

**THE MEASUREMENT OF LIQUIDITY
AND OPTIMAL MONETARY POLICY
RESPONSE IN A FINANCIAL MARKET
IN DEVELOPMENT: THE CASE OF
PARAGUAY**

Willian Bejarano

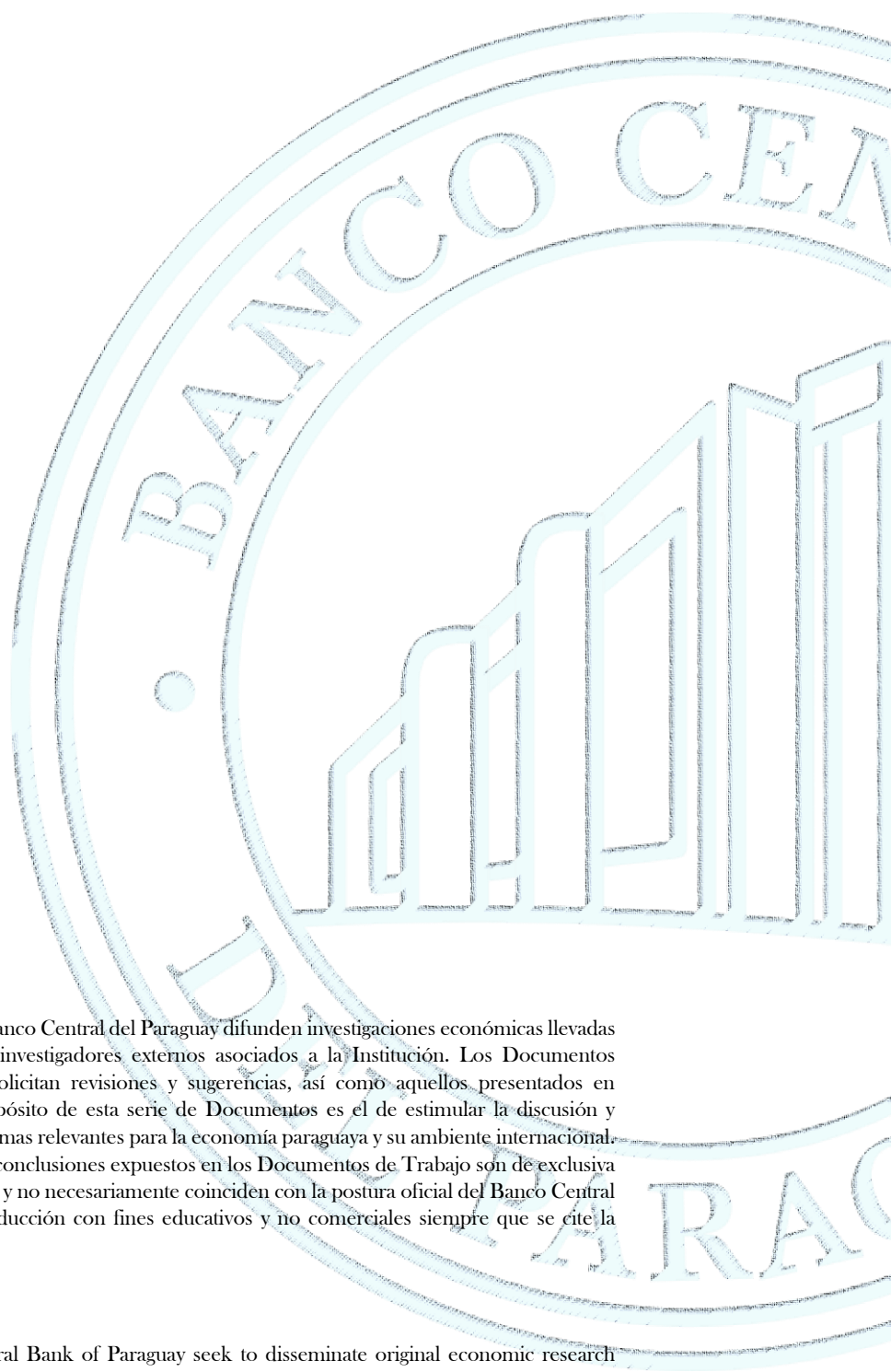
Carlino Velázquez

Bernardo Darío Rojas

Gustavo Biedermann

Víctor Ruíz Díaz





Los Documentos de Trabajo del Banco Central del Paraguay difunden investigaciones económicas llevadas a cabo por funcionarios y/o por investigadores externos asociados a la Institución. Los Documentos incluyen trabajos en curso que solicitan revisiones y sugerencias, así como aquellos presentados en conferencias y seminarios. El propósito de esta serie de Documentos es el de estimular la discusión y contribuir al conocimiento sobre temas relevantes para la economía paraguaya y su ambiente internacional. El contenido, análisis, opiniones y conclusiones expuestos en los Documentos de Trabajo son de exclusiva responsabilidad de su o sus autores y no necesariamente coinciden con la postura oficial del Banco Central del Paraguay. Se permite la reproducción con fines educativos y no comerciales siempre que se cite la fuente.

