

**IS MONETARY POLICY EFFECTIVE IN BRAZIL?:
ROLE OF QUASI-FISCAL OPERATION ON INFLATION EXPECTATIONS**

By

Jaesung Yoon

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF DEVELOPMENT POLICY

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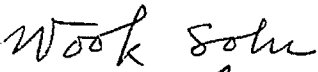
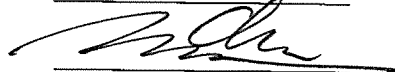
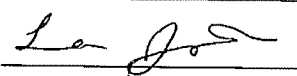
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ABSTRACT

IS MONETARY POLICY EFFECTIVE IN BRAZIL?: ROLE OF QUASI-FISCAL OPERATION ON INFLATION EXPECTATIONS

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Given unpleasant memories of hyperinflation in 1980s, Brazil has had macroeconomic concerns with regard to inflation. Since October 2010, the inflation rate has never converged to the target rate of 4.5% and even has hovered around upper target range of 6.5% despite nine consecutive Selic policy rate hikes from May 2013. Along with one of the highest policy rates among G-20 countries in terms of absolute level, the inflation rate has not been brought down effectively. The purpose of this study is to figure out the effectiveness of monetary policy in stabilizing inflation expectations in Brazil. This was achieved by analyzing several determinants of inflation expectations and especially by finding out the relationship between inflation expectations and fiscal operation including quasi-fiscal activities such as earmarked loans. The study conducted *ordinary least squares regression* to derive the empirical results by employing the monthly data from November 2001 to April 2014. Especially, the regression tried to figure out the trend after 2008 global financial crisis more in detail when earmarked loans as a percent of GDP was started to increase in order to respond to economic slowdown. Through the analysis, several noteworthy findings are obtained as follows: with regard to inflation expectations, 1) the primary fiscal surplus has negative relationship which gets weaker after 2009; 2) instead, the earmarked loans as a proxy for quasi-fiscal operations has positive relationship which becomes stronger after 2009; 3) interestingly, the Selic policy rate has positive relationship but it is not statistically

significant after 2009. In sum, it is concluded that the monetary policy has not been effective enough to bring down inflation expectations because the fiscal dominance over inflation has been persistent and especially obscure quasi-fiscal activities has been stronger after 2008 in order to deal with economic slowdown. Thus, the Brazilian authorities should take into account that expansionary fiscal operations such as atypical quasi-fiscal operations or subsidized long-term lending rate (TJLP) cause the costs of inflation expectations. By pursuing fiscal consolidation and adhering Fiscal Responsibility Law, the effectiveness of monetary policy will be improved and its inflation will be brought down to the target rate.

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I also thank KDI School of Public Policy and Management and the professors for providing me with valuable lectures, memorable experiences and notable memories. Two years in the School with great classmates will never be forgotten.

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CHAPTER 1. INTRODUCTION

High inflation has many negative effects on the national economy and it has been a major economic problem in many developing countries. With bitter experience of hyperinflation in the 1980s, inflation has been one of the major economic issues in Brazil as well. As Brazil's economic growth has been slowed down since 2011, concerns over persistent macroeconomic problems such as high inflation are reemerged (IMF 2014). Inflation has started to be accelerated since 2009 when the global financial crisis in 2008 faded out. Recently, the Central Bank of Brazil (Banco Central do Brasil; BCB) has raised the benchmark Selic rate for nine consecutive times from May 2013 to May 2014 in order to curtail high inflation rate by contractionary monetary policy. The rapid pace of the policy rate hike as well as the high level of the policy rate over 10%, however, was not proved to be effective in reining in high inflation which still hovers around 6% as this is far above from the inflation target level, 4.5%.¹

