

INFLATION TARGETING IN EASTERN EUROPE

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Abstract. *This paper addresses the inflation targeting approach in three transition economies, namely Hungary, Poland and the Czech Republic with the use of Taylor rules as benchmarks. The three economies considered have been successful at achieving disinflation, but deviations of inflation from its target have been persistent in all cases. Except for the Czech Republic, deviations from the Taylor rule are large and persistent, with Hungary displaying the largest fluctuations. Polish interest rates have consistently exceeded those suggested by the Taylor rule and given the prevalence of high unemployment, these undershootings do not augur well for the stability of monetary policy. Finally, the behaviour of Czech interest rates can be remarkably captured by the simple Taylor rule proposed in this paper, suggesting that the Czech National Bank has been the most successful at stabilising inflation and output around their target levels.*

Over the last two decades a number of central banks around the world have adopted inflation targeting (IT) as a monetary policy regime², and more recently, a number of Eastern European countries claim to have moved towards the implementation of an IT regime. One of the appealing features of IT is that the public understands more easily the monetary policy objectives, as stated by the central bank. The essential elements of the IT framework are the announcement of a numerical inflation target by the central bank together with a clear desire from the monetary and fiscal authorities to meet this target. The accomplishments of these criteria can be fairly easily monitored by the public, which can thus assess the central bank's performance against its stated objectives and penalise its behaviour if necessary.

There is now a growing literature that deals with IT; see among others, Amato and Gerlach (2001), Bernanke et al. (1999), Mishkin (2000), Taylor (1999), Truman (2003). Under this monetary policy regime, the central bank uses its instruments with the direct goal of bringing inflation as close as possible to the target over the medium run. In this framework, controlling inflation becomes the overriding goal of monetary policy. All the other indicators (ie output, money stock growth, the exchange rate, etc) become auxiliary variables; the central bank will take them into account only if this information helps it to improve its inflation forecast.

Given their post communist experience with high inflation it is not surprising that several central banks in Eastern Europe have become strong

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² Pioneers were New Zealand (1990), Canada (1991), Chile (1991), Israel (1992), United Kingdom (1992), Australia (1993) and Sweden (1993).

adherents of IT. Following a period in which most of them pursued a monetary policy aimed at stabilising the exchange rate, they subsequently turned to IT. The first country to adopt IT in Eastern Europe (EE) was the Czech Republic in December 1997. Initially the Czech National Bank (CNB) chose to target a 5.5-6.5% band for core inflation, defined over a one-year time horizon. From December 2001 the CNB moved to target the consumer price index (CPI). Starting with January 2002 the CNB adopted a 4-year inflation forecast period in which targeted inflation was expected to fall gradually within a band from 3-5% to 2-4% by the end of December 2005. From January 2006 the CNB announced that it would target an inflation rate of 3% until the country joins the euro area.

Poland followed suit in adopting an IT regime. Starting with June 1998 the National Bank of Poland (NBP) set a short-term inflation target within the 8-8.5% range. Subsequently different targets were set at the end of each year. It is worth noticing that the NBP was still maintaining an exchange rate band while targeting inflation. This was widened gradually before allowing the Polish zloty to float freely in April 2000. Since 2004 the NBP has been pursuing an inflation target of 2.5% within a +/-1% fluctuation band.

Following on the steps of the Czech Republic and Poland, Hungary launched inflation targeting in mid-2001. The first target band was +/-1% centred around a parity of 7%. For the end of 2005 the announced target band was 4% +/- 1% with the central parity target at the end 2006 falling by 0.5%. At the same time, the National Bank of Hungary (NBH) aims at maintaining the forint-euro exchange rate within a +/-15% band, which in effect emulates the ERM-II regime³.

More recently, both Slovakia (2004) and Romania (2005) have also publicly announced inflation targets.

