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Efficiency of the Monetary Policy and Stability of Central Bank Preferences. Empirical Evidence for Peru

Gabriel Rodríguez*

* Universidad of Ottawa and Central Bank of Peru

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Efficiency of the Monetary Policy and Stability of Central Bank Preferences. Empirical Evidence for Peru*

Gabriel Rodríguez†
University of Ottawa and Central Bank of Peru

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Abstract

Following the approach suggested by Favero and Rovelli (2003), I estimate a three-equations system for different sub-samples for Peru. The results indicate that the preferences of the monetary authority have changed between the different regimes. In particular, the parameter associated to the implicit target of inflation has been reduced significantly. The macroeconomic conditions from the side of the aggregate demand have been more favorable than those related to the aggregate supply. The standard deviation of the monetary rule suggests that it has been conducted successfully in the last regime.

Keywords: Interest Rate Rule, Structural Breaks, Inflation Targeting, Output Gap, Preferences, Macroeconomic Shocks.

JEL: C2, E5

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†Address for Correspondence: University of Ottawa, Department of Economics, P. O. Box 450, Station A, Ottawa, Ontario, K1N 6N5, Canada. Telephone: +613-562-5800 (1750), Fax: +613-562-5999, Email address: gabrielr@uottawa.ca.

1 Introduction

The literature dedicated to the estimation and analysis of interest-rate rules is very extensive. One of the issues more discussed in this literature is related to the analysis of the behavior of the parameter associated to the gap between expected and target inflation. When the estimate of this parameter is larger than unity, it is concluded that the monetary policy has been adequate. Representative researches on this aspect are Clarida et al. (1998, 2000), Judd and Rudebusch (1998), and Nelson (2003); see Hamalainen (2004) for a detailed survey. In order to analyze the behavior of the above mentioned parameter, the estimations have been performed by sub-samples, which have been selected based on prior exogenous criteria.

An interest-rate rule may be observed, following Svensson (1997), as the result of an optimization of an intertemporal loss function subject to two equations describing the structure of the economy (aggregate demand and supply). In general, the arguments of the loss function are the gap between expected and target inflation, and the output gap. The important issue in this context is that the parameters of the interest-rate rule are convolutions of the original parameters associated to the preferences of the Central Bank and the structure of the economy. Even assuming very simple specifications for the structure of the economy and the loss function, the convolution is complex.

In the above context, as Favero and Rovelli (2003) argue, estimation of an interest-rate rule in a single-equation specification is not a good advise, except if the researcher is only interested in the behavior of the coefficient associated to the gap between expected and target inflation. The recommendation is the estimation of a three-equations system, allowing for the possibility to retrieve the structural parameters associated to the preferences of the monetary authority and the structure of the economy.

In this paper, I adopt the approach recommended by Favero and Rovelli (2003) using data for Peru for the period 1979:1-2005:4. To the best of my knowledge, no similar approach has been used for this country. The results show important sensitivities of the smoothing coefficient and the weight assigned to the output gap according to which measure of output gap is used. All estimations indicate that the economic conditions related to the aggregate demand have been favorable in comparison to those related to the aggregate supply. Furthermore, all estimations indicate that the monetary policy has been successful in the last years.

The rest of the paper is organized as follows. Section 2 presents the model. The empirical results are presented and discussed in Section 3. Section 4 concludes.

2 The Model

I consider the simplest version of the inflation targeting problem as described by Svensson (1997). Using a similar notation as in Favero (2001), and Favero and Rovelli (2003), I assume that monetary authority preferences may be described by the following intertemporal loss function:

$$E_t \sum_{i=0}^{\infty} \delta^i L_{t+i}, \tag{1}$$

$$L = 0.5[(\pi_t - \pi^*)^2 + \lambda x_t^2 + \mu(i_t - i_{t-1})^2], \tag{2}$$

where π_t is the inflation rate, x_t is the output gap, i_t is the policy instrument, E_t defines the expectations taken with respect to the information available at time t, π^* is the target level of inflation[1], δ is the intertemporal factor of discount, λ is the weight associated to the output stabilization, and μ is the weight attached to interest rate smoothing. Equation (2) may be observed as a general characterization of the policy goals, where special cases such as strict targeting ($\lambda = 0, \mu = 0$), or flexible inflation targeting ($\lambda \neq 0, \mu = 0$) may be considered.