The Working Papers of the Central Bank of Paraguay seek to disseminate original economic research conducted by Central Bank staff or third party researchers under the sponsorship of the Bank. These include papers which are subject to, or in search of, comments or feedback and those which have been presented at conferences and seminars. The purpose of the series is to stimulate discussion and contribute to economic knowledge on issues related to the Paraguayan economy and its international environment. Any views expressed are solely those of the authors and so cannot be taken to represent those of the Central Bank of Paraguay. Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.

The Measurement of Liquidity and Optimal Monetary Policy Response in a Financial Market in Development: The Case of Paraguay

Central Bank of Paraguay

(PRELIMINAR VERSION – JUNE 2012)

Willian Bejarano* (1)

Carlino Velazquez* (2)

Bernardo Rojas* (3)

Gustavo Biedermann* (4)

Victor Ruiz Diaz* (5)

Abstract

This paper explains the relationship between monetary policy decisions and the liquidity indicators. To this end, a Taylor Rule is estimated and transitory deviations from the rule are related to a selected liquidity indicator. Results suggest that liquidity in the Paraguayan economy is intimately linked with how loose or tight monetary policy is relative to a Taylor Rule benchmark. Historical data for Paraguay has shown that high (low) liquidity in the financial system is correlated with negative (positive) Taylor residuals.

Key words: Taylor Rule, Liquidity, Inflation Targeting.

*Economists from the Monetary Policy General Management. Contacts: (1) wbejara@bcp.gov.py; (2) cvelaz@bcp.gov.py; (3) brojas@bcp.gov.py; (4) gbieder@bcp.gov.py; (5) vruizd@bcp.gov.py

The views expressed in this document are those of the authors, and are not necessarily those of the Central Bank of Paraguay.

We want to especially acknowledge Zulma Barrail for her collaboration in writing the paper. Also, we want to thank Diego Legal and Juan Corina for their assistance in the elaboration of this paper.

I. Introduction

The purpose of this paper is to measure market liquidity in an adequate manner and also analyze whether the monetary policy stance developed by the Central Bank of Paraguay (BCP for its acronym in Spanish) has explained the liquidity of the Paraguayan financial system. To this end, this paper follows the approach suggested by Adrian and Song Shin (2008), in which a Taylor Rule is estimated and the residual of this equation is related to a measure of aggregate market liquidity.

The measurement of liquidity differs among countries depending on the development and the deepness of the financial market. In some economies the financial operations are dominated by the traditional banking sector which receives deposits and channels them towards lending. Therefore, in such countries, the leverage of the financial system can be measured by the total amount of deposits and liquidity by the monetary aggregates growth rate. A precise measurement of liquidity is crucial, given that the excess of liquidity which has been observed in many developed countries in the last few years has created economic and financial imbalances.

Nonetheless, in other economies the financial system is centered upon the capital market rather than on the money market. In other words, a high percentage of the sources of funding of the financial intermediaries are channeled through the capital market. In this scenario, banking deposits usually represent a relatively small fraction of the financial system's sources of leverage. Thus, the growth rate of monetary aggregates that is usually measured in terms of deposits would not be the best indicator to capture excess liquidity.

In recent years, certain authors have emphasized the importance of linking the selected definition of liquidity, given different financial systems, with monetary policy. In this sense, previous research stated that a precise measurement of liquidity is needed in order to relate market liquidity with monetary policy and credit cycles.

Paraguay is a small open economy with a financial system characterized by the predominance of short term financial operations (private deposits and loans) and a not fully developed capital market. Over the past nine years, the country has registered an

increasing dynamism in its liquidity indicators. The average credit growth rate has been greater than 30% and the average growth rate of the monetary aggregate M2 (broad money) has been above 23% during these nine years.

However, significant inflationary pressures have not been observed in Paraguay during this same period, since the average rate of inflation was only 7.7 %. Since 2004, the BCP has been implementing and modernizing its operative instruments, setting as its objective a specific inflation rate with a fluctuation band. In early 2011, the BCP authorities officially began the institutional implementation of the inflation targeting (IT) framework, whereby the nominal anchor is the shortest term interest rate of the monetary regulation instruments.