Although the EE central banks which follow IT tend to stress the importance of pursuing this monetary policy framework in achieving low inflation this might not necessarily hold true. Clearly the recent low global inflation environment has made it easier for the EE countries to control domestic inflation. This argument aside, it is not clear what the results of implementing a different monetary policy framework would have been. The Baltic countries and Bulgaria, for instance, have also achieved low inflation, with the aid of a currency board. Moreover, there are a multitude of studies which show, in fact, that the benefits of IT are still to be proved in practice⁴.

As the experience in the EE economies mentioned above has shown

³ Each country aiming to join the euro area must spend a minimum of two years in the exchange rate mechanism II (ERM-II). This implies defining a central parity and a +/-15% variation interval of the domestic currency against the euro with the scope of ensuring the stability of the exchange rate prior to the adoption of the euro.

⁴ Mishkin and Schmidt-Hebbel (2001) argue that IT reinforced accountability and credibility. Yet they point that, at the end of the process, inflation in IT countries is not lower than in non-IT countries. Along the same lines Ball and Sheridan (2004) show that, once corrected for the initial conditions, the differences between inflation targeters and non-targeters are minor. Other authors such as Friedman (2004) contend that IT, as practised in reality in the low inflation countries, actually obscures the communication of the central bank's goals. Moreover, Friedman (2004) argues that this monetary policy framework is not as transparent as claimed by most IT advocates, casting doubts on the benefits brought about by the adoption of IT.

so far, targeting inflation is not an easy task. The ongoing restructuring process in these economies makes the inflation forecasting process more difficult and introduces an additional source of uncertainty in the system. Moreover, these central banks claim that interest rate setting is conducted in a forward looking manner due to the perceived lags in the monetary transmission mechanism, so that reliable forecasts are essential. By unequivocally choosing inflation as a nominal anchor the central banks could face potential dilemmas if, for example, the exchange rate appreciated too much following capital inflows. The paramount policy issue in EE countries is then whether the central bank should pre-commit itself to a single nominal anchor – namely inflation. This is clearly not the case in Hungary where the Central Bank Act of 2001 stipulates that both the government and the NBH mutually decide on the exchange rate policy.

There are a range of challenges faced by the central banks in the EE countries which could jeopardise the inflation targets. Firstly, the central bank's response to various shocks that hit the economy is made more difficult due to the effects caused by structural changes – as broad economic reforms still continue in EE countries. This increases the uncertainty regarding the source of the shocks making the understanding of the monetary policy transmission mechanism more difficult to learn.

Secondly, there is the issue of central bank independence and the objectives of monetary policy. Inflation

targeting was regarded as tool of anchoring low expectations of inflation during the early disinflationary process. However, now that low inflation has been achieved, and adding the fact that the inflation target has often been undershot for considerable periods of time in the Czech Republic and Poland has led to greater pressure on their central banks to pay greater attention to employment. In the case of Hungary, the lack of control over fiscal policy during election years suggests a weak institutional framework for guaranteeing actual central bank independence. In this respect, the upcoming Hungarian parliamentary elections in April of this year will provide a test of the continuing volatility in the budget deficit.

Another potential unavoidable conflict caused by multiple objectives is between IT and ERM-II, as the Maastricht criteria of maintaining a stable exchange rate could be incompatible with the IT framework. The experience of the NBH is illustrative in this respect. In January 2003, in the aftermath of a speculative attack on the forint, the NBH was forced to shift the band the Hungarian forint was trading in at that time. The NBH moved in strongly to defend the exchange rate band, spending some euro 5.3 billion or the equivalent of 7% of GDP. Apart from the spillover effects such actions might have⁵, they are bound to affect the credibility of monetary authorities.

Thirdly, fiscal policy considerations play an important role in the evolution of inflation in transition economies. Table 1 below shows that high fiscal deficits are a common characteristic

⁵ Foreign investors reacted to the NBH intervention in the foreign exchange markets by adopting different positions vis-à-vis other EE currencies. As a consequence, volatility of these currencies increased inducing more uncertainty. The movements in the Czech koruna against the euro provide a good example.