When the goal is the specification of an instrument rule, (1) and (2) have to be complemented by specifications of the structure of the economy. Following standard assumptions in the literature, see among others Favero (2001), and Favero and Rovelli (2003), I assume the following specifications

[1] In the case of Peru there is not an official target level of inflation. Perhaps, it is more adequate to name π^* as the implicit level of inflation.

for the demand and aggregate supply:[2]

$$x_{t+1} = \beta_x x_t - \beta_r (i_t - E_t \pi_{t+1} - \overline{r}) + u^d_{t+1}, \tag{3}$$
$$\pi_{t+1} = \alpha_\pi \pi_t + \alpha_x x_t + u^s_{t+1}, \tag{4}$$

where u^d_{t+1} and u^s_{t+1} represent shocks to the aggregate demand and supply, respectively. In the empirical section, I use the exchange rate as an additional variable.

In summary, the intertemporal optimization problem is then to minimize (1) and (2) subject to the restrictions (3) and (4). The coefficients of the obtained monetary rule are convolutions of the parameters associated to the preferences of the central bank (δ, λ, π^*) and the structure of the economy $(\alpha_\pi, \alpha_x, \beta_r, \beta_x, \overline{r})$. It represents a serious issue in terms of estimating an interest rate rule as a single equation since it implies that the structure of the economy cannot be identified.

I adopt the approach suggested by Favero and Rovelli (2003), which is based in a three-equations model. This system is obtained by minimizing the loss function (2) under the assumption of finite horizon, and subject to a general distributed lag specification of the aggregate demand and supply from the stylized specifications (3) and (4).

Therefore, allowing for a more general lag structure that one embodied for (3) and (4), and also adopting the backward-looking specification for the IS curve employed by Rudebusch and Svensson (1999), we may write the

[2] The equations (3) and (4) may be considered as the solutions of intertemporal optimization problems by agents of the private sector.

complete model as

$$\begin{aligned}
x_{t+j} &= C_1(L)x_{t+j-1} - C_2(L)[i_{t+j-1} \qquad (5)\\
&\quad -\pi_{t+j-1} - \overline{r}] + u^d_{t+j}\\
\pi_{t+j} &= C_3(L)\pi_{t+j-1} + C_4(L)x_{t+j-1} \qquad (6)\\
&\quad +C_5(L)w_{t+j} + u^s_{t+j},\\
E_t f[i_{t+i+j}, \pi_{t+i+j}, x_{t+i+j}] &= 0, \qquad (7)\\
f[i_{t+i+j}, \pi_{t+i+j}, x_{t+i+j}] &= \sum_{i=0}^{\tau} \delta^i E_t[\pi_{t+i+j} - \pi^*]\frac{\partial \pi_{t+i+j}}{\partial i_{t+j}}\\
&\quad + \sum_{i=0}^{\tau} \delta^i \lambda E_t x_{t+i+j}\frac{\partial x_{t+i+j}}{\partial i_{t+j}} + \mu(i_{t+j} - i_{t+j-1})\\
&\quad -\mu\delta E_t[i_{t+j+1} - i_{t+j}] + u^m_{t+j}.
\end{aligned}$$

Empirical estimation requires truncation of the relevant lags and leads. I select $\tau = 4$. I then select the best fitting empirical model by omitting non significant lags and leads for the general model. Assuming $j = 1$, we have:

$$\begin{aligned}
0 &= \lambda\delta^2 E_t x_{t+3}\frac{\partial x_{t+3}}{\partial i_{t+1}} + \lambda\delta^3 E_t x_{t+4}\frac{\partial x_{t+4}}{\partial i_{t+1}}\\
&\quad +\lambda\delta^4 E_t x_{t+5}\frac{\partial x_{t+5}}{\partial i_{t+1}} + \delta^3 E_t[\pi_{t+4} - \pi^*]\frac{\partial \pi_{t+4}}{\partial i_{t+1}}\\
&\quad +\delta^4 E_t[\pi_{t+5} - \pi^*]\frac{\partial \pi_{t+5}}{\partial i_{t+1}} + \mu E_t[i_{t+1} - i_t]\\
&\quad -\mu\delta E_t[i_{t+2} - i_{t+1}] + u^m_{t+1}
\end{aligned}$$