The paper is organized in the following fashion: Section II briefly describes the Paraguayan financial system. Section III gives details about the traditional monetary policy framework. Section IV develops the IT framework in Paraguay. Section V explains the methodology used and selects a proper measure of liquidity for the Paraguayan economy. Finally, sections VI and VII present the results and conclusions respectively.

II. The financial system in Paraguay

The Paraguayan financial system is characterized by the predominance of short term financial operations (private deposits and loans) and a not fully developed capital market. According to the International Monetary Fund (IMF) country report (2011), credit to the agribusiness sector and commerce accounts for almost 65% of banks' loan portfolio. This last feature indicates that the financial sector is exposed to idiosyncratic shocks in the productive sectors of agriculture and tradable goods. Therefore, its expected performance is strongly correlated with world commodity prices affecting main commodities of the country's export basket, swings in demand in key trading partners and weather cycles.

Aware of this characteristic, the BCP has been searching and developing mechanisms that can help mitigate the episodes of possible stress in this context. The Financial System Stability Assessment for Paraguay (FSAP), implemented by the joint mission of the World Bank (WB) and the IMF in 2005 and 2010, identified the strengths and weaknesses of the financial system. As a result of strengthening regulation and supervision in the financial system, significant improvements of all financial indicators have been achieved. This progress has incremented the degree of financial deepening and bancarization.

The regulation of the financial system is based on an adequate level of capitalization, sound management and a liquidity level consistent with the Paraguayan financial market features.

According to Basel requirements, the BCP has recently enforced a change of capital requirement for banking institutions. In addition, the mechanisms for bank management have been strengthened, especially those concerned with credit and market risk management.

Moreover, the duty of achieving a greater financial depth and bancarization of the financial system is still pending, as it is evident that the financial system is still notably relegated in comparison with that of the country's neighbors. While there has been a sharp increase in the credit growth granted by the financial system in the last few

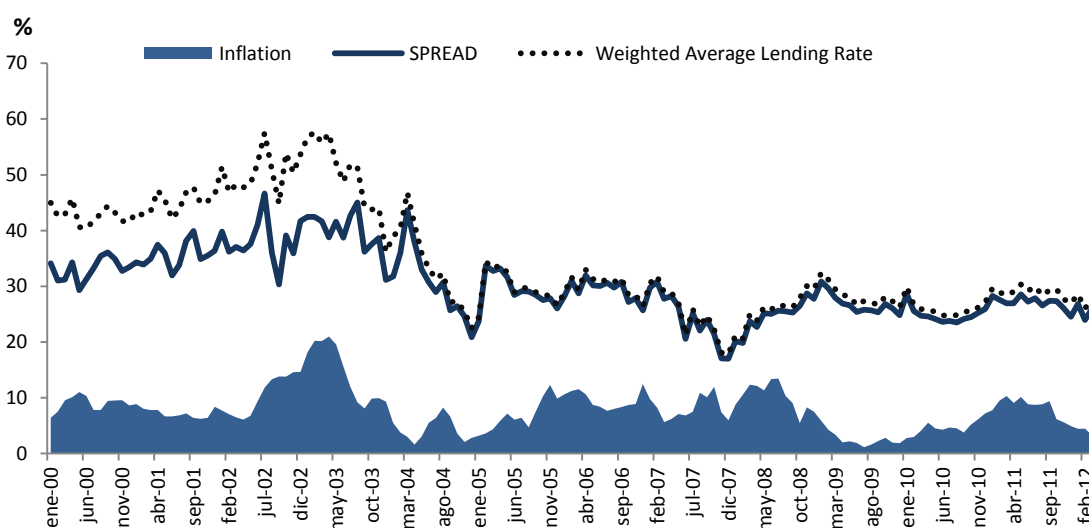
years¹, bancarization is still notably low, with only 10% of the population operating within the formal financial system. Even though bancarization is low, it has been increasing, and also bank delinquency has been reduced (see Table 6 in appendix).

Despite the greater predictability of the economy which has led to recent reductions in the average and variance of inflation, there has not been a significant reduction in the banking spread² as Figure 1 shows.

Even though the BCP has incorporated financial instruments of short-term liquidity injection, these have not been widely used by the financial system.

Figure - 1

Lending interest rate, spread and inflation



Source: Authors' calculations based on BCP data.

With respect to monetary policy, the BCP announced in 2011 the shift of its monetary policy towards the IT framework. In this context, there is a stronger institutional commitment to incorporate mechanisms and regulations that can develop the financial market. Because of this, one of the implemented measures has been to improve predictability and transparency in the exchange rate market.

¹ The credit volume as GDP proportion has increased from 26.6% to 36.2% in the last 9 years.

² Lending rates are still high and they are concentrated in short-term commercial operations.