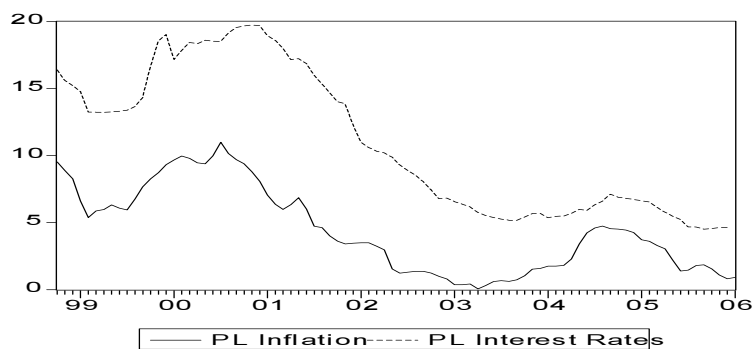
across the three economies considered. The pressure on budget deficits is likely to grow in the years to come as the EU accession costs will have to be

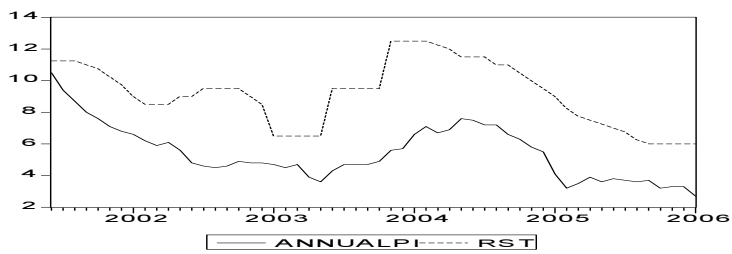
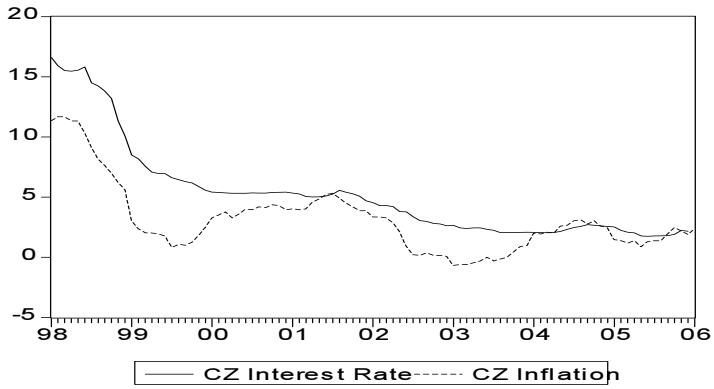
added to the costs of reforming social security systems. Such actions can affect the credibility of fiscal policies and raise inflation expectations.

Table 1. Selected Macroeconomic Indicators

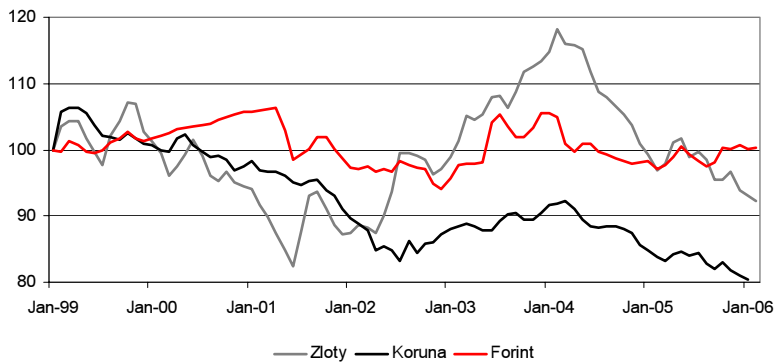
	Czech Republic				Hungary				Poland			
	GDP (%)	CPI (%)	Gov. bal. (% of GDP)	C/A (% of GDP)	GDP (%)	CPI (%)	Gov. bal. (% of GDP)	C/A (% of GDP)	GDP (%)	CPI (%)	Gov. bal. (% of GDP)	C/A (% of GDP)
2003	3.2	0.1	-6.0	-6.2	3.4	4.7	-7.2	-8.7	3.8	0.7	-5.9	-2.2
2004	4.4	2.8	-4.0	-5.2	4.0	6.8	-5.4	-8.9	5.4	3.4	-6.1	-4.3
2005	4.1	1.6	-6.3	-4.0	3.4	4.0	-6.1	-8.4	3.2	2.2	-3.4	-1.5
2006	3.8	2.8	-5.8	-3.1	3.6	3.6	-5.9	-8.7	3.7	1.9	-3.6	-0.9
2007	3.8	3.0	-4.5	-3.0	3.3	3.7	-5.9	-8.5	4.3	2.1	-3.3	-0.3

