be the difference between the domestic target inflation rate and the average inflation rate of other countries. Once such consistent long-run targets are set, then there is a variance tradeoff (Taylor (1979)) between keeping small the fluctuations around the inflation target and the fluctuations around the other targets. The policy rule tells one how to pick a point on this tradeoff. The variance tradeoff replaces the old Phillips curve tradeoff.

I think it is useful to quote Donald Brash (1999)—Governor of the Reserve Bank of New Zealand and a pioneer in the use of inflation targeting. He states “Clearly, inflation targeting is no panacea. It is no silver bullet. It is certainly no guarantee against monetary policy error. In many respects, it is a mistake to think of inflation targeting as some kind of new approach to monetary policy.” And he emphasizes that “All the debates about how to formulate monetary policy in order to deliver the best outcomes are still relevant. Should we use monetary aggregates? Should we use Taylor rules? Should we simply adjust interest rates so that the exchange rate moves in such a way that the direct price effects of the change in the exchange rate produce the desired effect on the domestic price level?”

In sum, with inflation targeting, you need to have a policy procedure—a policy rule—to achieve the target. I like to give a sailing analogy: Inflation targeting is like the destination for a sailboat. A policy rule is how to sail the boat to get to the destination: for this you need to describe the angle of attack, the sail trim, the contingency for wind change, and so on.

Inflation Targeting and Policy Rules with Monetary Aggregates

There is no inconsistency between using inflation-targeting and using a monetary aggregate as the instrument in the policy rule, though in a number of recent discussions about inflation targeting in emerging market economies, some have suggested that inflation targeting is an alternative to monetary aggregate targeting. In fact, because of the difficulties with the interest rate as an instrument in some emerging market economies, which I mentioned earlier, the monetary base might be a better instrument for achieving the inflation target. In earlier work on policy rule evaluation with an inflation target, such as Taylor (1979), the money supply is the

instrument. Inflation targeting is an alternative to fixed or managed exchange rates, not to policies that focus on the monetary aggregates.

Inflation Forecast Targeting and Inflation Based Policy Rules

Let me briefly discuss the idea of “inflation *forecast* targeting,” which usually means something different than having an inflation target. Inflation forecast targeting means that the central bank chooses the instruments of policy so as to bring a *forecast* of inflation into equality with the inflation target at some future date, such as 4 quarters from now or 8 quarters from now. Some members of the Monetary Policy Committee of the Bank of England describe their policy operations this way. A policy rule that will perform well in achieving an inflation target is not necessarily inflation forecast targeting. Inflation forecast targeting requires a good econometric model and an experienced staff to run it because the model is the only way a policy maker can ascertain whether the interest rate decision affects the forecast by the right amount. Thus, inflation forecast targeting as defined here may be difficult in an emerging market economy. The obvious alternative to inflation forecast targeting is simply to use a monetary policy rule.

Inflation forecasts can be used in monetary policy rules in place of actual observed values; such rules are called “inflation forecast based” policy rules. See Batini and Haldane (1999) or Rudebusch and Svensson (1999). In reality, any policy rule—including the rule I recommended in 1993—will involve some forecasts of inflation. That rule states policy should react to the current quarter, but data on the current quarter are not tabulated until after the quarter, so at least one-quarter forecasts are needed. Batini and Haldane (1999) showed that the optimal horizon (if one does not include output in the rule) is about 3 or four quarters, so in

practice there is not too much difference between inflation forecast based rules and rules with current data.

4. The Term Structure and the Long Term Bond Market

One reason why monetary policy rules are useful for monetary policy is that *expectations* of future changes in the policy instruments affect financial markets and thus the rest of the economy. Expectations of future short-term interest rates can—through the term structure of interest rates—affect long-term interest rates immediately. The rule itself affects these expectations. For this reason a monetary policy rule is more important than any single change in the monetary policy instruments. This is why monetary policy makers should be as clear as possible about their policy actions and should try to keep the same policy rule in place for the long run, so that financial markets can form clear expectations of future policy actions. Then people can expect that in the same circumstances the policy instruments will change by the same amount, time and time again. Of course, gradual changes in the structure of the economy may entail gradual changes in the policy rule.

Recent events in Japan are a good illustration of these term structure effects. In February of last year the Bank of Japan initiated a zero interest rate policy. The Governor of the Bank of Japan made it clear that the monetary policy board would keep the overnight interest rate at zero (actually 2 basis points) until “deflationary concerns are dispelled.” Deflationary concerns were defined as a combination of actual changes in the price level and the gap between real output and potential output—sometimes called the “output gap.” This contingency statement has had the effect of lowering longer term interest rates because people in the financial markets expected that the zero interest rate would last for a while, or at least as long as deflationary conditions

persisted. Thus the zero interest rate policy “rule” had expectation effects beyond simply setting the overnight rate to zero because it brought expectations of future interest rates to zero. In the view of the Bank of Japan this increased the expansionary effects of the policy.

Reifschneider and Williams (1999) have shown how the expectations effects of policy rules can greatly reduce the likelihood of getting into deep recessions. Such expectations effects are present in any monetary policy in which changes in the instruments depend on future events. Woodford (1999) shows that these expectations effects indicate that the response of the interest rate to the inflation rate and other variables should have a lot of inertia. Inertia is created by slowly adjusting the interest rate instrument to changes in the economy. The inertia actually increases the size of the response of variables that are forward looking such as long-term bonds.