Generally, several factors such as wage, exchange rate, food price, fiscal policy or real interest rate influence propelling inflation rate in emerging market economies but the extent that each factor affects inflation varies across the countries (Mohanty and Klau 2001). In response to high inflation, the monetary authority implements contractionary monetary policy such as the policy rate hike so that inflation rate is stabilized. More fundamentally, the authority adopts inflation targeting framework in order to increase monetary policy discipline so that low and stable inflation is explicitly acknowledged (Bernanke and Mishkin 1997). This means that the acknowledgement brings inflation expectation down and eventually

¹ The information on inflation rate can be found at the Central Bank of Brazil, Copom Minutes with the following link, <http://www.bcb.gov.br/?MINUTES>

future inflation can be stabilized. The empirical study by Levin, Natalucci and Piger (2004) show that inflation targeting framework has contributed a significant share in anchoring inflation expectations as well as in bringing down persistent inflation pressure among industrial countries when compared to those countries without inflation targeting framework.

However, recent efforts by Brazilian monetary authority and its existing inflation targeting framework were not effective to stabilize inflation and inflation expectation remains high. This paper's objective arises from this point: persistent high inflation in Brazil despite its contractionary monetary policy as well as its inflation targeting framework.

Other than many factors that influence inflation, prudent fiscal operation reduces the probability of high inflation when monetary policy does not show its full effectiveness. (Domaç and Yücel 2005; Sargent and Wallace 1981) and this is also true for Brazil's case. Along with the inflation targeting framework and continuous policy rate hike, fiscal policy can be the right instrument to decrease inflation rate in Brazil where the public debt is relatively high (Blanchard 2004).

With this regard, the objectives of this research are 1) to identify the relationship between fiscal balance and inflation expectation as well as the relationship between quasi-fiscal operation and inflation expectation, 2) to compare the relationship in the post-2008 with that of pre-2008 and 3) to highlight and discuss the policy implication to stabilize inflation in Brazil.

The research questions are as follows: First, does the fiscal primary balance affect inflation expectation? Second, does the quasi-fiscal operation that is not captured in the primary balance affect inflation expectation?² Third, does the quasi-fiscal operation influence

² Primary balance is fiscal balance excluding interest payments.

inflation expectation more heavily after 2008? To answer the research questions, empirical analysis ranging from November 2001 to April 2014 will be applied.

For the analysis, this paper consists of six sections. The first section will discuss Brazil's background and current macroeconomic situation, especially overall fiscal operation and monetary policy trends. Literature review on related studies will be provided in the second section. In the third section, the hypothesis will be developed and methodology and detailed data description will be discussed in the fourth section. Based on these, empirical analysis on what determines the inflation expectation in Brazil and what is the role of fiscal variables on the inflation expectation will be conducted as well. Analysis will be done by comparing different time period between pre-2008 and post-2008 first and then by comparing state-owned bank loans and private bank loans. Thereafter, the findings and remarks will be developed and robust analysis will be conducted in this section as well. Lastly, in the fifth section, the study will discuss policy implications for Brazil.

