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Inflation Targeting and Dollarization in Bolivia

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Inflation Targeting and Dollarization in Bolivia

An Honors Thesis submitted in partial fulfillment of the requirements for Honors Studies in Economics

By

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2015
Economics
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I would also like to thank my committee members, Dr. Avishek Chakraborty and Dr. Jinping Gu for the lessons taught in Statistical Methods and Economics Forecasting and for participating in this committee.

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Last but not least, I would like to thank my family for all their support during my academic life at the University of Arkansas. Sometimes college teaches more than just academic content and my family was aware of this when I came to the United States.
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Brief Historical Context

Over the past twenty years an increasing number of developing countries have introduced inflation targeting (IT) as a framework for monetary policy with some flexibility in exchange rates (Solanes and Torrejón, 2009). The main purpose of this type of monetary regime is to maintain price stability in the long run. The IT regime is based on the historical assumption that price stability is an essential factor towards economic growth. In the IT regime, central banks set a public quantitative target for the annual inflation and guide their monetary policy towards that target.

A considerable number of developing countries introduced the IT regime successfully as an anchor to their monetary policy. The most representative examples are in Latin America. Chile and Brazil constitute remarkable examples about the success of the IT regime in Latin America (Solanes and Torrejón, 2009). Since the implementation of the IT regime, inflation rates in these countries have continuously followed a declining path (Solanes and Torrejón, 2009). Another country, which also implemented successfully an IT regime, is Peru. In fact, the Peruvian annual inflation rate declined from over 20 % to 3 % since the implementation of the IT regime until 2001 (Solanes and Torrejón, 2009).

This thesis attempts to test the effectiveness of a possible IT regime in Bolivia. Bolivian economy has been characterized by a high degree of dollarization in its financial system as a consequence of a dramatic hyperinflation during the 80’s (Sachs, 1986). For instance, the Bolivian annual inflation rate in 1984 was 20,000 % and it constituted the most rapid inflation in Latin America during that time (Sachs, 1986). Subsequently, the
Bolivians did not trust in their national currency as a reserve of value. A massive process of currency substitution from the peso boliviano to the US dollar emerged at the beginning of the 80’s (Antelo, 1996). In 1982, the government of President Hernán Siles Zuazo attempted to reduce dollarization in the economy through a decree of de-dollarization that led to a massive bank run and the circulation of US dollars outside the formal financial system (Orellana and Mollinedo, 1998). In 1985, Victor Paz Estenssoro assumed the presidency with an economic program called “Nueva Política Económica” (“The New Economic Policy”), which reduced inflation rate from 60,000 % in 1985 to 17 % in 1989 through a contractive fiscal policy showed in Figure 1 (Antelo, 1996). Also, Paz Estenssoro abolished Siles Zuazo’s decree of de-dollarization and created a new currency (“boliviano”). Even though hyperinflation was eliminated, the high degree of dollarization in the Bolivian financial system still remains a challenge for policymakers. Dollarization represents a problem for policymakers due to the fact that if people are not using the national currency, central banks do not have control of their monetary policy. This loss of control makes central banks more vulnerable to external shocks, which is harmful to small open economies.
In 1994, the Bolivian Central Bank indicated its intention to move from the current pegged regime to the IT regime (Bolivian Ministry of Finance, 2012). As a result, during the 90’s, the Central Bank started a process called “bolivianización” (“turn dollars into bolivianos”). The goal of this process is to de-dollarize the financial system by stimulating the use of bolivianos in the financial system. From Figure 1, it is possible to see that the Central Bank kept a declining inflation rate until 1999-2000, when Brazil (Bolivia’s main trade partner) devaluated its currency. As a consequence, Bolivian inflation fluctuated dramatically. Also, from 2003-2011, Bolivia had a period of high political instability that led to increasing inflation expectations as showed (except for 2009, when Bolivia had -2.3% deflation due to the world’s recession) in Figure 1.
Bolivian GDP followed a cyclical pattern in the last 30 years as showed in Figure 2. During the 80’s, GDP fell dramatically due to the political instability and hyperinflation. During the 90’s, Bolivian GDP increased as a consequence of a process of economic stabilization and openness. This positive pattern lasted until the Brazilian devaluation in 2000, when GDP growth declined. From 2005-2011, the Bolivian GDP growth increased to 90’s levels due to the increase in price of commodities and natural resources. Natural gas, petroleum, and soybean constitute Bolivia’s main export products.
Purpose of the Thesis and the Latin American Context

