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To cite this article: John B. Taylor (2019) Inflation targeting in high inflation emerging economies: lessons about rules and instruments, *Journal of Applied Economics*, 22:1, 103-116, DOI: [10.1080/15140326.2019.1565396](https://doi.org/10.1080/15140326.2019.1565396)

To link to this article: <https://doi.org/10.1080/15140326.2019.1565396>



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Published online: 07 Feb 2019.



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REVIEW ARTICLE



Inflation targeting in high inflation emerging economies: lessons about rules and instruments

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ABSTRACT

This talk emphasizes the connection between inflation targeting and monetary policy rules. Inflation targeting is not enough. You need to have a policy procedure – a policy rule – to achieve the target. And one cannot design or evaluate a monetary policy rule without a target inflation rate. Hence, there is a symbiotic relationship between inflation targeting and monetary policy rules. Initially, the instrument in the policy rule was a monetary aggregate – a quantity, usually the money supply. It was only later that research on monetary policy rules focused on another instrument of monetary policy – the interest rate, as velocity became more volatile so the interest rate was more reliable as instrument, at least for low levels of inflation. Interest rate rules work best within a band between very high inflation and deflation. Outside that band, the central bank should rely more on money growth rules.

ARTICLE HISTORY

Received 22 December 2018
Accepted 24 December 2018

KEYWORDS

Inflation targeting; monetary policy rules; monetary policy instruments; interest rate rules; money growth rules

1. Inflation targeting and monetary policy rules

I have been working on monetary policy for most of the 40 years since the founding of the CEMA, the Center for the Study of Macroeconomics in Argentina, and even for a decade or so before that. My research on monetary policy has always been about monetary policy rules. The inflation target has always featured prominently in the research.

In this article, I would like to emphasize the connection between inflation targeting and monetary policy rules. The article is thus related in several ways to the recent change in the monetary policy rule at the Central Bank of the Republic of Argentina – from an interest rate rule to a monetary base rule.

A number of years ago in a speech on inflation targeting in emerging economies, I argued that “[t]here is an interesting symbiotic relationship between inflation targeting and monetary policy rules. And like many symbiotic relationships in nature, it is a beneficial relationship.” At a most basic level, “[o]ne cannot design or even evaluate a monetary policy rule without a target inflation rate...” And you cannot reliably achieve an inflation target without a policy rule. Thus, “[e]ver since the 1970s, research on policy rules has taken the target rate of inflation as given” (Taylor, 2000a, p. 9).

To see this relationship, consider a typical monetary policy framework. The goal includes an inflation target and the aim of policy is to reduce inflation to that target,

and then to keep it low and near that target, without having a severe adverse effect on real variables such as real gross domestic product (GDP) or unemployment. The goal can be represented mathematically by an objective function which penalizes large fluctuations of inflation from the target inflation rate along with deviations of real GDP from its potential. In the models that I built over the years, there is a trade-off between the fluctuations from these targets which could be sketched out on a piece of paper, as I will come back to later in this talk. That trade-off existed in the data too and could be estimated. The purpose of the research on monetary policy rules was to find a good rule for the instruments of monetary policy to achieve the goals, including the inflation target.

The relationship between policy rules and inflation targets can also be illustrated with some statements by those who served in official policy positions at the central banks in high inflation emerging economies that first introduced inflation targeting.

Donald Brash, who served as Governor of the Reserve Bank of New Zealand from 1988 to 2002, said: “In many respects, it is a mistake to think of inflation targeting as some kind of new approach to monetary policy 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 direct price effects of the change in the exchange rate produce the desired effect on the domestic price level?” (Brash, 1999), pp. 9–10 and 12.

Jose De Gregorio, who served on the Board from 2001 to 2007 and as Governor from 2007 to 2011 of the Central Bank of Chile, stated that “[t]he inflation target is an efficient framework to conduct monetary policy. The issue then is how to operationalize this framework. When should monetary policy be tightened or loosened? The most traditional answer is the Taylor rule A good policy rule is one in which the fluctuations around the target inflation rate are small” (De Gregorio, 2014, p. 29).

Thus, inflation targeting is not enough. You need to have a policy procedure – a policy rule – to achieve the target.