With regards to the money market, financial mechanisms, that will help reveal the market's yield curve, are being implemented. Monetary policy is focused on setting short-term rates while the long-term curve is left to the market. Furthermore, the BCP is working on developing an interest rate corridor, a fundamental market condition for the IT framework.

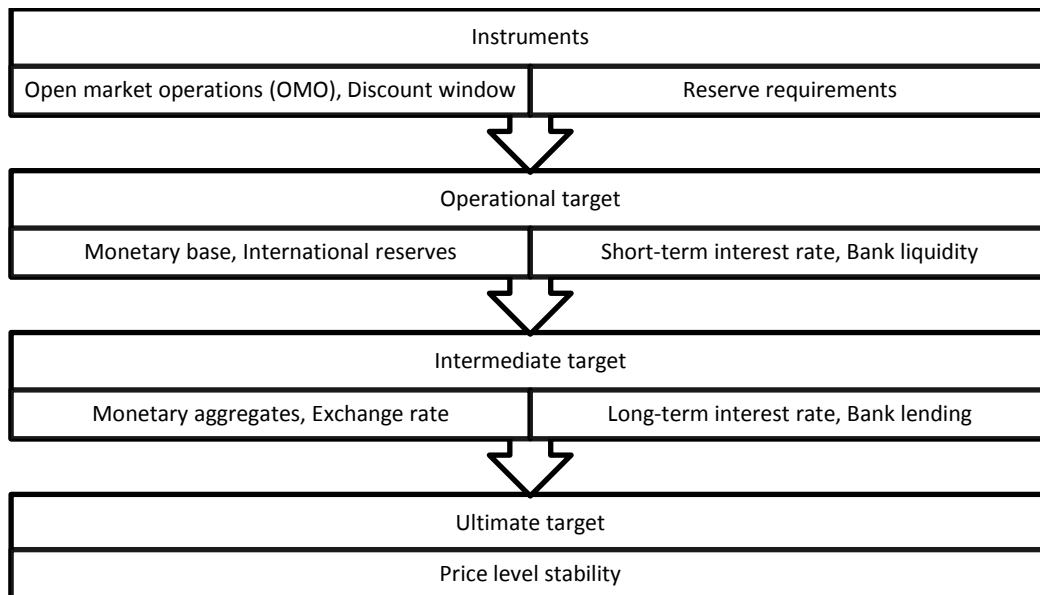
III. A framework for the monetary policy conduction

When formulating and implementing traditional monetary policy, a Central Bank (CB) uses operational variables, operational objectives, and intermediate objectives in order to attain its ultimate goal, which is maintaining the economy's price level stability.

We can observe a summary of the overall scheme of traditional monetary policy in the table below.

Table - 1

Instruments and objectives of monetary policy



Source: Freedman (1994), Fernández, et al (1999).

The CB makes operative its monetary policy using its instruments (OMO³, discount window, reserve requirements), which influence operational targets, passing down to intermediate targets and finally achieve the ultimate target (price level stability).

Due to long lags in the monetary transmission mechanism and the indirect relationship between instruments and the ultimate target, most central banks use other variables such as operational and intermediate targets.

An intermediate target is a variable that is closely related to the ultimate target of the CB, and it is influenced by changes of the monetary policy instruments. The main advantage of having an intermediate target is that it allows the CB to move its instruments in a rapid and precise manner when facing shocks that might imbalance the banking and financial system.

For instance, if the CB has a monetary aggregate as intermediate target, its policy makers can react more rapidly to offset an aggregate demand shock that affects money demand, so that it would not be transferred to inflation. The use of such instruments, that are observable and easily influenced by the CB, increases celerity in monetary policy operations since it does not require a long waiting time to observe variations of the final target.

In recent years, CBs of emerging and developed economies have substituted monetary aggregates for interest rates as intermediate target. This fact is due to a structural change in the financial system of these countries, which has weakened the connection between monetary aggregates and inflation. Therefore, the acceptance that a variable can serve as intermediate target is a question of judgment, and it is based mainly on how close and stable is the empirical relationship between the intermediate target and the ultimate target. According to Sterne (2002), it is difficult to differentiate exactly the IT framework from the monetary aggregates⁴ framework, since both schemes use the same ingredients for monetary policy conduction. We discuss the inflation targeting scheme recently implemented in Paraguay.

³ In Paraguay OMO are made by issuance monetary regulation instruments and accumulation/deaccumulation of foreign reserves.

⁴ The monetary aggregate and exchange rate framework are considered as traditional monetary policy frameworks.