This thesis attempts to test the effectiveness of the IT regime as a nominal anchor (reference for monetary policy) to the Bolivian Central Bank through the use of the Taylor rule. In order to use the Taylor Rule, it will be necessary to collect data from the monetary aggregates, interest rates (preferably US interest rates since the boliviano is pegged to the US dollar), and Bolivian Central Bank international reserves. Depending upon the results of the coefficients found it would be possible to make some initial conclusions. The reason why this amount of data will be required is that this thesis will not present a standard Taylor Rule (which assumes that central banks are autonomous with respect to monetary policy). The Bolivian Central Bank does not have an autonomous monetary policy. Therefore, there will be some modifications to the variables present in the standard Taylor Rule.

Moreover, the thesis will attempt to capture the relationship among the mentioned data in a time series framework through the use of a vector auto regression model (VAR). In that way, it will be feasible to study how the data (such as interest rates and international reserves) react to exogenous shocks. Through the use of the VAR framework, the effects of the IT regime in the Bolivian economy will be known more accurately.

The Bolivian economy is an example of a small open economy with fixed exchange rates. The ISLM-Foreign Exchange market model describes specifically how such type of economy operates, and depends on the accumulation of foreign reserves to maintain their exchange rates. As a consequence, Bolivia faces the known macroeconomic trilemma in which is impossible to have at the same time monetary policy autonomy, capital controls, and floating exchange rates. It is only possible to have two of the three mentioned policies.
In the case of Bolivia, the ultimate goal is to achieve monetary policy autonomy with the IT regime. In that way, the Bolivian Central Bank would be able to implement monetary policies that are beneficial to the economic growth of the country without having to keep a high percentage of international reserves (which also imply financial costs to the country).

The IT regime has been implemented successfully across Latin American countries such as Brazil, Chile, Peru, Mexico, and Colombia. The change from a pegged currency to an IT regime represents a total change in the role of the central bank in Bolivia. Having implemented an IT regime, the Central Bank will not rely exclusively on the effects of the exchange rate to price level (effect known as pass-through). In fact, the IT regime provides more responsibility to the monetary policy from central banks. As a consequence, confidence from economic agents is a key factor towards the transition from a pegged regime to the IT regime.

A failed transition from a pegged regime to the IT regime can cause severe damages to the economy. If people do not trust that the inflation target will be accomplished by the central bank, they will certainly attempt to exchange “bolivianos” for dollars. This can cause a run for dollars and leave the banking system illiquid (and possibly insolvent). In other words, a failed transition can harm severely financial markets and the Bolivian economy.

The main particularity about the Bolivian economy is its high degree of dollarization (even with the “Bolivianización”). However, a high dollarization does not imply that IT is impossible in Bolivia. Peru implemented successfully an IT regime when 55 % of money in circulation and 70 % private credit was issued in US dollars (Armas and Grippa, 2005).
In 2004, Peru had the lowest inflation target in South America (2%) (Armas and Grippa, 2005). Currently, 71.6% of bank deposits are in bolivianos (Bolivian Ministry of Finance, 2012). This implies that Bolivia now is probably in a better condition than Peru (at the time it implemented its IT regime). Therefore, it is likely that the migration to the IT regime would not be traumatic to financial system (as Peru was not). It is expected that results will be positive. Most likely, these results will indicate that Bolivian economy can actually improve with the IT regime (lower inflation in the long-run) as Peruvian, Brazilian, and Chilean economy improved right after the implementation of the IT regime.
Literature Review

The popularity of the inflation-targeting (IT) regime as a nominal anchor for monetary policy has been growing since its establishment in New Zealand during the 90’s. Since then, many advanced and emerging economies have adopted the IT regime as an anchor for their monetary policy particularly in Latin America.

There is an abundant literature about the theory behind inflation-targeting regime and the effects of its implementation. One of the pioneer works from a theoretical and practical perspective is “Inflation Targeting: A New Framework for Monetary Policy” (Bernanke and Mishkin, 1997), in which the authors discuss the theory and the practical aspect of the IT regime in industrialized advanced economies. Another important pioneer work is the seminar paper “Inflation Targeting as a Monetary Policy Rule” published by Lars E.O. Svensson (1998), where the author examines the different types of monetary rules (mainly interest rate rules) and applies to the European Systems of Central Banks. In addition, Miller, Fang and Eren (2006) also concluded that inflation targeting implementation had little effect on inflation rates and real Gross Domestic Product (GDP) growth for developed countries. Nevertheless, the authors found out that, for developing countries, the effect was much larger with positive results.