2. Money growth rules and inflation targeting

It may come as a surprise to many who know about the Taylor rule that from the beginning of my research (Taylor, 1968), the instrument in the policy rule was a monetary aggregate – a quantity, usually the money supply. For example, in a paper (Taylor, 1979) that I worked on during the time CEMA was being founded, I built and estimated a model with staggered price/wage setting and rational expectations, and with the model I calculated a numerically specified monetary policy rule for the growth rate of the money supply. According to the policy rule, which took the form of a mathematical equation:

- The central bank *increases* the money growth rate by specified amounts if inflation *falls* below the inflation target or if real GDP *falls* below potential GDP.
- The central bank *decreases* the money growth rate by specified amounts if inflation *rises* above the inflation target or if real GDP *rises* above potential GDP.

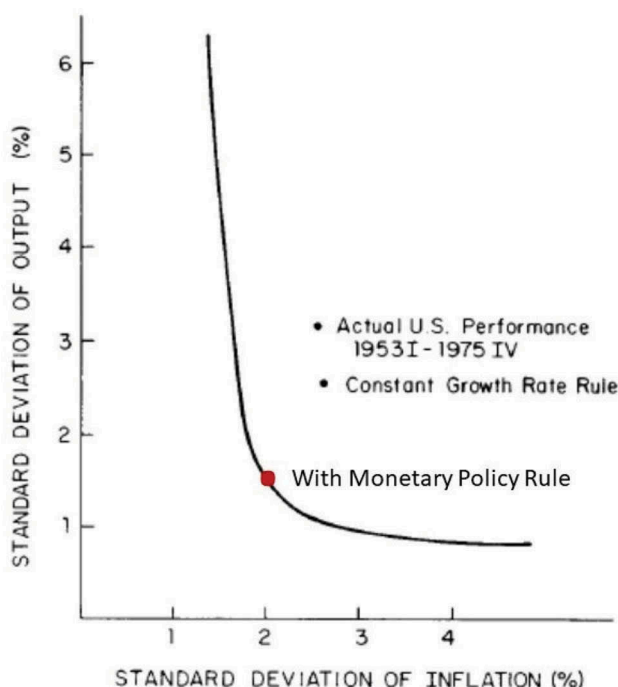


Figure 1. Tradeoff between inflation volatility and output volatility.

The model showed that this monetary policy rule for the money supply would have led to lower and more stable inflation as well as greater stability of real GDP over specific historical periods, as shown in Figure 1, which is drawn from that paper. All the points on the trade-off curve shown in Figure 1 were feasible with the rule, and the dot on the curve is one possible choice.

The model also showed that economic performance would have been better than the historically observed performance over that same period if the growth of the money supply had simply been held constant without these reactions to real GDP or inflation. In other words, the “constant growth rate rule” would have led to better performance than what had happened in fact. Milton Friedman later wrote that he did “not find that surprising at all. If, as I believe to be the case, inappropriate fluctuations in the quantity of money produce inappropriate fluctuations in output, keeping money growth constant would eliminate such inappropriate fluctuation in output” (Friedman, 2010).

3. Interest rate rules and inflation targeting

It was only later that research on monetary policy rules focused on another instrument of monetary policy – the interest rate. This came about as velocity became more volatile and, at least for low levels of inflation, the interest rate was thus more reliable as instrument. Research with Nicholas Carlozzi on international monetary policy (Carlozzi and Taylor (1983, 1985)) considered simulations with interest rate rules noting that “interest rate rules ... are possible characterizations of monetary policy.”

The paper that was the origin of the Taylor rule, and brought increased attention to the interest rate instrument, was published in December 1993, exactly 25 years ago this month. So, in effect, I have spent nearly equal time on money growth rules and interest rate rules. According to the Taylor (1993) rule,

- The central bank *decreases* the interest rate by certain amounts if the inflation rate *falls* below the inflation target or if real GDP *falls* below potential GDP.
- The central bank *increases* the interest rate by certain amounts if the inflation rate *rises* above the inflation target or if real GDP *rises* above potential GDP.

The inflation target was taken to be 2 percent, and the real interest rate in equilibrium was taken to be 2 percent, yielding a nominal interest rate of 4 percent on average. The response of the interest rate was 0.5 times the GDP gap and 1.5 times the inflation rate.