IV. Inflation targeting framework

In the early 90's, some countries decided to substitute the traditional monetary aggregate framework for that of the IT given that it has been observed dissociation between monetary aggregates and inflation. The inflation targeting framework is based on an announced inflation by the CB as its main monetary policy goal and the operative instrument used to fulfill this announcement is the short-term interest rate⁵. Explicit inflation announcements, CB's operative independence, transparency and accountability attempt to anchor inflation expectations. There are some requisites to anchor inflation expectations, which are crucial under the IT framework, such as CB's independence from fiscal policy, other political objectives and electoral cycles. Fulfilling these requisites would eliminate the possibilities of inflationary financing which weakens the credibility in the established inflation goal as De Gregorio (2006) explained.

Since 2004, the BCP started to lay the groundwork to migrate its monetary policy from monetary aggregates to the IT framework. During 2004 - 2011 the BCP implemented new operational instruments and kept modernizing them. In addition, a specific inflation rate with fluctuation bands has been defined as target. In May 2011, the BCP officially announced the institutional implementation of the IT framework where the operational target is the shortest-term interest rate (14 days) of the instrument of monetary regulation.

Remarkably, the average inflation in the period 2001-2010 was 7.8%, lower than that of the previous 2 decades. In the following table, the behavior of the main statistical data on inflation is presented.

⁵ Overnight interest rate for most countries and the 14 day interest rate of the monetary regulation instrument for Paraguay.

Table - 2

Statistics of inflation in Paraguay

Main Statistics	1980-1989	1990-1999	2000-2011
Mean	20.06%	15.73%	7.80%
Median	20.01%	13.23%	7.94%
Max.	32.04%	44.07%	14.65%
Min.	8.12%	5.40%	1.86%
Standard error	8.65%	11.0%	3.67%

Source: Authors' calculations based on BCP data.

The inflation statistics in Paraguay clearly show that in the last 30 years the monetary policy was able to reduce inflation and volatility. The latter is still the main obstacle for an optimal performance of monetary policy in the medium-term because volatility in Paraguay is still bigger than in other Latin-American countries⁶ with IT framework. Thus, in order to optimize the monetary policy, to anchor inflation expectations and to reduce inflation volatility, the BCP has decided to introduce the IT framework.

This framework considers all available and relevant information in the decision making process. In addition, the inflation targeting framework uses inflation projection models to make optimal decisions on changing interest rates. One of the most important equations of the projection models is the Taylor Rule⁷, which is used to predict the optimal monetary policy interest rate consistent with macroeconomic fundamentals. Thus, the question that arises is whether discretionary monetary policy, measured by the Taylor Rule residual, influences the liquidity of the Paraguayan financial system.

Therefore, given this new monetary policy framework for Paraguay, it is necessary to shed light on the implications of the transmission mechanism of interest rates towards the financial system liquidity. To this end, this paper defines M2 as the measure of liquidity and relates it to the Taylor Rule residual to verify the link between monetary policy and financial system liquidity.

⁶ Brazil, Chile, Colombia, Guatemala, Mexico and Peru.

⁷ The Taylor Rule is a decision criterion to guide changes in the monetary policy interest rate based on inflation rate and output gap deviations. According to John Taylor(1993), this rule should not be used in a mechanical fashion, but it should be constantly updated with new information for decision making process.

V. Methodology used and measure of liquidity for Paraguay's economy

The definition of liquidity is broad and scholars have not reached consensus on that matter. This paper considers the definition proposed by Adrian and Song Shin (2007) which establishes that liquidity can be measured by the growth rate of the aggregate balance sheet of the financial sector. In developed financial systems the balance sheet liability side of financial institutions is composed not only by conventional private deposit but also by financial resources obtained by the issuance of debt in the capital market⁸.

Once established a measure of liquidity (growth rate of repos), Adrian and Song Shin (2008) estimated a Taylor Rule for the US in order to obtain the residuals, which were interpreted as "discretionary" monetary policy. They found that there is a clear cut relationship between their proposed notion of liquidity and the notion of how closely monetary policy follows an estimated Taylor Rule. In particular, they found that when the Fed Funds rate is lower than that predicted by the Taylor Rule, financial market liquidity is higher. Conversely, when monetary policy is tight relative to the Taylor Rule benchmark, repo growth is lower than average and liquidity is low. Their findings challenge the orthodox view of monetary policy since they suggest that the policy rate might affect the economy not only through its role of signaling future short rates, but also through its role as determinant of liquidity.