Furthermore, many researchers wrote extensive works regarding the central aspects of the IT regime in Latin American countries. García Solanes and Torrejón Flores (2009) developed some descriptive and inferential statistics to measure macroeconomic performance (especially in terms of the variance of international reserves) after the implementation of the IT regime in Latin American countries that adopted this type of monetary policy rule. The authors found positive results for those countries that adopted
the IT regime. In addition, Céspedes, Chang and Velasco (2012) tested the effectiveness of the IT regime in response to the recent financial crisis with a sample of six countries (Brazil, Chile, Colombia, Mexico, Peru and Uruguay). The researchers concluded that sterilized interventions and reserve requirements were important to palliate the effects of the “sudden stop” of capital inflows to the sampled countries. Previous works did not emphasize this aspect in IT regime economies.

With respect to the scope of this thesis specifically, which is to test the effectiveness of the IT regime in Bolivia, there is not a vast amount of works published. Armas and Grippa (2005) discuss the unique experience of implementing an inflation-targeting regime in Peru, an economy characterized by a high degree of financial dollarization, such as Bolivia. Besides the decline in inflation expectations, the authors also discovered that although there is an inherent exchange rate risk with allowing the currency to float, “dedollarizing” the economy with an IT regime reduces the risk of exchange rate variability in the long run. Armas and Grippa demonstrated that dollarization in the Peruvian financial system decreased from 76% in 2001 to 71% in 2004. They also demonstrated that the Peruvian exchange rate volatility was one of the lowest in the region. Peruvian economy resembles to a great extent Bolivian economy, especially with respect to financial dollarization as mentioned before.

Another important paper and probably unique at the moment is “Metas Explicitas de Inflación y la Política Monetaria en Bolivia” published by Raúl Mendoza and Rafael Boyán (2012). Mendoza and Boyán tested the effects of a hypothetical IT regime on inflation and domestic credit. They used Granger tests; autoregressive vectors model and variation coefficients to estimate that a hypothetical inflation target goal (understood as the variation
of the Consumer Price Index) could be achieved. However, the researchers signaled that although Bolivia did not have operational problems to implement the IT regime, there could be some structural problems that should be addressed (mainly the high degree of financial dollarization in Bolivia). One important aspect is that the mentioned authors did not use the conventional interest rate rules (Taylor Rule) to evaluate the possible outcomes of the IT regime for inflation and output growth in Bolivia. This thesis will attempt to analyze the possible outcomes with the use of the Taylor rule for financially dollarized economies for the case of Bolivia.
Reference Model for the thesis: Mundel- Fleming (IS-LM- BoP)

Bolivia currently adopts a “crawling peg” macroeconomic regime, which resembles the case of a monetary policy under a fixed exchange regime in the well-known IS-LM-Balance of Payments model. This model consists on how monetary and fiscal policy operates under different types of macroeconomic regimes. The focus on this thesis will be the Bolivian case of monetary policy under a fixed exchange regime peg. As every small open economy with fixed exchange rate, Bolivian exchange rate is very sensitive on the movements of capital and trade flows. To maintain the peg, the central bank must buy or sell foreign exchange reserves. Due to the fact that Bolivia does not possess a well-developed financial, it is reasonable to assume perfect capital immobility (no considerable flow of capital). For instance, it is possible to assume a scenario in which the central bank engages in an expansionary monetary policy in Figure 3.

Figure 3: Monetary Policy under Fixed Exchange Regime

![Figure 3: Monetary Policy under Fixed Exchange Regime](image)
From the graph showed, it is possible to observe that the mentioned monetary stimulus initially increases income (GDP) and lowers i (interest rate) but due to the fact that capital is immobile the effect of the increase in money supply cannot be compensated by the balance of payment. Consequently, in this case, the bank must sell foreign exchange reserves to maintain the peg. The opposite effect would occur if the central bank arbitrarily decides to engage in a contractive monetary policy.

This simplified model helps understand how Bolivian macroeconomic policy currently operates. Most importantly, it emphasizes the necessity of keeping an adequate level of foreign reserves in order to maintain the peg in the event that it becomes necessary.