McCallum (2015, p. 2) later pointed to some side benefits of stipulating policy as a rule for the interest rate back then: "... previously suggested rules ... had all been expressed in terms of the monetary base or some other aggregate as the instrument variable Both officials and economists in central banks, by contrast, thought of monetary policy in terms of interest rate control. Partly as a result of this, there was in 1993 very little interaction between academics and central banks. But then Taylor's paper showed academics by example that a sensible activist policy could be formulated in terms of an interest rate instrument and at the same time showed central bankers...that a maintained rule could lead to good policy choices! ... over the next few years there came to be much more interaction between academic and central bank economists."

But as I stressed many times, such as at a meeting at Bank Indonesia which included many emerging market central banks – Brazil, Chile, Czech Republic, New Zealand, Korea, and Thailand: "In my view it is mistake to think of inflation targeting and money base targeting as mutually exclusive alternatives The important point here is *that it is possible for an inflation targeting central bank to use the monetary base as the instrument to achieve that target*. The correct question is: 'Should we use the interest rate or monetary base?' not 'Should we use inflation targeting or the monetary base?'" (Taylor, 2000b, p. 2). Or at a meeting at the Bank of Mexico, "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" (Taylor, 2001, p. 4).

4. The similarity between money rules and interest rate rules

Even with the increased attention paid to interest rate rules in recent years, it is a mistake to give up on money rules. To emphasize this, I included a section, "The Similarity Between Money Rules and Interest Rate Rules" in Taylor (1996). To see the connection, consider first the case of a constant growth rate rule for the money supply. If the demand for money balances depends negatively on the interest rate and positively on nominal GDP – the product of real GDP and the price level – then an increase in

real GDP will imply an increase in the interest rate, and a decrease in real GDP will cause a decrease in the interest rate. This is exactly what would be called for with an interest rate rule like the Taylor rule. In addition, an increase in inflation would call for an increase in the interest rate, and a decrease in inflation would call for a decrease in the interest rate. Again, this is exactly what is in the Taylor rule. To be sure. The connection does not depend on this example of fixed money growth: Nelson (2003) emphasized that an interest-rate policy rule implies a pattern of behavior for monetary growth.

This close connection between money rules and interest rate rules is very important. First, it helps one design good rules, because the good properties on one type of rule can be copied in another rule. Second, it helps make rules more robust: That interest rate rules mimic, in certain ways, money supply rules, gives one more confidence in interest rate rules. Third, if interest rate rules are unreliable because of high inflation, then one can emphasize money rules. As I stated in Taylor (1996, p. 37), “interest rate rules need to be supplemented by money supply rules in cases of either extended deflation or hyperinflation.”

Nevertheless, as many central banks, including the Federal Reserve, have focused more on the interest rate as an instrument, they have focused less on money aggregates in their models. For a long time, I have pushed back against the trend of central banks to ignore money growth.

Belongia and Ireland (2014) recently noted that my work on policy rules in the 1970s was in terms of money growth rules. They also noted that my 1993 paper “showed how well the Fed adjusted its funds rate target in response to movements in output and inflation during the late 1980s and early 1990s. The debate was closed. A new consensus, prevailing to this day, placed interest rates instead of money at the heart of all monetary policy discussions.”

But that Fed decisions were close to that interest rate rule during that short span of time was not my rationale for a proposed interest rate rule. Rather, research in monetary theory was the rationale. The proposed rule was the implication of empirically estimated structural monetary models (with rational expectations and staggered price setting) that I was developing and working with in the 1980s. The models had exchange rates and long-term interest rates as well as short term interest rates with both internal and external dynamic stochastic shocks.

These models showed that interest rates rules would work better within the range of observed shocks. Different types of models and views on the monetary transmission mechanism led to similar conclusions, so it was a robust result. In one of his last research papers, Milton Friedman argued that the Taylor rule for the interest rate worked well because it was a way to keep the growth rate of the money supply constant, another way to make the connection between money growth rules and interest rate rules.

To go from the interesting empirical results of Belongia and Ireland (2017) to a policy strategy for the money supply, more modelling research on money growth rules would be useful. Are there structural models where alternative policy rules with money growth would work better? What are those rules? Are they robust to other types of models? Such research led to the types of policy rules that are now the focus of so much attention. In my view, it will lead to improvement in these rules.