Data Sources: IMF Country Reports and OECD Economic Outlook





Exchange Rates Against the Euro



Taylor Rules and Inflation Targeting

Most modern research on monetary policy rules focuses on Taylor rules (Taylor, 1993, 1999), so that the monetary policy instrument is set in

$$R_t = r + \pi_t + \mu_1(\pi_t - \pi^T) + \mu_2\tilde{y}_t \quad \mu_1 > 0, \mu_2 > 0 \quad (1)$$

where r represents the real interest rate, π_t denotes the inflation rate, π^T is the inflation target and \tilde{y}_t is the output gap. The underlying assumption behind this rule is that the central bank aims to stabilise inflation around its target rate and the output gap around zero (so that actual output equals its potential value). Therefore, whenever inflation rises above the target, the central bank increases interest rates by more than the rise in the inflation rate, so as to raise real rates, stabilising economic activity.

Much modern research has extended Taylor's analysis by focusing on what coefficient values are optimal and by modifying the rule to include additional variables or by changing the timing framework (e.g., by having the central bank react to past values, rather than current ones, as in (1)). From this perspective, the Taylor rule is compatible with a flexible inflation targeting regime, that is, the central bank uses its policy to achieve the inflation target, but also attempts to stabilise output. Applied Taylor rules generally include a lagged interest rate on the right hand side of (1) on the grounds that central banks also attempt to smooth interest rate movements, but more important for our analysis is the possibility of including some exchange rate measure in the policy rule; it is possible for a central bank following a forward looking Taylor rule to react to

terms of a short term interest rate that responds to deviations of inflation from a (possibly explicit) target and the output gap, such as:

the exchange rate because of its direct effect on expected future inflation, but this would not require an additional coefficient for the exchange rate in (1). If this were the case, then the central bank would be reacting to exchange rate movements over and above their impact on inflation and output. Taylor (2000, 2001) has argued that the original Taylor rule did not include a response to the exchange rate because its inclusion worsened economic performance within the context of a multicountry model⁶. However, this conclusion was relevant in the context of developed economies, so that it is not clear whether the results also extend to Central Europe.⁷ Most importantly for the economies considered here, given the uncertainty surrounding the independence of their central banks and lack of knowledge on the correct 'model' of the economy, it seems overambitious to expect monetary policy to stabilise all four variables (inflation, the output gap, interest rates and the exchange rate). A likely result of paying too much attention to exchange rate fluctuations is that the public's understanding of the objectives of monetary policy will become obfuscated with the result of greater uncertainty for inflation. Furthermore, as in the case of Hungary, implementing a policy of a fixed exchange rate and an inflation target in the presence of openness to capital flows⁸ seems to ignore the

⁶ Although Svensson (1999) among others, has argued in favour of including the exchange rate in the policy rule.

⁷ It should be noted that this response to the exchange rate pertains to normal fluctuations and not those caused by, say, a financial crisis.

monetary policy dilemma, whereby the monetary authority can only focus on two of the three objectives.

To gain a better understanding of the actions of the three largest countries that joined the EU in 2004, namely the Czech Republic, Hungary and Poland, one can compare the behaviour of interest rates in recent years with alternative monetary policy rules by varying the basic Taylor rule in (1).⁹ To this end, the policy rule variants considered will be the basic Taylor rule with two alternative measures of the output gap commonly used in the literature on Central Europe and an “inflation-nutter” rule, where the monetary authority only responds to deviations of inflation from the target¹⁰.