One of the main purposes of this thesis is to verify until what extent the Bolivian central bank used the reserves wisely in order to maintain the peg. In a few words, part of the purpose of this thesis is to verify that the central bank followed the nominal anchor it declares to follow. This is one preliminary step towards an inflation-targeting regime because consistency is essential for a sound central banking.
Preliminary Econometric Results

In order to verify that the current monetary policy in Bolivia follows, in some way, the US monetary policy, a simple linear regression was elaborated. In the regression, Bolivian inflation rate was the dependent variable and US inflation rate was the independent variable that explains Bolivian inflation rate. The results are exposed in Figure 4 below.

Figure 4: Bolivian Inflation rate vs US inflation rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation US</td>
<td>0.772722**</td>
<td>0.243241</td>
<td>3.176776</td>
</tr>
<tr>
<td>R squared</td>
<td>0.287585</td>
<td>Sample</td>
<td>1987-2013</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>0.962168</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Significant at the 1% level

From Figure 4, it is possible to see that Inflation US (US annual inflation rate) helps explain Bolivian inflation at a 10% and 5% levels of significance (but not a lower levels) when a typical hypothesis test is made. In other words, there is a close relationship between Bolivian and US inflation. Although this relationship is not perfectly linear, it is strong. The reason the level of significance is not perfect has to do with some structural factors in Bolivia. For instance, there are some goods (such as food in general) in the Bolivian Consumer Price Index whose seasonality is stronger than in the US Consumer Price Index. Also, there are some other more macroeconomic answers to why this relationship is not almost perfect. One of these is when Bolivia in 2000-2001 had a recession as a consequence of the Brazilian devaluation crisis.
The red line represents the actual values for Bolivian inflation and the green lines represent the fitted values for US inflation. From the graph, it is possible to see that there is a considerable discrepancy between years 2000 and 2002 for the reasons already mentioned. Furthermore, there is a discrepancy (not as considerable as the previous one) between years 2008 and 2010. The reason for this is obviously the financial crisis in the United States, which affected Bolivia as well but not as much as the US.

United States Taylor Rule

As mentioned before, Bolivian monetary policy currently does not have an inflation targeting regime as a nominal anchor. Bolivian monetary regime follows a ‘crawling peg’ exchange regime which resembles more a fixed exchange regime than a flexible. Bolivia, in some way, “imports” US monetary policy that can be described as the following version of the Taylor Rule:

\[ i_t = i_{t-1} + \pi_t + g_t + \varepsilon_t \]

\( i_t = \text{Interest rate at time } t \)
\( i_{t-1} = \text{Interest rate at time } t-1 \)

\( \pi = \text{Annual inflation rate at time } t \)

\( g = \text{Gross Domestic Product Annual Growth at time } t \)

\( \varepsilon = \text{Error term at time } t \)

Empirically, the mentioned version of the Taylor Rule would be as follows:

** Figure 6: United States Taylor Rule Estimation Output**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>( i_{t-1} )</td>
<td>0.840766**</td>
<td>0.063542</td>
<td>13.23163</td>
</tr>
<tr>
<td>( \pi_t )</td>
<td>0.841723**</td>
<td>0.154679</td>
<td>5.441741</td>
</tr>
<tr>
<td>( g_t )</td>
<td>0.40574**</td>
<td>0.129306</td>
<td>3.13782</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.93425</td>
<td>Sample</td>
<td>1988-2013</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>1.525166</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Significant at the 1% level

In this regression from 1988 to 2013, the theoretical Taylor Rule is estimated for the United States. In this case, \( i_{t-1} \) represents the average Federal Reserve Funds Rate. All of the independent variables are significant at all considerable levels of significance.

Approximate Taylor Rule for Bolivian Monetary Policy

Since Bolivia does not adopt an inflation targeting regime, it is logical that Bolivian monetary policy does not follow an exact Taylor Rule as the US monetary policy. As the Mundel-Flemming-BoP model explains, Bolivia “imports its monetary policy” when it adopts a fixed exchange arrangement. In order to keep a fixed exchange rate arrangement, the Bolivian Central Bank has to accumulate foreign reserves. With foreign reserves, the Central Bank can make interventions in the foreign exchange market without changing the
money supply (“sterilized interventions”). In Bolivia, these interventions are made on an auction popularly known as “bolsin” in Spanish.