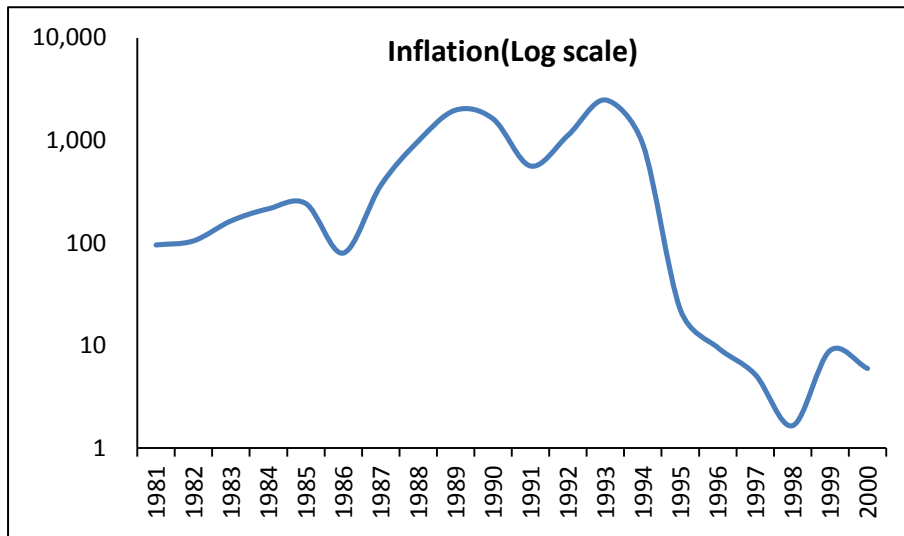
1.1 Brazil's History of Inflation

Brazil is the biggest country and the largest economy in Latin America. As of the end of 2013, GDP recorded 2,242.9 billion USD and its GDP per capita was 11,310.9 USD with total 198.3 million populations.³ Brazil experienced rapid economic growth in the mid-2000s thanks to increasing demand for primary products and commodities, the main export items of Brazil.⁴

³ This information can be found at <http://www.imf.org/external/pubs/ft/weo/2014/01/weodata/index.aspx>

⁴ This information can be found at IMF Article IV Consultation Report on Brazil, http://www.imf.org/external/np/sec/pn/2007/pn07114.htm#P28_354.

Figure 1.1: Brazil Inflation Rate before 2000



Source: IMF World Economic Outlook Databases

Until 2000, Brazil suffered from hyperinflation and high inflation.⁵ Annual inflation rate exceeded 90 percent from 1981 and recorded as high as 2,477 percent in 1993. During the period between 1981 and 2000, inflation rate was 548 percent on average.⁶ Due to the hyperinflation, people's purchasing power was undermined severely during the period and the economic situation had worsened. In order to tackle the problem, a set of measures called '*Plano Real* (Real Plan)' was taken in 1994 during the presidency of Itamar Franco. The measure eventually intended to stabilize inflation via introducing new currency, *Real*, deindexing the economy on past high inflation, freezing public sector prices, implementing contractionary fiscal and monetary policies, opening up the trade and then increasing foreign exchange reserves (Clements 1997). The policies enabled Brazil to bring down the inflation rate after 1994 and eventually stabilized it throughout the end of 1990s.

⁵ The definition of hyperinflation varies across the researches. For example, Cagan(1956) defined hyperinflation as an inflation rate of 12,875 percent per year, while Dornbusch et al.(1990) defined it as 1,000 percent per year. In this paper, the definition follows the latter one.

⁶ This information can be found at <http://www.imf.org/external/pubs/ft/weo/2014/01/weodata/index.aspx>

Furthermore, inflation had remained at a comfortable level thanks to two important institutions implemented just after the Real Plan – Inflation Targeting and Fiscal Responsibility Law. Brazil officially implemented inflation targeting framework in June 1999. Inflation targeting is a monetary policy framework which entails the announcement from the central bank or, more broadly, the monetary authority that the central bank will make an effort to keep inflation at or near predetermined specified level (Bernanke and Mishkin 1997). It played a great role in stabilizing economy by achieving low levels of inflation and by anchoring price stability commitment along with people’s awareness in Brazil (Minella et al. 2003).