5. Transitions from too high inflation

It is also important to distinguish the *operation* of a policy rule in a relatively low inflation regime from the *transition* from a high inflation rate to a lower inflation rate. Recall that in the United States, price stability was achieved in early 1980s by focusing on the money aggregates. Gradually over time, the Federal Reserve moved to focus more on the interest rate.

It is helpful to look at simulations of inflation and interest rates as the central bank lowers money growth in a high inflation situation. Figure 2 shows simulation of a macro model calibrated to actual microeconomic data on multi-period wage contracts as in Taylor (1982). The task is to find a money growth path for the central bank to transition from high inflation to low inflation with little or no effect on real variables – real output or the real interest rate. Figure 2 shows the results for the special case where inflation could be reduced without any effect on real output or the real interest rate.

In this simulation, the nominal interest rate equals the unchanged real interest rate plus the expected inflation rate. Figure 2 shows the interest rate path and the inflation rate path in the case of a policy change announced at the time shown in the charts. The real interest rate is assumed to be constant, at 2 percent, and that number is added to the expected inflation rate to get the nominal short-term interest rate as shown.

Lowering the interest rate is associated with lowering the inflation rate. The path of the interest rate is gradual; it was chosen that way to take account of the structure of the wage contracts. Money growth is reduced as the interest rate is cut, even if very gradually at the start. This is an ideal way to dis-inflate because the expectational effect on the interest rate of the change in monetary policy then offsets any liquidity effect. Of course, there is a need for strong credibility. Calvo (2017) has emphasized these

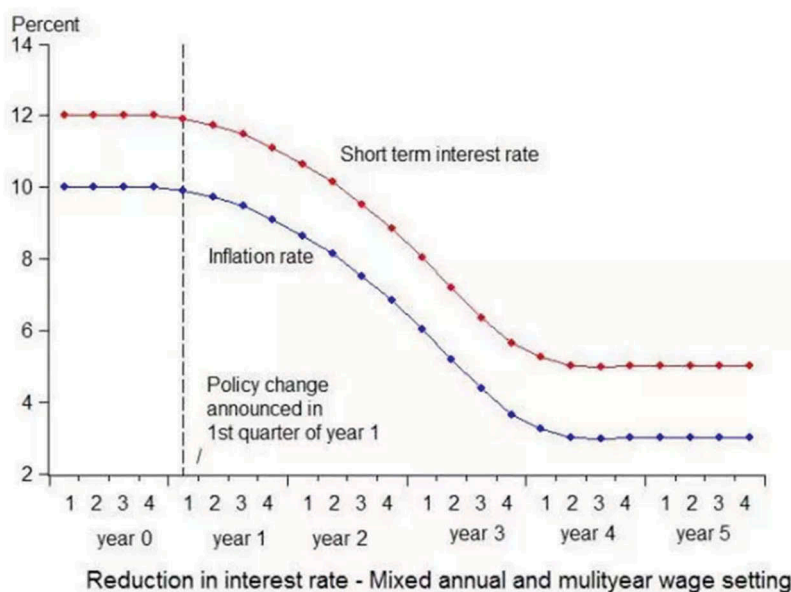


Figure 2. Gradual dis-inflation program without effects on real output or real interest rates.

liquidity effects versus expectational effects, pointing also to the possible additional use of the exchange rate mechanism to establish credibility and benefit from direct exchange rate effects on inflation. In the simulations shown here, the money supply provides an anchor and the interest rate is determined in the markets. The central bank is effectively saying that it will set the money supply path and the market will then set the interest rate according to the path.

6. The zero lower bound and monetary policy rules

Another issue for interest rate rules – though not currently an issue in Argentina – is the lower bound on the interest rate. Recently, there has been an increased interest in money supply rules because of concerns in a number of “center” countries that the policy rules will take the interest rate below zero or below an effective lower bound on the nominal interest rate.

In some sense, this is not a new concern for monetary research. In simulating multi-country empirical models in the 1980s, we took account of the zero bound on the interest rate, switching to money growth when the lower bound was near. And this is what I recommended in 2009 for the Federal Reserve. However, the series of on-and-off quantitative easings that began in 2009 in the United States was never aimed at keeping money growth steady or at keeping it from falling, which is clear in the erratic behavior of M2.