As in the original formulation of the Taylor rule, the particular values in the rule will be calibrated, as the small sample size would not make estimation fruitful.¹¹

Hungary

Starting with Hungary, Figure 1 plots the value of the actual short term interest rates and two variants of the basic Taylor rule during Hungary’s inflation targeting period, which began in June 2006. The general interpretation of this type of analysis is that if for a particular time period actual interest rates were lower than suggested by the Taylor rule, monetary policy was regarded as too loose, that is, interest rates were lower than required by fundamentals.

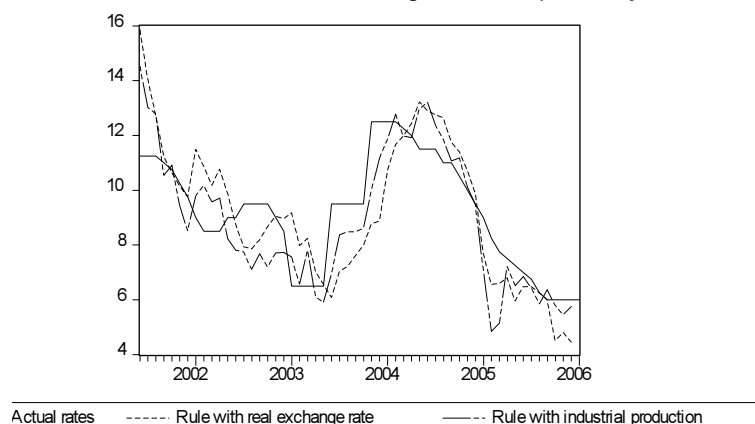


Fig. 1 Taylor rule for Hungary during inflation targeting period (2001:06-2006:01). The central bank reacts to deviations of inflation from its target, the output gap and smoothes interest rates: $R_t = (1 - 0.2)[2.5 + \pi_t + 0.25ygap_t + 0.8\pi gap_t] + 0.2R_{t-1}$, where the output gap measure is either the detrended real exchange rate or detrended industrial production (in both cases these have been detrended using the Hodrick-Prescott filter using $\lambda = 14400$). πgap represents the deviation of inflation from the announced end-of the year target. Source: Eurostat and Magyar Nemzeti Bank.

⁸ Although for Hungary the exchange rate band is a rather wide one.

⁹ An alternative, related exercise is to estimate (1) to infer the central bank’s response to fundamentals. However, as noted by Siklos and Ábel (2003), the very small samples considered here and the existence of large structural change would lay serious doubts to the results.

¹⁰ A similar exercise for Hungary which only considered the first two rules and covering only the 1990s (before IT was in place), was conducted by Siklos and Ábel (2003).

¹¹ Examples of these for Hungary, Poland and the Czech Republic can be found in María-Dolores (2005) and Leigh (2005), and Mohanty and Klau (2004), but one should be wary about the robustness of the results given the small sample size and likelihood of structural change.

The sample begins with actual rates much lower than those suggested by both rules, but this is gradually reversed, so that by from mid-2003 short term interest rates are above those suggested by the Taylor rule for most of the period. An alternative view of Figure 1 is can be seen below, in Figure 2, which plots the gaps between actual rates and each of the two rules above. Both measures of the output

gap yield similar conclusions: the gap has been rising gradually, remaining positive throughout 2005, the reason being that inflation remained below target for that year. Moreover, the relatively large discrepancy between the two rules for early 2005 arises from the fact that detrended industrial output was over 4% below trend, which called for an additional reduction in interest rates.