Then, the estimated complete system, written for $j = 1$, is the following:

$$\begin{aligned}
x_{t+1} &= c_1 + c_2 x_t + c_3 x_{t-1} + c_4(i_{t-1} - \overline{\pi}_{t-1}) + c_5(i_{t-2} - \overline{\pi}_{t-2})\\
&\quad +u^d_{t+1} \qquad (8)
\end{aligned}$$

$$\pi_{t+1} = c_6\pi_t + c_7\pi_{t-1} + c_8 x_t + c_9 \Delta w_t + u^s_{t+1} \qquad (9)$$

$$
\begin{aligned}
0 \quad = \quad & \mu E_t(i_{t+1} - i_t) - \mu\delta E_t(i_{t+2} - i_{t+1}) + \delta^3 E_t\{c_8 c_4(\pi_{t+4} \\
& -\pi^*) + \delta[c_6 c_8 c_4 + c_8(c_5 + c_2 c_4)](\pi_{t+5} - \pi^*)\} + \\
& \lambda\delta^2 E_t\{c_4 x_{t+3} + \delta(c_5 + c_2 c_4)x_{t+4} + \delta^2[c_2(c_5 + \\
& c_2 c_4) + c_3 c_4]x_{t+5}\} + u^m_{t+1} \qquad (10)
\end{aligned}
$$

where w_t is an additional explanatory variable which is the nominal exchange rate. Joint estimation of (8)-(10) allows the identification of the parameters δ, λ, μ and π^* which fully describe the preferences of the Central Bank. As in Favero and Rovelli (2003), I use $\delta = 0.975$ because estimation of this parameter is very instable. However, unlike them, I do not impose the restriction that $c_6 + c_7 = 1$.

3 Empirical Results

It is worth to note the following issues concerning the estimation of the system (8)-(10): i) the variable Δw_t is the growth rate of the nominal exchange rate; ii) overall, the set of instruments includes four lags of the inflation rate, the output gap, the interest rate, and the growth rate of the exchange rate. However, given that the sample size changes, the set of instruments changes consequently.

Quarterly data is used from 1979:1 to 2005:4. As a measure of the output gap, we have three measures. One measure is obtained after application of the filter of Hodrick and Prescott (1997). The other two measures are obtained after using a linear and a quadratic trend, respectively. The three measures of the output gap are denoted by HP, LT and QT, respectively. Annual inflation is measured as $100 \times (p_t - p_{t-4})$, where p_t denotes logarithms of Consumer Price Index (CPI)[3]. The source of the information is the Central Bank of Peru.

The literature on monetary rules has suggested an estimation by subsamples, where the break point is considered exogenous. In a recent paper,

[3] I also consider estimations using a more narrow measure of Consumer Price Index, frequently denoted as the Core CPI. Results are available upon request.

Castillo, Humala and Tuesta (2006) identify three different regimes for the behavior of the inflation rate in Peru. The first regime is represented by the period 1994:2-2005:4 and it is characterized for a low-level inflation rate with low volatility and low persistence. Other regime covers the period 1979:1-1987:4 and 1991:2-1994:1. This period corresponds to high-levels of inflation rate and high volatility and persistence. The last regime covers the period 1988:1-1991:1 and it is characterized for a extremely volatile and outlier-type hyperinflation period[4]. In this paper estimation of the three-equation system is performed for the period 1979:1-1987:4 and 1991:2-1994:1 (first regime or sub-sample) and 1994:2-2005:4 (second regime or sub-sample). Unfortunately, hyperinflation period does not have sufficient number of observations and therefore, estimation is not performed for this regime.

Table 1[5] shows the estimates using the filter HP to measure the output gap. The estimates of the coefficient π^* reflect clearly the evolution of this parameter through the two samples. As Castillo, Humala and Tuesta (2006) suggest, the estimates of the second regime indicate low volatility and low persistence in the inflation rate. In the first regime, persistence in the output gap and inflation rate are 0.92 and 0.97, respectively. Both values in the second regime are 0.68 and 0.59, respectively. They indicate a strong impact of the desinflation policy applied for the government. The evolution of the value of the implicit inflation rate (π^*) also confirms this evidence.