As a consequence of the exchange rate arrangement already explained, money supply is strictly linked to the amount of international reserves. To empirically prove that Bolivia follows very closely the IS-LM-BoP, a simple regression was run linking money supply (M1) to the amount of foreign reserves in US dollars. Figure 7 shows the estimation output for this regression.

$$\text{MONEYSUPPLY}_t = \text{INTERNATIONALRESERVES}_t + \epsilon_t$$

$\epsilon_t$: Error Term at time t

**Figure 7: Money Supply vs International Reserves**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNATIONAL RESERVES$^t$</td>
<td>3127.169**</td>
<td>141.0088</td>
<td>22.17712</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.98203</td>
<td>Sample</td>
<td>1997-2013</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>1.067375</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** significant at the 1% level

Additionally, a simple regression was run in order to verify that the exchange rate had some significance regarding the Bolivian annual inflation rate. The results can be seen below in Figure 8.

**Figure 8: Bolivian Inflation Rate vs Exchange Rate**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Exchange Rate at time t</td>
<td>1.281088**</td>
<td>0.303873</td>
<td>-4.215861</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.415526</td>
<td>Sample</td>
<td>1987 2013</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>1.345708</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
** significant at the 1% level

According to the estimation output in Figure 8, nominal exchange rate (Bolivian exchange rate pegged to the US dollar) has a very significant effect on Bolivian inflation rate at almost all levels of significance. From this, it is possible to conclude that this simple econometric results constitutes an evidence that Bolivian monetary policy follows an IS-LM – BoP model with fixed exchange rate and with perfect capital immobility.

Nevertheless, it is very difficult to estimate a Taylor Rule for Bolivian monetary policy since the Taylor Rule assumes a flexible exchange rate arrangement. In order to attempt to approach a Taylor Rule for Bolivian monetary policy, the following adaptation was made:

\[ \text{GRES}_t = \text{EXCH}_t + g_t + \xi_t \]

GRES = Growth rate of international reserves in US dollars hold by the Central Bank

g = Bolivian annual GDP growth

\( \xi \) = Error term

Due to the mentioned Bolivian nominal anchor, the central bank does not determine explicitly the interest rate in the showed version of a Bolivian Taylor rule. For the US case, the Federal Reserve influences the Fed Funds rate. This is why this rate is used for the US version but not for the Bolivian version. A proxy for Fed Funds rate in the Bolivian version is the growth rate of international reserves in US dollars. Since Bolivia adopts a fixed exchange arrangement, the growth rate of international reserves rather than nominal interest rates become the most important tool to control inflation.

Figure 9: Estimation output for the Bolivian Version of the Taylor Rule
From Figure 8, it is conceivable to observe that the Bolivian version of the Taylor Rule possesses similarities with the US Taylor version. In Bolivia’s case, the growth rate of international reserves works as a “proxy” for “interest rates”. Therefore, this independent variable has to be significant (as the results show). Also, Bolivian GDP growth is not significant. This significance on Bolivian nominal exchange rate at 5% level is explained by the fact that the main concern for Bolivian monetary policy is the stability of prices through the peg with the US dollar. In the last years, Bolivian inflation rate expectations increased due to the fact that there were some natural disasters that affected severely the price of goods in the food basket. Nevertheless, the Central Bank had enough reserves to keep the keep although there was an increase on the price level. In addition, the Bolivian government announced in 2013 that most of the workers would receive an additional wage increase at the end of the year (“doble aguinaldo” in Spanish). This unexpected increase in inflation expectations made Central Bank adopt a contractionary monetary policy (different from the expansionary monetary policy in the US). The Central Bank offered bonds that paid yielded annually a return of 7% (a rate above the bond market rate). These mentioned factors help explain why the Bolivian inflation increased but the peg remained almost unchangeable due to the availability of international reserves.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Exchange Rate at $t$</td>
<td>0.20492*</td>
<td>0.078693</td>
<td>2.604027</td>
</tr>
<tr>
<td>Annual GDP growth at $t$</td>
<td>0.054728</td>
<td>0.041143</td>
<td>1.330197</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.421409</td>
<td>Sample</td>
<td>1997-2013</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>1.131741</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the 5% level of significance
Figure 10 shows how the growth rate of international reserves is linked to the evolution of the nominal exchange rate especially after 2004 when Bolivian exports increased due to the increase in the price of commodities. This factor facilitated the accumulation of foreign reserve for the central bank.

Figure 10: Growth rate of foreign reserves and Nominal exchange rate
Autoregressive Vector Analysis (VAR)

An important part of the empirical analysis of this thesis makes use of VAR methodology. The VAR methodology is used due to the fact that it can provide a decomposition of the variances and an impulse-response analysis of the variables. In other words, the VAR methodology can help explain better what causes what in different types of situations (known in the literature as “shocks”). For this thesis, a Cholesky decomposition of the variances is made to estimate the structural form of the VAR. This decomposition facilitates the VAR analysis. Another important fact is that it is known that the limited availability of observations (from 1996-2013) constitutes a weakness for this VAR. Nevertheless, it is still possible to make a VAR analysis based on the available sample with feasible conclusions.