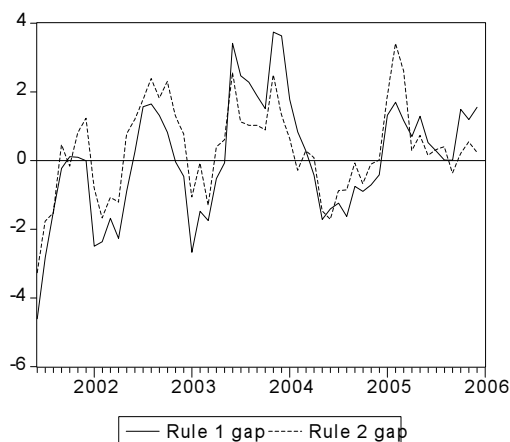


Figure 2: gap between actual interest rates and those proposed by the Taylor rule described in Figure 1 for Hungary. Rule one uses the detrended real exchange rate and rule 2 detrended industrial production.

Nevertheless, the main conclusions from both rules remain broadly the same, except for the fact that the first rule is more volatile than the second. In terms of the actual size of the gaps between the rates suggested by the rules and actual interest rates, reaches a maximum of 4.6 at the beginning of the sample, which compares favourably with the experience of the UK reported by McCallum (2000), with an interest rate gap of approximately 13 percentage points.

Czech Republic

In the case of the Czech Republic, the sample considered will begin in 1998, which is when inflation targeting was implemented. The Czech central bank began a process of disinflation targeting net inflation of 6%, culminating in a target for headline inflation for 3% until accession to the euro area. In contrast to the experiences of Hungary and Poland, the Czech process of disinflation was achieved gradually, without interest rates steadily declining throughout the inflation targeting period.

The results for the same two rules and parameter values are shown in Figure 3. In this case, both rules track actual rates very closely throughout the inflation targeting period, especially from 1999 onwards. The magnitude of the gaps between the actual rates and

those suggested by the Taylor rule variants is far smaller than for Hungary; given the discussion above regarding the lack of central bank independence in Hungary and its commitment to an exchange rate target, this should not be surprising.

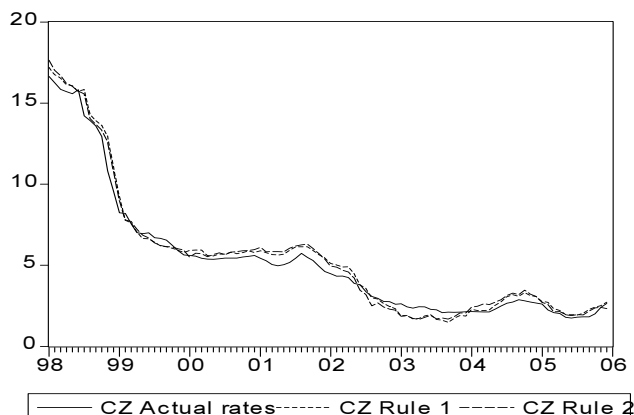


Fig. 3 Taylor rule for the Czech Republic during inflation targeting period (1998:01-2006:01). The central bank reacts to deviations of inflation from its target, the output gap and smooths interest rates: $R_t = (1 - 0.2)[2.5 + \pi_t + 0.25ygap_t + 0.8\pi gap_t] + 0.2R_{t-1}$, where the output gap measure is either the detrended real exchange rate or detrended industrial production (in both cases these have been detrended using the Hodrick-Prescott filter using $\lambda = 14400$). πgap represents the deviation of inflation from the announced end-of-the year target. Source: Eurostat and Czech National Bank.

Nevertheless, it is also worth pointing out that the although the gaps, which are very highly correlated, display a considerable amount of persistence, especially during the periods 1999:11 to 2002:08 and 2004:11 to 2005:12. The

reason for this lies primarily in the fact that the deviations of inflation from the central bank's target remain highly persistent, and in fact, inflation has been undershooting its target for most of the past four years.