How should policy makers in emerging market economies without highly liquid longer maturity markets view these results? Perhaps most important is that they should not think that they can have a less clearly stated policy will work better. The term structure is not the only place in the economy where expectations of the future matter. Even in situations where financial markets are not fully developed and there are few long-term securities, movements in the exchange rate, the price of land, even wages are affected by expectations of the future. It will be easier for the private sector to form expectations if the central bank is clear in its intentions through some kind of policy rule.

However, without longer-term markets, it may be wise to react more quickly and by a larger amount because the shorter-term interest rates will have to do more of the work. If expectations effects working through the term structure are weak, then more action will have to occur in the shorter-term markets than through the expectations effects. This suggests that

“optimal” monetary policy rules in emerging economies are more response than optimal policy rules in more developed economies.

5. Should the Exchange Rate Be Part of the Policy Rule?

Inflation targeting, especially as discussed in the context of emerging market countries, is an alternative to a fixed or crawling peg exchange rate regime. A floating exchange rate regime means that domestic monetary policy can be aimed at domestic economic conditions and that usually means keeping inflation low and stable, or, in other words, the inflation is the first priority. Thus, another way to think about inflation targeting is that it is an essential part of a three-part policy—a trinity—that also includes a flexible exchange rate and a monetary policy rule. To be sure, a flexible exchange rate policy does not mean that the exchange rate plays no important role in interest rate decisions or in the policy rule. But with a completely fixed exchange rate, there is no need for a monetary policy rule, because the policy instruments cannot be used for domestic purposes.

Though exchange rate fluctuations are of greater concern in emerging market economies than in most developed economies, much attention has already been given to exchange rate issues in research on policy evaluation in developed economies. The exchange rate is part of the transmission mechanism in many of the models used for policy evaluation. The exchange rate enters both in the determination of net exports and in equations describing how the prices of foreign goods are passed through to domestic prices. And there is a link between the exchange rate and the interest rate through capital markets. In general the models that have been used for policy evaluation assume perfect capital mobility, either by writing down an *ex ante* interest rate

parity condition or a reduced form relationship between the real interest rate and the real exchange rate.

In fact, the policy evaluation research that helped design the Taylor rule considered the role of the exchange rate. Simulations of multicountry models led me to believe that if the central bank reacted too strongly to the exchange rate then inflation-output performance would deteriorate. It was for that reason that I omitted the exchange rate in the Taylor rule for the United States. However, it is clear that the same conclusion would not necessarily be reached for other countries, especially small open economies. A country's size, openness, capital mobility, and degree of exchange market development would matter.

Work by Ball (1999), Svensson (1999), and Battini, Harrison and Millard (2000) on small open economy models is helpful. A Taylor rule with the exchange rate included was proposed by Ball (1999) as a rule designed for small open economies. For the Ball (1999) open economy model, he found that such a rule would improve on the Taylor (1993) rule. For example, for the same standard deviation of output (1.4 percent) the interest rate rule that reacts to the exchange rate as well as to output and inflation reduces the standard deviation of the inflation rate around its target from 2.0 percent to 1.9 percent (Ball (1999), p. 134). However, this is not a very big improvement.

Svensson (1999) and Battini, Millard, and Harrison consider a very similar rule to that of Ball (1999) though in more forward-looking open economy models. Though the motivation for this rule is not optimality (the rule is not optimal in his model) Svensson (1999) finds that this rule reduces the standard deviation of CPI inflation from 2.1 to 1.8; however, it increases the variance of output from 1.7 to 1.8, and therefore does not dominate a rule without the exchange

rate. Batini, Millard, and Harrison (2000) find bigger improvements, but their rule has a very small reaction to the exchange rate, at least when they use inflation forecast based rules.

How does the exchange rate enter in these rules? An appreciation of the exchange rate leads to a cut in the interest rate, followed in the next period by an offsetting increase in the interest rate. The negative interest rate response is called for because the appreciation is contractionary, and a cut in interest rates offsets this contraction.

The implication of these simulations is that while an open economy emphasis on the monetary transmission mechanism makes a difference for policy rules, in practice it does not seem to have a big effect on their performance—at least with the current models and with loss functions that concentrate on the variability of inflation and output.

The results suggest that simple policy rules that focus on a smoothed inflation measure and real output and do not try to react too much to the exchange rate might actually work well in emerging market economies. However, the current models may understate the exchange rate effects in small open economies and therefore tend to underestimate the costs of exchange rate fluctuations. The costs of such exchange rate fluctuations may be very high in emerging market economies where there is a mismatch of assets by currency or duration. The forward-looking nature of the exchange rate suggests that there may be significant gains from policies that utilize rational expectations in the same way that inertial rules for the interest rate do in the closed economy models discussed by Woodford (1999).

5. Conclusion

In this paper I have presented the case that monetary policy rules of the type that are frequently called Taylor rules can provide policy makers in emerging market economies with a

good overall framework for making monetary policy decisions. Such rules help policy makers lay out plans for future policy actions, communicate with the public and financial markets about policy, and search for improvements in policy.

However, it is likely that some modification of such monetary policy rules is required, either in the choice of the instrument (perhaps a monetary aggregate rather than an interest rate), in the variables in the rule (a greater role for the exchange rate), or in the size of the response of the instrument to economic events (to deal with less developed long term securities markets). More research on the appropriateness of each of these possible modifications would be very useful.

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