In situations where the interest rate hits the lower bound, or more generally in situations of deflation, I have argued that central banks need to focus on a policy rule which keeps the growth rate of the money supply steady. This approach has also been suggested by Christiano and Rostagno (2001), Christiano and Takahashi (2018), and Bias (2018).

More generally, interest rate rules work best within a band between very high inflation and deflation. Outside that band the central bank should rely more on money growth rules.

7. International monetary policy and inflation targeting in emerging economies

Let me now consider the important issue of the impact of the international monetary system on emerging market economies (EMEs) and on their monetary policy rules and objectives. During the past decade or so, the impact of the central banks in the larger developed economies on the emerging market economies has been significant and widely-discussed. The International Monetary Fund (2016, p. 3) summarized the issue this way: “many EMEs found the monetary policy of ‘center’ countries imperfectly calibrated, and in many cases out of sync, to their own ...” and that “EMEs’ central banks ...were therefore compelled to adapt their policy framework and toolkits”.

Such “out-of-sync” deviations from monetary policy rules at the “center” country central banks spread to emerging market central banks. This caused EME central banks to deviate from their own policy rules, a phenomenon dubbed the Great Global Deviation by Hofmann and Bogdanova (2012) of the Bank for International Settlements (BIS). The reason for the international contagion is straightforward.

Policy deviations at “center” country central banks in the form of “lower-than-rule” interest rates cause capital outflows from the “center” countries and thus inflows to emerging market countries along with appreciations of their currencies. According to simulations of the IMF’s multi-country model by Carabenciov et al. (2013), the exchange rate appreciation effect dominates other effects, and has a negative effect on emerging market countries. The emerging market central banks tend to resist this effect by lowering their own policy interest rates below their own policy rule. There is much empirical evidence for this reaction either in regression analyses or in the observed behavior of the emerging market central banks.

Figures 3 through 6 show updated charts on policy interest rates and monetary policy rules from the BIS using the methodology of Hofmann and Bogdanova (2012). Figure 3 shows averages from the full global set of countries and emerging market economies tracked by BIS. The “policy interest rate” and the “mean Taylor rate,” averaged across countries, are shown along with a “Range of Taylor Rule Rates” due to alternative measures of inflation and real GDP.

The countries represented in the average in Figure 3 are Australia, Canada, Denmark, the Euro Area, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, the United States plus the following emerging market economies shown on the left: Argentina, Brazil, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Israel, South Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Singapore, South Africa, and Thailand. Clearly, the deviation is global and is clearly seen in the emerging market countries.

Figure 4 shows the United States. It is clear from these BIS calculations that there was a deviation from the policy rule in 2003–2005. I have argued that this deviation was a source of the global financial crisis as financial institutions searched for yield and increased risk taking. Policy then got back on track during the crisis of 2008 and 2009,

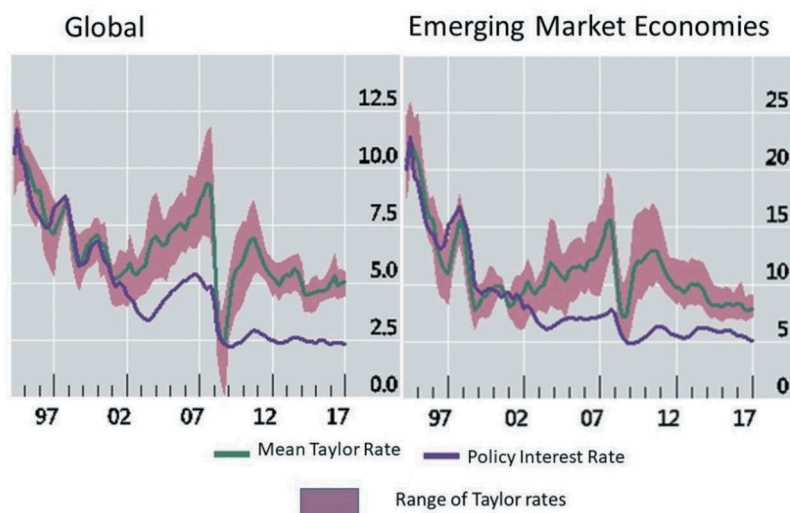


Figure 3. Policy rates and policy rules around the world.



Figure 4. Policy rates and policy rules for the United States.