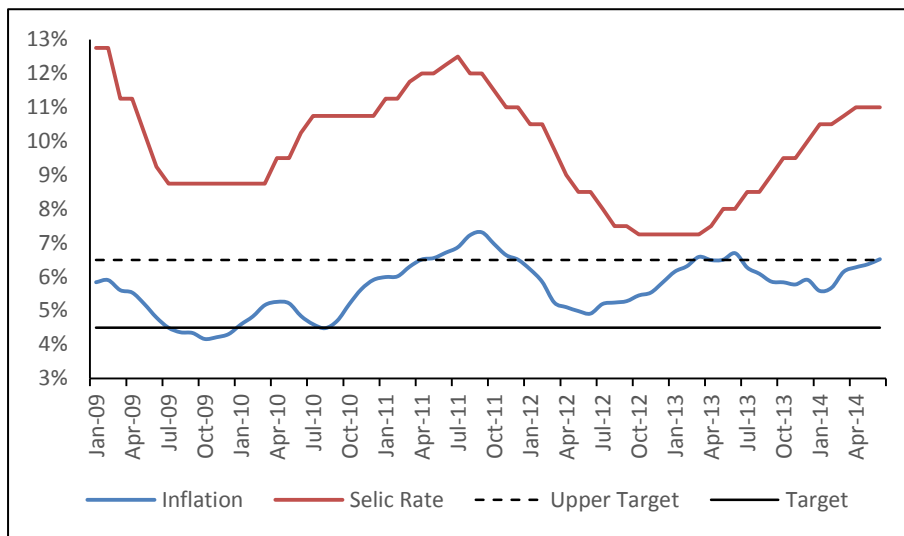
Fiscal Responsibility Law which makes the government avoid irresponsible fiscal behavior was adopted in 2000. The Law helped Brazil to sustain fiscal prudence in the early-2000s (Liu and Webb 2011). Given that fiscal deficits affect negatively on inflation, enhanced fiscal conservatism helped to stabilize inflation in the early-2000s in Brazil.

1.2 Recent High Inflation Trends and Reasons

Inflation rate began increasing since 2009 and it has never reached its target, 4.5 percent, since August 2010. As of June 2014, it recorded 6.52 percent, which breached the upper ceiling of inflation target, 6.5 percent, set by the central bank as shown in Figure 1.2.⁷ Although monetary policy has been contractionary since May 2013, inflation rate has not been stabilized rather accelerated. Moreover, the level of the policy rate, 11 percent, is the highest among OECD and G20 countries but inflation rate is still the sixth highest among these countries as of the end of 2013.

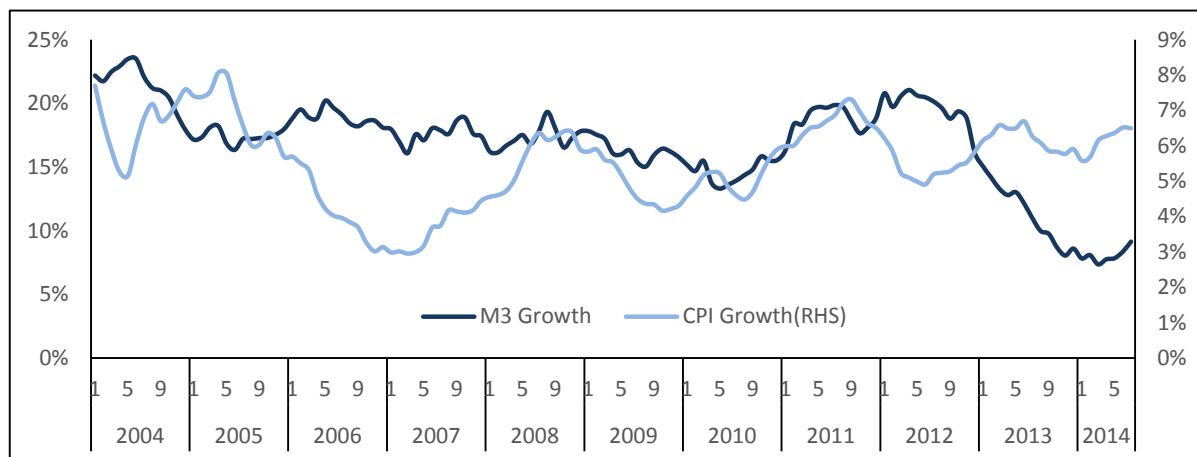
⁷ This information can be found at the Central Bank of Brazil, <http://www.bcb.gov.br/?INDICATORS>.