The purpose of the VAR methodology in this thesis is to test if the Bolivian Central Bank follows currently a coherent monetary policy based on its nominal anchor (the exchange rate peg already mentioned). After this, an impulse-response analysis is made to predict the the response of the VAR variables to the structural shocks. The VAR model utilized is presented as follows:

\[ Y_t = [g_{res,t}, g_{exc,t}] \]

\[ Y_t = \text{Impulse-Response of foreign reserves and nominal exchange rate at time } t \]

\( g_{res,t} = \text{growth rate of foreign reserves at time } t \)

\( g_{exc} = \text{change in the nominal exchange rate at time } t \)

The autoregressive part of the model is evaluated as follows:

\[ Y_t = C + AY_{t-1} + E_t \]

\[ Y_t = \text{Impulse Response of foreign reserves and nominal exchange rate at time } t \]
\[ Y_{t-1} = \text{Impulse Response of foreign reserves and nominal exchange rate at time } t-1 \]

\[ E_t = \text{Error term} \]

Initially, two variables are utilized. These are: growth rate of foreign reserves (gres) and the growth rate (or change) in nominal exchange rate (gexc). Two scenario are simulated: a shock in gres and a shock in gexc.

The impulse-response scenarios are showed below in Figure 11.

In the first scenario, which corresponds to a positive shock in the growth rate of foreign reserves (gres), it possible to observe that when the growth rate of reserves increases (especially during the first four periods), the nominal exchange rate (gexc) appreciates. This apparently contradicts the idea of the Mundel Flemming model presented before. However, it is important here to make a distinction between “flow” and “stock”. By definition, the amount of foreign reserves kept at Bolivian Central Bank increases. This does not mean that the Central Bank sells dollars into the domestic market. This means that the capital inflows to Bolivia increase as a consequence of the increase in the price of commodities (Bolivia’s main export products). Automatically, this causes an appreciation.
of the nominal exchange rate (this effect is known “dutch disease”). This effect does not depend on any monetary policy applied by the Bolivian Central Bank.

In the second scenario, which corresponds to a positive shock in the nominal exchange rate, it is possible to see that the growth rate of foreign reserves is almost not affected by this positive shock. This clearly indicates that foreign reserves and nominal exchange rate are not very correlated in the future. In other words, foreign reserves and the nominal exchange rate are not very attached. This shows that the public trusts more in the domestic currency nowadays than it trusted a few years ago. The increased confidence in the domestic currency is one important preliminary step towards the implementation of the inflation targeting regime (which supposes the application of floating exchange rate).
Conclusive Considerations

The econometric analysis through the multiple regressions and the autoregressive vector analysis leads towards the conclusion that an inflation targeting is possible and feasible in the long run for Bolivia. The Bolivian Central Bank has been following a coherent monetary policy clearly focusing its aims towards the maintenance of its nominal anchor (the nominal exchange rate fixed). Additionally, the public trusts more in the national currency (*boliviano*) as the results from VAR analysis indicate. From the regressions utilized, it is possible to conclude that the most important variable for guiding monetary policy was the exchange rate. Another important factor is that the Bolivian Central Bank has followed a very transparent policy. Every semester, the central bank releases publication regarding inflation and the behavior of foreign reserves. This also explains why the public trusts more in the national currency and the inflation targeting is likely to occur without a crisis or speculative bank runs in the long run.

Nevertheless, there are other factors that need to be considered before the introduction of the inflation targeting regime in Bolivia. Probably the most important of these factors is the operational independence of the central bank towards the stability of prices. In the last years, the Bolivian Central Bank has been accumulating a considerable amount of foreign reserves due to the rapid in capital inflows (mainly exports). The government has been borrowing a small part of these excesses in order to finance the gas/oil industrialization projects. As a consequence, the operational independence of the Bolivian Central Bank is broken towards its main goal of price stability. In order to maintain the central bank’s independence and make a normal transition towards the IT regime, the Bolivian government has to avoid the “sweet temptation” to make use of foreign reserves to achieve
economic growth. The only focus of the Central Bank is towards the stability of prices not economic growth. If the governments avoids “eating the Eden’s apple”, the inflation targeting regime has its stability and future guaranteed.
List of References