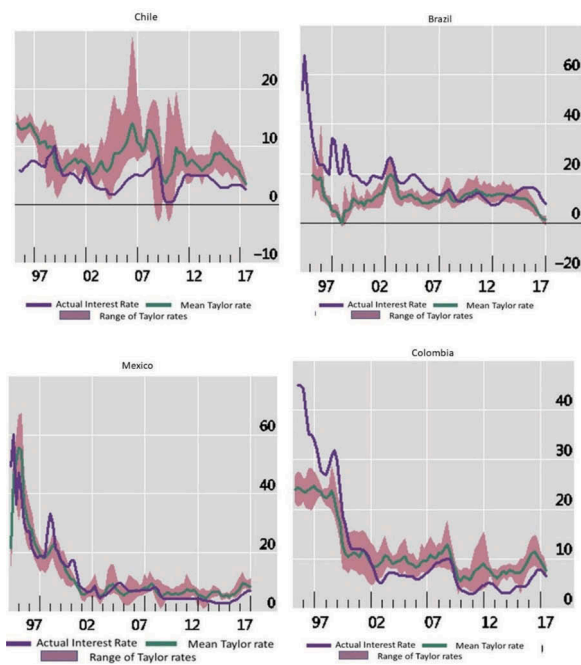


Figure 5. Policy rates and policy rules for four Latin American countries.

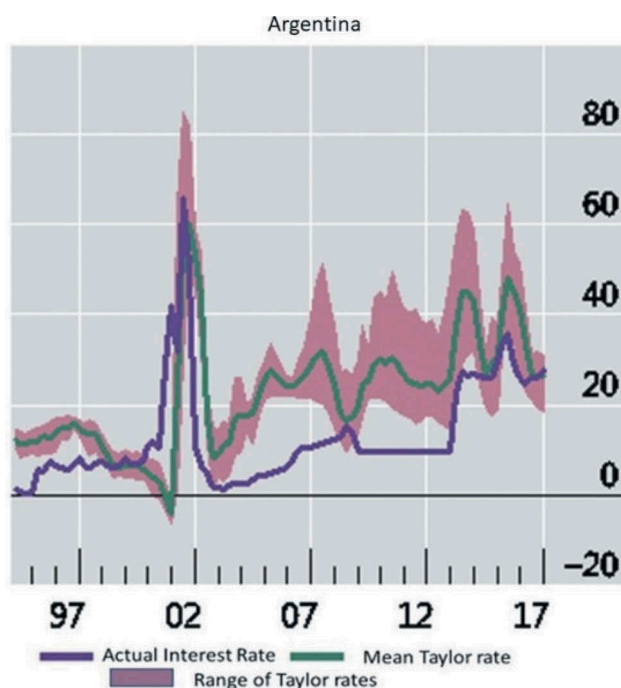


Figure 6. Policy rates and policy rules for Argentina.

but then deviated again. The recent return toward rules, or normalization, is seen for the past two years in [Figure 4](#).

Now consider the emerging economies, focusing on Latin America. [Figure 5](#) shows the same type chart again calculated by the BIS, but for Chile, Brazil, Colombia, and Mexico. Chile already had gone a long way in reducing inflation by the mid-1990s before the time the BIS chart begins, and policy was then on track according to these calculations. However, around 2003, the central bank deviated below the rule, as in the US, before cutting interest rate during the financial crisis and then deviating again.

The charts for Brazil, Colombia, and Mexico are dominated by the large reduction in inflation in the 1990s, a period which is included in the charts. For Brazil and Colombia, the policy interest rates were much higher than the policy rule settings during this period, suggesting that monetary aggregates were playing a role. After this disinflation period, the policy rates are much closer to the interest rate policy rule. Though harder to detect on this scale, one can see the deviations in Colombia and Mexico below the rule, mirroring the deviation in the US in the years following the financial crisis of 2008.

[Figure 6](#) shows the policy rate and the same rule for the same time period for Argentina. The results are of course much different from the other emerging market countries. The interest rate is quite low during the convertibility period in the 1990s when the peso-dollar rate was credibly fixed and had a direct effect on inflation. The 2001–2002 crisis shows up in a massive increase in the interest rate as inflation takes off and the central bank endeavors to respond. For the period from the end of the Argentine crisis in 2003 until around 2015, there seems to be very

little effect of conditions in Argentina on the policy interest rate. The interest rate is generally below the rule during this period, perhaps influenced by global conditions. The more recent disinflation effort then shows up, and it is very visible through the end of 2017, the last data points in the chart. The interest rate was generally below the policy rule during this period of attempted disinflation, the opposite of what was observed in the other Latin American countries during their disinflations.