In selecting a measure of liquidity for Paraguay's economy, the fact that its financial system is still dominated by commercial banks needs to be taken into account. About 60 percent of bank liabilities are private deposits, while the rest is represented by liabilities to the public sector, to foreign creditors and a small amount of subordinated bonds (IMF, 2011). According to Adrian and Song Shin (2008), if the financial system were dominated by deposit-taking banks and aggregate liability is captured by the stock of deposit, then, excess liquidity would correspond to excessive growth of the

⁸ The authors provide evidence that the liability base for US financial intermediaries balance sheets is increasingly characterized by non-deposit liabilities and that the best indicator of the availability of credit seems to be the growth of collateralized borrowing, and in particular the stock of outstanding repurchase agreements (repos).

money stock. Therefore, the rate of growth of M2⁹ (broad money) has been selected as a good proxy for domestic currency liquidity.

VI. Results

In general, this paper attempts to determine whether discretionary monetary policy appears to be an important determinant of liquidity in a financial system dominated by deposit-taking banks. In particular, the purpose of this paper is to verify whether the conventional definition of liquidity is related to discretionary monetary policy decisions for the Paraguayan case. The evidence, shown below, proves to be consistent with Adrian and Song Shin (2008)'s findings. In other words, liquidity in the economy is intimately linked with how loose or tight monetary policy is relative to a Taylor Rule benchmark.

The Taylor Rule estimated describes an adjustment rule for the monetary policy rate as a function of output gap, inflation and real exchange rate annual percentage variation¹⁰. In addition, the rule aims to smooth policy rate variations.

The estimated Taylor Rule uses quarterly data from June 1995 to March 2012 and it is as follows:

$$INTR_t = 0.79 \cdot INTR_{t-1} + 0.23 \cdot INF_t + 0.34 \cdot YGAP_t + 0.05 \cdot ZI_t + res_t$$

Where,

$INTR_t$: Short term nominal interest rate of monetary regulation instrument (14 days).

INF_t : Annual percentage variation of Consumer Price Index.

$YGAP_t$: Output gap.

⁹ M2 constitutes the sum of currency in circulation, deposits in checking accounts and amount of money (domestic currency) in savings accounts (all maturities).

¹⁰ As noted by Berg et al (2006), developing countries may attain more macroeconomic stability if deviations from trend and excessive volatility of the real exchange rate are avoided. Therefore, the authors suggest that the Taylor Rule should include the real exchange rate as argument in order to counteract foreign shocks in the economy.

ZI_t : Annual percentage variation of bilateral real exchange rate index with respect to US dollar.

res_t : Taylor Rule residual.

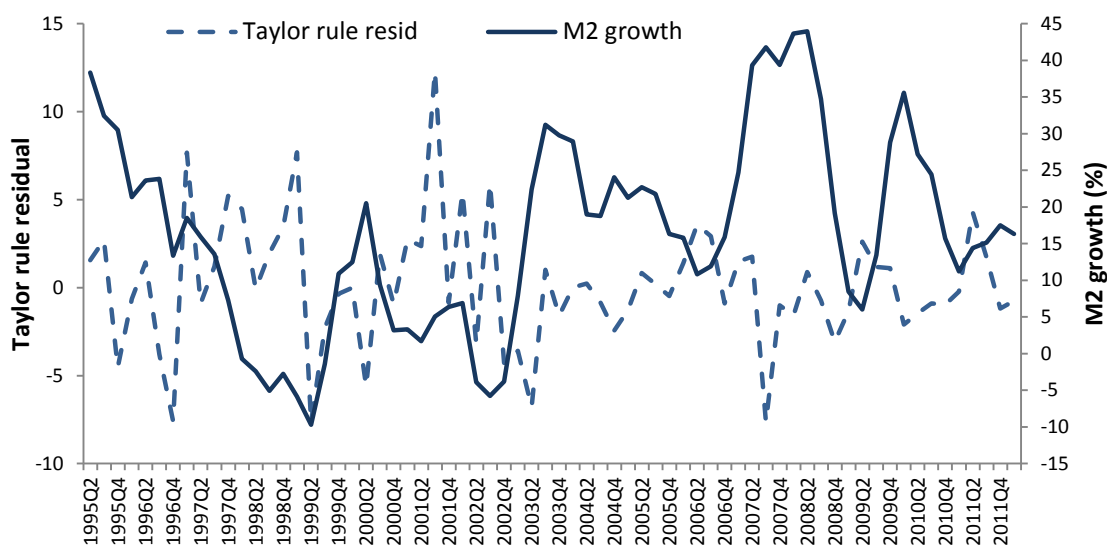
The coefficient of determination R^2 is 78%; thus, on average, less than one fourth of policy rate variation appears to have been determined by discretionary decisions. Summary statistics of variables used and the estimated Taylor residuals can be found in Table 5 in the Appendix.