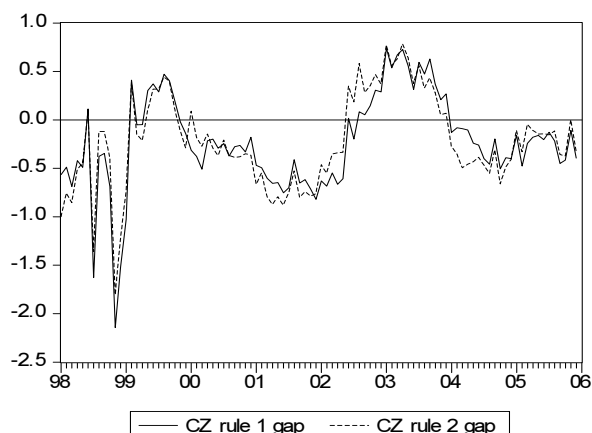


Figure 4: gap between actual interest rates and those proposed by the Taylor rule described in Figure 1 for the Czech Republic. Rule one uses the detrended real exchange rate and rule 2 detrended industrial production.

Nevertheless, the remarkable result of applying a simple Taylor rule to the Czech Republic is its ability to track actual rates so closely. Indeed, the magnitude of the gaps in Figure 4 compare well with those found by McCallum (2000) for the US, Japan and the UK, with the conclusion that Taylor rules can be yield fruitful insights to the study of monetary policy in transition economies.

Poland.

For Poland the same Taylor rules are applied during the period 1998:10 to 2006:1 and are shown in Figure 5. Inflation targeting in Poland, as in the other countries described above, was successful in achieving low inflation, although this was not a steady process.

Inflation exceeded 10% in 2000 and approached deflation in early 2003. Consequently, deviations of inflation from the target level have been highly persistent and worst of all for the purposes of maintaining the integrity and independence of the central bank, inflation undershot its target for most of 2001-2004. Given that over this period the unemployment rate averaged around 18%, reaching 20.4% in 2002:09, However, this was not achieved in a uniform manner and in 2000 the inflation rate exceeded 10% and then bordered near deflation in early 2003.

As was the case with the Czech Republic, the deviations of inflation from its target¹² have been large and persistent.

¹² The Bank of Poland focused on a band rather than a point, but the central point will be considered here for simplicity.

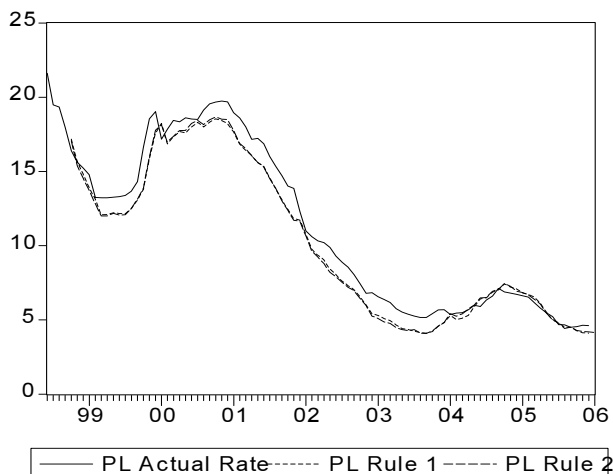


Fig. 5 Taylor rule for the Poland. During inflation targeting period (1998:10-2006:01). The central bank reacts to deviations of inflation from its target, the output gap and smoothes interest rates: $R_t = (1 - 0.2)[2.5 + \pi_t + 0.25ygap_t + 0.8\pi gap_t] + 0.2R_{t-1}$, where the output gap measure is either the detrended real exchange rate or detrended industrial production (in both cases these have been detrended using the Hodrick-Prescott filter using $\lambda = 14400$). πgap represents the deviation of inflation from the announced end-of-the year target. Source: Eurostat and Polish National Bank.

As shown in Figure 6, the gaps implied by the two Taylor rules have been large and persistent, with no clear indication of an improvement over time, suggesting that although disinflation in Poland has been a success, inflation

targeting, in the sense of maintaining a low and stable inflation rate, has not been very successful; in effect Polish monetary policy has been unnecessarily restrictive.