Figure 1.2: Brazil Annual Inflation Rate and Selic Policy Rate Trends (%)



Source: Central Bank of Brazil(BCB)

Figure 1.3: Changes in CPI Inflation Rate Growth and M3 (YoY, %)



Source: Central Bank of Brazil(BCB)

Figure 1.3 also shows recent inflation persistence. The growth rate of M3, the broad measure of money supply in the economy, has decreased since the end of 2012 and was dropped to a record low but CPI inflation rate growth rate has been as high as 6 percent, showing that inflationary pressure is not tamed. More worryingly, an expected increase in

public utilities prices and oil prices which have been contained so far is likely to add much pressure on inflation again. Considering this possibility, weakening efficiency of monetary policy will dampen Brazil's macroeconomic stability. Several factors are discussed as a reason behind high inflation.

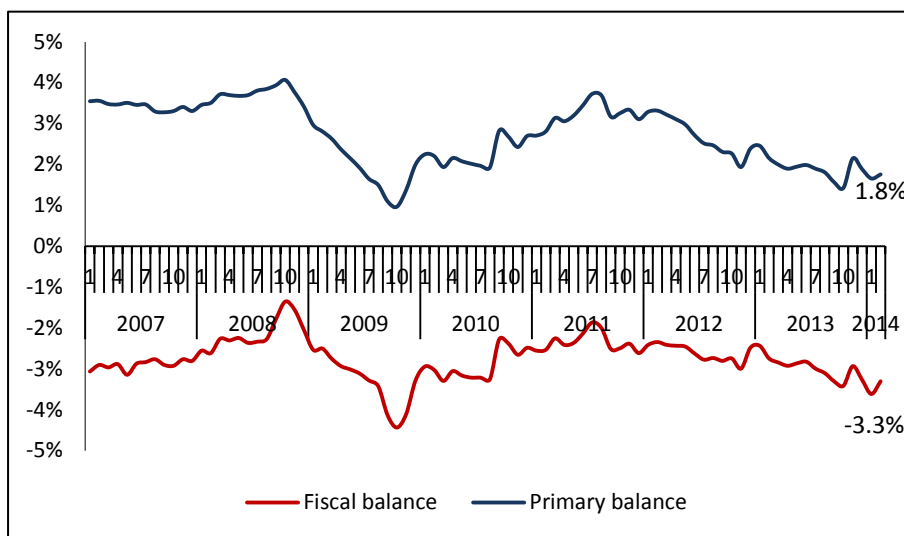
First, according to Oliveira and Petrassi (2010), the history of hyperinflation during the 1980s and the early of the 1990s still affects people's inflation expectation. For those emerging countries that have had the experience of recent past hyperinflation, average inflation tends to be higher than the others that did not experience hyperinflation (Oliveira and Petrassi 2010). Second, the inflation rate in non-tradable sector such as service sector is higher than other sectors, which pushes up overall inflation (Carvalho 2013). This is because annual minimum wage growth rate in Brazil is set by the combination of inflation rate in the previous year and average economic growth rate in the past years (Berg 2009). It means that minimum wage is increased more than inflation rate, which in turn affects higher price level in non-tradable sectors. Moreover, the labor market is rigid with low unemployment rate around 4 to 5 percent. This causes wages to be increased more than the productivity growth rate.

Other factors are more related with fiscal operations. Fiscal policy is an important tool to achieve macroeconomic stability because the government is the main economic player, employer and bond issuer in any country in the world. Fiscal operations are generally done by the government's budget. It is measured by fiscal balance which shows the net difference between government revenue and expenditure.

As shown in Figure 1.4, the expansionary fiscal stance during the recent years has made it difficult to meet the original primary surplus target, and doubts are rising over the

government's determination to fix the worsening fiscal balance. Fiscal balance plunged in 2009 after 2008 global financial crisis and has been again in downward trend since 2011. The 12-month accumulated fiscal deficit in the public sector reached 3.3% of GDP in February 2014. Given that increasing fiscal deficits can cause inflation as mentioned above, recent fiscal deficits deterioration can propel more inflation pressure.