The estimated interest rate can be interpreted as the approximate optimal response of the monetary policy rate given the effective variations of economic fundamentals. Following Adrian and Song Shin (2008) the Taylor Rule residuals can be interpreted as deviations from the optimal response or broadly speaking, as a measure of “discretionary” monetary policy. A positive residual would indicate that monetary policy is tight (or contractionary) relative to what the estimated Taylor Rule suggests. Conversely, a negative residual would indicate that monetary policy is loose (or expansionary) relative to the Taylor Rule benchmark.

As shown in Figure 2 and Table 5 in the appendix, under expansionary monetary policy relative to the Taylor Rule benchmark (negative residuals), financial market liquidity, measured by M2 growth rate, is high. On the contrary, when monetary policy is tight relative to the Taylor Rule benchmark (positive residuals), M2 growth rate is lower and in some cases negative.

Figure - 2

M2 growth and Taylor Rule residual



Source: Authors' calculations based on BCP data.

VII. Concluding remarks

The purpose of this paper has been to verify whether there is a relationship between the conventional definition of liquidity and discretionary monetary policy decisions for the Paraguayan case.

Results suggest that liquidity in the Paraguayan economy is intimately linked with how loose or tight monetary policy is relative to a Taylor Rule benchmark. Interestingly, from 2004, year in which the BCP has initiated the migration towards an IT regime, the correlation between discretionary policies and the selected measure of liquidity appears to have risen.

The evidence for the Paraguayan case proves to be consistent with Adrian and Song Shin (2008) findings for the US financial system. Deviations from the Taylor Rule, or in other words discretionary monetary policy, might have an impact on the real economy

in the short term. Historical data for Paraguay has shown that high (low) liquidity in the financial system is correlated with negative (positive) Taylor residuals.

As mentioned above, an impulse in the discretionary degree of monetary policy is associated with a significant change of the selected measure of liquidity in Paraguay. Therefore, the Taylor Rule might be a very useful instrument in forecasting liquidity of the financial system.

VIII. References

Adrian, T. y Song Shin, Hyun (2007). "Liquidity and Leverage". Paper presented at the Financial Cycles, Liquidity, and Securitization Conference hosted by the International Monetary Fund. Washington, DC- April 18, 2008.

Adrian, T. y Song Shin, Hyun (2008). "Liquidity, Monetary Policy and Financial Cycles". Paper prepared for Current Issues in Economics and Finance. Federal Reserve Bank of New York. Volume 14, Number 1. Issued in January/February 2008.

Allen W. (2007). "Metas del Inflación: la Experiencia Británica". Centro de Estudios Monetarios Latinoamericanos (CEMLA).

Berg, A.; Karam, P.; Laxton, D. (2006). "A practical model-based approach to monetary policy analysis-Overview". IMF Working Paper 06/80.

Bernanke B. and Gertler M., (2001). "Should Central Banks Respond to Movements in Asset Prices". The American Economic Review.

Bernanke B. and Blinder A.,(1992). "The Federal Rate and the Channels of Monetary Transmission". The American Economic Review.

Çağlayan, E. and Astar, M. (2010). "Taylor Rule: Is it an Applicable Guide for Inflation Targeting Countries?". Journal of Money, Investment and Banking, issue 18 (2010). © EuroJournals Publishing.

Corvalán J. (2012). "Monetary Policy and Macroprudential Measures". Central Bank of Paraguay.

De Gregorio, J., (2006). "Esquema de Metas de Inflación en Economías Emergentes". Central Bank of Chile.

Fernández, A.; et al. (1999). "Política Monetaria: su Eficacia y Enfoques Alternativos". Ed. Ac. ch. 2.

Freedman, C. (1994). "The Use of Indicators and of the Monetary Conditions Index in Canada". Eds. In Baliño, T. J. T., y Cottarelli, C. Frameworks for Monetary Stability: Policy Issues and Country Experiences. Washington D.C., US, International Monetary Fund. ch. 18.

Gustalle Gill, J. and Heisecke, C. (2011). "Adopción de Metas de Inflación en Paraguay: Una Evaluación". Central Bank of Paraguay.

Hammond, G. (2011). "State of the art of inflation targeting". Centre for Central Banking Studies, Bank of England.

Staff team (2011). "Financial System Stability Assessment - Update". IMF staff country report 11/198, International Monetary Fund.

Sterne, G. (2002). "Inflation target in a global context". Central Banking, Analysis, and Economic Policies Book Series, in: Norman Loayza & Raimundo Soto & Norman Loayza (Series Editor) & Klaus Schmidt-Hebbel (Series Editor) (ed.), Inflation Targeting: Design, Performance, Challenges, edition 1, volume 5, chapter 2, pages 023-078 Central Bank of Chile.

Taylor J., (1993). "Discretion Versus Policy Rules in Practice". Stanford University, Stanford.