A new monetary policy rule with the monetary base as the instrument was put in place by the central bank of Argentina in October of this year. The new policy has been clearly described by the central bank governor Sandleris (2018) as well as by the International Monetary Fund (2018) and Neumeyer (2018). The new policy is to keep the monetary base growth rate to zero (except for prespecified seasonable demand changes), let the exchange rate fluctuate within a band (with non-sterilized interventions outside the band), and let the policy interest rate be more market-determined. The goal is to reduce inflation and thereby have more favorable inflationary expectations drive the interest rate down over time.

Though it is clear from this discussion that monetary policy differs from country to country, the international effects on monetary policy are observable in all countries throughout the region, and indeed throughout the world. Some countries have tried to reduce the impact of these contagion effects by responding in other ways than by changing their interest rate, including by using capital controls or temporary “macro-prudential” actions aimed at international capital flows. Ghosh, Ostry, and Qureshi (2017, p.5) document that capital controls have been used “to stem inflows in the wake of historically unprecedented accommodative monetary policies of the US Federal Reserve.” One result of these efforts was the creation of the IMF’s “Institutional View” which encourages such restrictions. However, capital controls can have adverse effects.

A better approach to deal with these international effects, in my view, would be an international monetary reform in which each central bank would describe and commit to a strategy or rule for setting policy. This will reduce the size of the “out-of-sync” deviations and thus reduce the contagion. As should be clear from this talk, different policy instruments could underly the strategies or rules in each country. This approach will work best if it is accompanied along with flexible exchange rates between countries or currency zones and with open capital markets.

Change along these lines may be on the way. The Federal Reserve has begun to bring monetary policy back on track as it emphasizes a strategy and use of monetary policy rules. These changes began in 2017 and 2018. There has also been support for international reform: Volcker (2014) says that “the absence of an official, rules-based, cooperatively managed monetary system has not been a great success.” Rajan (2016) added that “what we need are monetary rules” and Draghi (2016) argued that “[w]e would all clearly benefit from ... improving communication over our reaction functions...”

8. Conclusion

In this article, I have emphasized the close symbiotic connection between inflation targeting and monetary policy rules. Despite often stated views to the contrary, that

connection applies to money supply rules, including money base rules, not only to interest rate rules, a message that is particularly relevant for emerging economies.

I also showed that while interest rate rules work well to keep inflation low in a low-inflation regime, getting inflation down from high levels to low levels is a transition issue which raises other concerns. For such transitions, the role of quantitative instruments such as the money supply or the monetary base is crucial because the interest rates in a high inflation regime are hard to interpret. It is very difficult to assess the level of the real interest rate when inflation expectations are moving around rapidly.

According to the International Monetary Fund (2018), the central bank of Argentina is “temporarily replacing the inflation targeting regime with a monetary base target.” I do not think that is the way to characterize the new policy. The central bank is replacing an interest rate rule with the monetary base rule, but it has not given up the objective of lowering inflation.

I also discussed international monetary effects on emerging economies. International contagion is a reason why monetary policy deviations have spread to many countries in recent years. To prevent these deviations in the future, international monetary reform is needed. The best way toward such reform is a commitment to a policy rule in each country. While change may be on the way in some countries, this is yet another reason for high inflation emerging markets to get inflation down and keep it down using clear transparent monetary policy rules with inflation targets.

Acknowledgments

Mary and Robert Raymond Professor of Economics, Stanford University and George P. Shultz Senior Fellow in Economics, Hoover Institution, Stanford University. This paper is a written version of remarks presented at the Celebration of the 40th Anniversary of UCEMA on 10 December 2018. I am grateful to Fernando Alvarez, Guillermo Calvo, David Delgado de Robles, and Andy Neumeyer for helpful conversations in advance of the talk, to Boris Hofmann of the Bank for International Settlement for sharing the charts which appear in Figures 3 through 6, and to Roque Fernandez and Valeria Dowding for wonderful hospitality during my visit.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributor

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