Figure 1.4: Brazil Monthly Fiscal/Primary Balance in the Public Sector (% of GDP)

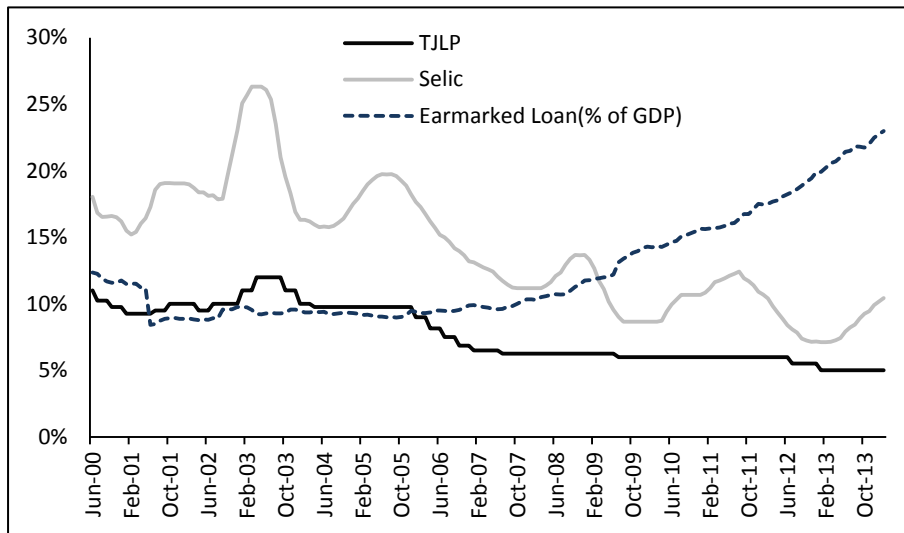


Source: Central Bank of Brazil (BCB)

Not only explicit fiscal balance but also implicit quasi-fiscal operation is another factor that affects inflation (Dornbusch 1992; Goodfriend 2011). Quasi-fiscal operation is implemented by central bank or state-owned enterprises in order to achieve specific fiscal objectives with off-budget (Mackenzie and Stella 1996). Quasi-fiscal deficits emerge from subsidized loans, losses from foreign exchange guarantees, forward contracts, or gaps between purchases and sales of foreign exchange under multiple exchange rates (Dornbusch 1992). These operations can be regarded as either expansionary monetary policy or fiscal

deficit which propels more inflation pressure. Generally, these quasi-fiscal operations are not taken into fiscal accounts explicitly, so the transparency of fiscal operation can be also undermined (Mackenzie and Stella 1996).

Figure 1.5: TJLP Long Term Rate, Selic Policy Rate and Earmarked Loan (% , % of GDP)



Source: Central Bank of Brazil (BCB)

For example, subsidized lending in Brazil, one of the quasi-fiscal operations, is generally called as directed lending or earmarked loan and is prevalent in Brazilian loan market. It is the loan to favored sectors that are designated by government regulations and is lent at below-market interest rates (World Bank 2006). This is usually intermediated by specific state-owned banks and total earmarked loan accounts for 44.3% of total credit as of June 2014 which is increased from 35.5% in March 2007 as shown in Figure 1.5.⁸ The share of earmarked loan in total loans remains high in the regional context as other neighboring

⁸ This information can be found at Central Bank of Brazil.

Latin American countries have reduced its portion. Its lending rate around 5 percent is far lower than Selic policy rate. It means that almost half of total credits are originated below market interest rate.