Table 2 presents the estimates obtained using a linear trend (LT) to measure the output gap. Overall all values are higher than previous results (Table 1). The persistence for the output gap is 0.95 and 0.90 for the two regimes, respectively. In the case of the inflation rate there is a coefficient of unity in the first identified regime. It reveals a strong persistence for the inflation rate during this period. The second regime is characterized for a low persistence (0.69). The implicit value of the inflation rate (PI*) is also dramatically reduced in the second regimen in comparison with the first

[4] Castillo, Humala and Tuesta (2006) also find very similar dates for the three regimes when they analyze the growth rate on money.

[5] All errores standards of the estimated coefficients are consitent to the presence of heterocedasticidity and autocorrelation using the correction suggested by Newey and West (1987).

regimen or the total sample. Overall, the shocks related to the aggregate supply are more important than those coming from the aggregate demand side. Both kind of shocks are more reduced in the second regime compared to the first regime.

Table 3 presents estimates obtained using a quadratic trend (QT) to measure the output gap. Very similar results are obtained. The implicit value of the inflation rate (π^*) is the smallest compared with those obtained in Table 1 and 2. Macroeconomic shocks are smaller in the second regime compared with those related to the first regime. Furthermore, the shocks related to the aggregate demand are more favorable than those coming from the aggregate supply side.

A general conclusion from the estimates is the extreme sensitivity of the estimates to the different approaches in calculating the output gap. It is particularly the cases for the parameters λ and μ. Another conclusion is the fact that preferences of the monetary authorities have changed drastically in the second regime in comparison with the behavior observed in the first regime. It is clearly reflected in the estimates of the π^*. Better macroeconomic conditions are also observed from the side of the aggregate demand in comparison with those from the aggregate supply. The empirical evidence suggests, without any doubt, the fact that the monetary policy has been conducted efficiently in the last regime.

4 Conclusions

Estimations of an interest rate rule using single-equation methods has been criticized by Favero and Rovelli (2003) based on the fact that structural parameters, associated to the preferences of the monetary authority and the structure of the economy, cannot be retrieved. This issue of convolution of parameters may be fixed in estimating a three-equations system by GMM as suggested by Favero and Rovelli (2003). In this paper, I applied this approach for the case of Peru. Estimation by sub-samples is performed using different measures to calculate the output gap.

The results showed important sensitivities of the smoothing coefficient and the weight assigned to the output gap according to which measure of output gap is used. All estimations indicated that the economic conditions related to the aggregate demand have been favorable in comparison to those related to the aggregate supply. Furthermore, all estimations indicated that the monetary policy has been successful in the last regime. It is observed in the value of the π^*.

References

[1] Castillo, P., A. Humala, and V. Tuesta (2006), "Monetary Policy, Regime Shifts, and Inflation Uncertainty in Peru (1949-2006)," manuscript.

[2] Clarida R., J. Galí and M. Gertler (1998), "Monetary Policy Rules in Practice. Some International Evidence," *European Economic Review* **42**, 1033-1067.

[3] Clarida R., J. Galí and M. Gertler (2000), "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics* **115**, 147-180.

[4] Favero, C. A. (2001), *Applied Macroeconometrics*, New York: Oxford University Press.

[5] Favero, C. and R. Rovelli (2003), "Macroeconomic Stability and the Preferences of the Fed. A Formal Analysis, 1961-1998," *Journal of Money, Credit and Banking* **35** (4), 545-556.

[6] Hamalainen, N. (2004), "A Survey of Taylor-Type Monetary Policy Rules," Working Paper 2004-02, Department of Finance.

[7] Hodrick R. J. and E. C. Prescott (1997), "Post-War U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit and Banking* **29**.

[8] Judd, J. P. and G. D. Rudebusch (1998), "Taylor's Rule and the Fed: 1970-1997," Federal Reserve Bank of San Francisco, *Economic Review* **3**, 1-16.

[9] Nelson, E. (2003), "UK Monetary Policy 1972-1997: A Guide Using Taylor Rules," in P. Mizen (Editor), *Central Banking, Monetary Theory and Practice: Essays in Honour of Charles Goodhart*, Volume 1, Cheltenham: Edward Elgar, 195-216.

[10] Newey, W. K., and K. D. West (1987), "A Simple Positive Semi-Definite, Heterocedasticity and Autocorrelation Consistent Covariance Matrix," *Econometrica* **55**, 703-708.

[11] Rudebusch, G. D., and L. E. O. Svensson (1999), "Policy Rules for Inflation Targeting," in John B. Taylor (Editor), *Monetary Policy Rules*, University of Chicago Press.