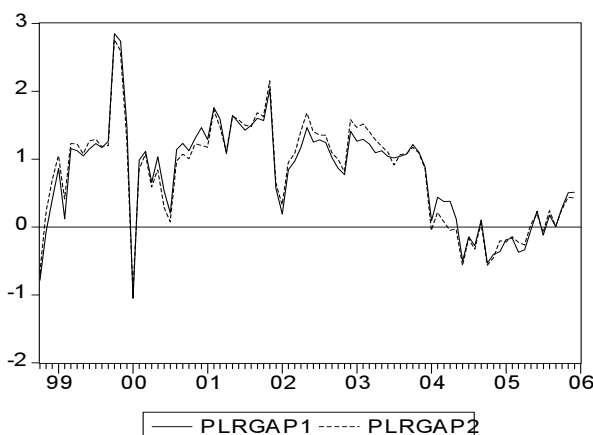


Figure 6. Gaps between actual rates and rates implied by the Taylor rules described in Figure 2.

Issues Regarding the Output Gap.

One limitation of analysis conducted above, and also applicable to much current research on estimating monetary policy rules for the transition economies concerns the measured of the output gap. As described in the previous Bulletin (Páez-Farrell, 2005), the Hodrick-Prescott yields cyclical output, for a given definition of a business cycle, but not the output gap unless the economy does not experience any real shocks. Given the prevalence of ongoing structural change in the economies described above this is highly implausible. Moreover, the filter will be sensitive to the end points and in this regard it would normally be preferable to discard the first and last two years of data, but this is not an

option given the short sample, so that the cycle obtained could be largely spurious. In this sense, when using Taylor rules for normative analysis one should be cautious in the presence of discrepancies arising from large deviations in the measured output gap. For the current context this problem is alleviated by the fact that the output gap enters the Taylor rule with a very small coefficient and that deviations in the measured output gap have not been excessively large.¹³

As an alternative to this, one could also consider the consequences of a Taylor rule without an output gap measure. Doing so, as shown below (third Taylor rule) for Poland, does not in this case¹⁴, alter the main conclusions of the paper.

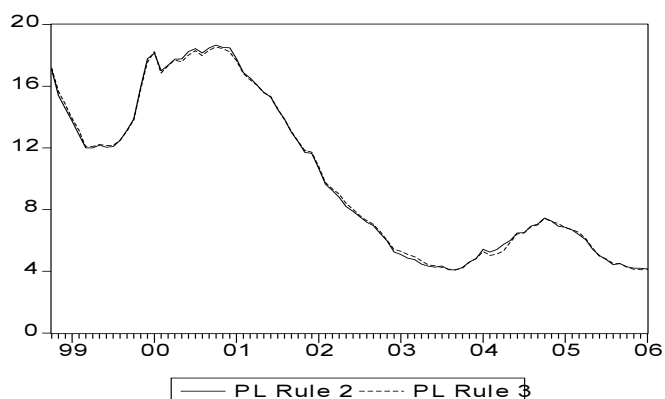


Figure 7. Comparison of rule 2 and an “inflation nutter” rule, where the response coefficient to the output gap is zero, for Poland.

¹³ This is also the reason the results remain largely robust to the two rules analyzed.

¹⁴ The results are virtually identical for Hungary and the Czech Republic.

CONCLUSION

This paper has analysed the inflation targeting approach in three transition economies, namely Hungary, Poland and the Czech Republic with the use of Taylor rules as benchmarks. The three economies considered have been successful at achieving disinflation, but deviations of inflation from its target have been persistent in all cases. Except for the Czech Republic, deviations from the Taylor rule are large and persistent, with Hungary displaying the largest fluctuations. The fact that Hungary is following an inflation targeting regime and a fixed exchange

rate is probably part of the problem, a policy that is inconsistent with perfectly flexible capital markets.

Polish interest rates have consistently exceeded those suggested by the Taylor rule and given the prevalence of high unemployment; these undershootings do not augur well for the stability of monetary policy. Finally, the behaviour of Czech interest rates can be remarkably captured by the simple Taylor rule proposed in this paper, suggesting that the Czech National Bank has been the most successful at stabilising inflation and output around their target levels.

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