In Brazil, subsidized lending is categorized into three major loans – long-term finance, housing finance, and agricultural finance. Earmarked lending for long-term finance originates in the national development bank, BNDES. BNDES does not have a deposit function but rather finances itself via constitutional funds or from Treasury loans.⁹ Its earmarked long-term lending is offered at the TJLP rate, a long-term rate far lower than Selic policy rate. As shown in Figure 1.5, TJLP rate is not linked with the Selic rate and has been lowered since 2003. Such a spread is driven by formula but TJLP rate is highly discretionary. As for housing finance and agricultural finance, the lending is also offered at regulated lower interest rate. Given high portion of subsidized loans to total loans, it is assumed that the low TJLP weakens the transmission effect of Selic rate, a monetary policy. Moreover, because the TJLP does not change according to the Selic rate change and has never increased since 2003, the government had to further raise the Selic rate for non-earmarked credit instead to increase the effect of its monetary policy.

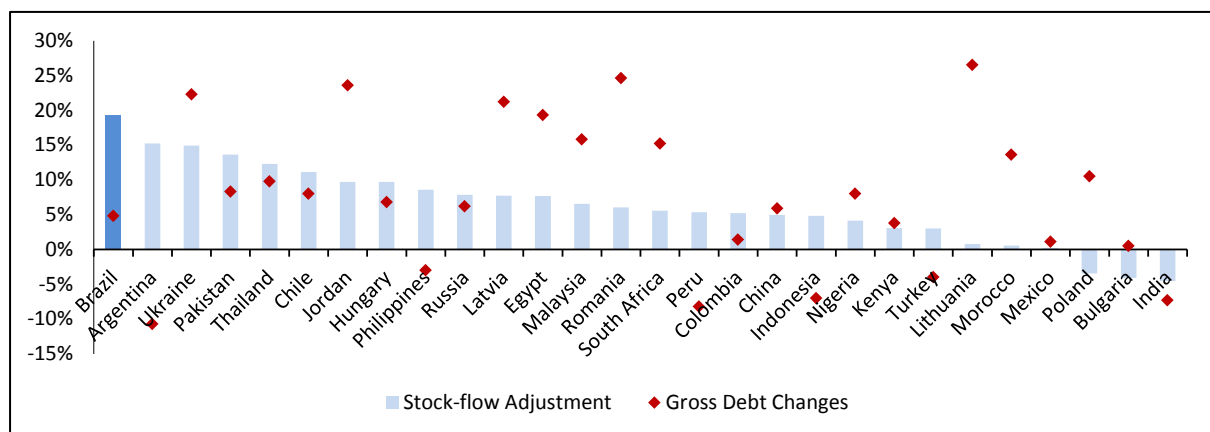
At the same time, low TJLP rate causes fiscal costs. While the interest costs of financing for Treasury are generally linked to a higher Selic rate, Treasury loans to BNDES are normally compensated by lower TJLP. In other words, the spread between Selic and TJLP which is 6 percent points as of April 2014 is applied to the outstanding Treasury loans to BNDES and this becomes an implicit government subsidy on Treasury-financed BNDES loans. Treasury loans to BNDES costs to Treasury as much as the spread. Thus, it negatively

⁹ This information can be found at BNDES' balance sheet. Over half of liabilities consist of loans from Treasury.

impacts fiscal deficits as interest-related costs.

Though it is not a complete indicator of quasi-fiscal activities, stock-flow adjustments in government gross debt is an indirect indicator that figures out the government’s engagements in off-budget operations in order to disguise the impact of the fiscal deficits on public debt (Weber 2012). Stock-flow adjustments are defined as the difference between the annual changes in gross debt and the budget deficit (Campos, Jaimovich and Panizza 2006). This means that the portion of annual gross debt changes unexplained by annual budget deficit is stock-flow adjustments and is attributable to government’s off-budget operations.