[12] Svensson, L. E. O. (1997), "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targeting," *European Economic Review* **41**, 1111-1146.

Table 1. Estimates of the system (8)-(10) for Peru; Total CPI; Estimates using HP

	No Breaks	Estimates by sub-samples	
	1979:1-2005:4	1979:1-1987:4 1991:2-1994:1	1994:2-2005:4
c_1	0.014	0.456^a	0.922^a
c_2	1.115^a	1.096^a	0.685^a
c_3	-0.339^a	-0.177^a	-0.059
c_4	-0.000^a	-0.001^a	-0.048^a
c_5	0.000^a	-0.001^a	-0.020^a
c_6	-0.282^a	0.688^a	0.336^a
c_7	-0.333^a	0.285^a	0.256^a
c_8	2.938^a	0.838^a	0.455^a
c_9	1.851^a	-0.048	0.133^a
δ	0.975^e	0.975^e	0.975^e
π^*	56.245^a	71.343^a	4.026^a
μ	-0.000^a	0.000	0.009^a
λ	20.883^a	-2.343^a	-0.464^a
$\sigma(u^d)$	3.085	3.349	1.874
$\sigma(u^s)$	58.480	22.546	3.332
$\sigma(u^m)$	0.071	0.328	0.155
J	0.285	0.299	0.274

^{a,b,c,d} denote statistic significance at the 1.0, 2.5, 5.0 and 10.0% levels, respectively. An ^{e} indicates that the coefficient has been imposed in the estimation.

Table 2. Estimates of the system (8)-(10) for Peru; Total CPI; Estimates using LT

	No Breaks	Estimates by sub-samples	
	1979:1-2005:4	1979:1-1987:4 1991:2-1994:1	1994:2-2005:4
c_1	0.080	0.407^b	1.439^a
c_2	1.285^a	1.127^a	0.822^a
c_3	-0.340^a	-0.176^a	0.081^c
c_4	0.000	-0.005^a	-0.054^a
c_5	0.000^a	-0.002^a	-0.015
c_6	-0.287^a	0.686^a	0.345^a
c_7	-0.351^a	0.317^a	0.351^a
c_8	1.102^a	0.509^a	0.096^a
c_9	1.885^a	-0.073^a	0.092^a
δ	0.975^e	0.975^e	0.975^e
π^*	60.181^a	73.549^a	6.246^a
μ	-0.000^a	-0.000^a	0.002^a
λ	2.058^a	-0.858^a	0.036^a
$\sigma(u^d)$	3.368	3.363	2.023
$\sigma(u^s)$	59.534	22.268	3.462
$\sigma(u^m)$	0.041	0.529	0.043
J	0.161	0.296	0.226

^{a,b,c,d} denote statistic significance at the 1.0, 2.5, 5.0 and 10.0% levels, respectively. An ^{e} indicates that the coefficient has been imposed in the estimation.

Table 3. Estimates of the system (8)-10) for Peru; Total CPI; Estimates using QT

	No Breaks	Estimates by sub-samples	
	1979:1-2005:4	1979:1-1987:4 1991:2-1994:1	1994:2-2005:4
c_1	0.043	0.789^a	0.664^a
c_2	1.241^a	1.105^a	0.842^a
c_3	-0.343^a	-0.137^a	-0.014
c_4	-0.000^a	-0.003^a	-0.038^a
c_5	0.000^a	-0.002^a	-0.000
c_6	-0.279^a	0.679^a	0.365^a
c_7	-0.334^a	0.303^a	0.315^a
c_8	1.422^a	0.642^a	0.343^a
c_9	1.838^a	-0.060^a	-0.026
δ	0.975^e	0.975^e	0.975^e
π^*	66.610^a	67.625^a	2.796^a
μ	-0.000^a	-0.000^a	0.003^a
λ	2.341^a	-1.396^a	-0.267^a
$\sigma(u^d)$	3.297	3.375	2.029
$\sigma(u^s)$	59.380	22.187	3.348
$\sigma(u^m)$	0.029	0.448	0.084
J	0.171	0.296	0.262

^{a,b,c,d} denote statistic significance at the 1.0, 2.5, 5.0 and 10.0% levels, respectively. An ^{e} indicates that the coefficient has been imposed in the estimation.

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