IX. Appendix

Table – 3 Taylor Rule estimation

1995 Q2 to 2012 Q1

Dep. Var:		Monetary policy rate
Monetary policy rate (-1)	(0.05)** [15.31]**	0.79
CPI (annual % variation)	(0.06)** [3.60]**	0.23
Output gap	(0.18)* [1.85]*	0.34
Bilateral RER (annual % variation)	(0.03)* [1.85]*	0.05
R-squared:		0.78

Source: Authors' calculations based on BCP data.

Notes: ** statistically significant at 5% level.

* statistically significant at 10% level.

Standard errors are reported in parenthesis and t-statistics in square brackets.

Table – 4 Summary statistics

	Mean	Maximum	Minimum	Std. Dev.
Monetary policy rate (INTR)	9.93	27.50	0.00	7.67
Inflation (INF)	7.74	27.68	-8.34	6.54
Output gap (YGAP)	0.04	4.49	-7.99	2.52
Bilateral RER index (IZ)	-1.02	41.99	-44.94	19.29
M2 (annual percentage variation)	16.42	43.95	-9.72	13.30
Taylor Rule residual	0.00	12.30	-7.64	3.58

Source: Authors' calculations based on BCP data.

Table – 5 Other estimated regressions*

1995 Q2 to 2012 Q1

Dep. Var:	M2 (annual % variation)	
Monetary policy rate	-1.09 (0.20)** [-5.51]**	
Constant	26.62 (3.39)** [7.85]**	29.91 (4.31)** [6.95]**
Taylor Rule residual		-1.43 (0.33)** [-4.41]**
Estimated Taylor Rule		-1.52 (0.52)** [-2.91]**
R-squared:	0.35	0.27

Source: Authors' calculations based o BCP data.

Notes: * This table reports the results from regressing M2 (rate of growth) on monetary policy rate, Taylor residual and estimated Taylor Rule.

** statistically significant at 5% level.

Standard errors are reported in parenthesis and t-statistics in square brackets.

t-statistics were adjusted by autocorrelation and heteroskedasticity.

Table - 6**Main indicators of the financial system**

<i>Financial System Indicators (FSIs)</i>	2007	2008	2009	2010	2011
<i>Core FSIs</i>					
<i>Capital adequacy</i>					
Regulatory capital / Risk-weighted asset	16.9%	16.3%	16.3%	15.4%	14.9%
(NPLs-provisions) / capital	12.7%	7.3%	1.5%	0.8%	2.6%
<i>Asset quality</i>					
NPLs (gross) / Total loans	3.2%	2.6%	2.3%	2.0%	2.7%
Provisions / NPLs	68.2%	78.8%	94.7%	97.5%	91.5%
<i>Sectorial distribution of loans / Total loans</i>					
Agriculture	26.9%	26.5%	25.3%	21.3%	21.5%
Livestock	9.7%	9.2%	10.7%	11.1%	11.5%
Industry	12.0%	11.2%	9.3%	9.7%	9.1%
Wholesale	12.8%	13.0%	12.0%	12.2%	15.3%
Retail	4.6%	6.3%	7.7%	8.9%	10.4%
Services	11.6%	10.8%	11.5%	13.0%	8.3%
Consumption	8.4%	9.4%	10.4%	13.1%	15.4%
Export	0.1%	0.1%	0.1%	0.1%	0.4%
Financial services	14.0%	13.5%	13.0%	10.6%	8.3%
<i>Profitability</i>					
ROA (after-tax)	2.8%	3.2%	2.4%	2.4%	2.3%
ROE (after-tax)	25.7%	28.4%	23.2%	22.3%	22.4%
Net interest incomes / Operating margin	75.3%	73.1%	72.1%	71.2%	73.4%
Non interest expenses / Operating margin	51.3%	48.0%	54.0%	55.4%	53.2%
<i>Liquidity</i>					
Liquid assets / Total assets	44.3%	37.0%	41.2%	33.5%	32.6%
Liquid assets / Short-term liabilities	73.8%	70.4%	74.0%	64.6%	72.0%
<i>Sensitivity to market risk</i>					
Net FX exposure / capital	33.3%	12.7%	-1.2%	4.7%	18.5%
<i>Encourage FSIs</i>					
Capital / Assets	4.2%	4.3%	4.6%	4.2%	5.5%
Public deposit / Total loans	23.4%	19.2%	25.4%	18.4%	18.1%
FX loans / Total loans	37.5%	38.4%	35.3%	37.1%	41.2%
Foreign-currency-denominated liabilities / Total liabilities	41.7%	47.5%	42.9%	45.8%	46.1%

Source: Superintendency of banks, Central Bank of Paraguay