Figure 1.6: Stock-flow Adjustments in Government Debt and Change in Gross Debt during 2008~2013 (% of GDP)



Source: IMF World Economic Outlook Databases

As shown in Figure 1.6, Brazil recorded the highest stock-flow adjustments among 28 countries from 2008 to 2013. The fiscal deficit contributed to just 40% of the debt increase and the remaining 60% was explained by the stock-flow adjustments. Compared to GDP for

international comparisons, Brazil's stock-flow adjustments reached 19.4%, the highest ratio among major emerging nations. This illustrates that Brazil has increased off-budget operations that is not reflected in fiscal balance appropriately since 2008 global financial crisis. Thus, it is assumed that overall quasi-fiscal operations such as subsidized lending in Brazil have been prevalent, have played an important role in off-budget operations and have influenced on inflation pressure as well as future inflation expectation.

CHAPTER 2. LITERATURE REVIEW

Many literatures show that fiscal deficit is one of the important factors on determining inflation. Earlier study by Sargent and Wallace (1981) argues that monetary policy may not have enough power to accomplish price stability when the fiscal authority dominates the monetary authority. The research further mentions that the constraints will exist for monetary authority to control inflation if fiscal deficit is not financed by new bond sales due to low demand for government bonds. In this case, the monetary authority is pushed to conduct expansionary monetary policy to create more money and tolerate more inflation. Thus, fiscal deficits and inflation are correlated.

Many following theoretical studies propose that inflation is not solely determined by monetary policy but by the combination of fiscal and monetary policy and the impact of fiscal deficits is generally large on inflation when it is especially in high inflation episodes. The so-called fiscal theory of price level determination is proposed by many researches. Sims (1994) argues that inflation is a fiscal phenomenon in a fiat money economy and it is more fundamental than monetary phenomenon. Woodford (2001) also proposes that contractionary monetary policy itself cannot ensure price stability because there is a fiscal policy inconsistency. This study argues that as anti-inflationary monetary policy and the independence of central bank started to be emphasized in the 1990s, a suitable fiscal commitment along with this kind of monetary policy now becomes a sturdy approach to the long-run price stability achievement. Cochrane (2005) adopts stock analogy analysis to government budget and debt and states that the fiscal theory is still important in determining price stability despite some criticism from monetarist arguments.

Recent article by Catão and Terrones (2005) shows that strong positive relationship between inflation and fiscal deficits exists among high-inflation and developing country groups. The study argues that fiscal deficits have influenced on inflation not only for high or hyperinflation groups but also for moderate inflation period.

It is argued that fiscal deficits also influence inflation expectations. Celasun, Gelos and Prati (2004) assert that the trend of fiscal variables significantly influence inflation expectations. Furthermore, this research proposes that the primary balance adjustments seem to play an important role in reining back high expected inflation rates.

In spite of the theoretical studies that fiscal deficits affect inflation, empirical studies provide mixed results. Earlier empirical study by Darrat (1985) states that both federal government deficits and monetary growth largely affect inflation between 1960 and 1980. This study further highlights that relative to money growth federal government deficits show stronger impact on inflation. It also suggests that contractionary fiscal policy is an important anti-inflationary measure. Meanwhile, Ahking and Miller (1985) show that both inflation and government deficits are exogenous in the 1960s but are causally related in the 1950s and the 1970s, which illustrates inconsistent empirical results depending on the period.

Also, empirical studies give different results depending on which country the research focuses on. For instance, empirical studies on the United States have not yielded a strong or statistically significant relationship between fiscal deficits and inflation. In earlier study by Hamburger and Zwick (1981), the government budget deficits had had an enormous impact on the growth of U.S. money supply growth throughout a great part of the period since 1961. However, this study states that the relationship does not always hold but rather is dependent on whether fiscal deficits put more pressure on interest rate increase so that the

central bank monetizes the debt in order to stabilize interest rate. Dwyer (1982), furthermore, argues that there is no significant relationship between expected government deficits and future inflation in U.S. after the end of World War II. King and Plosser (1985) conduct analysis on the determinants of seigniorage in the United States and other countries. The study finds that there is generally no significant causality relationship between government deficits and changes in base money, thus inflation.

Those of other industrial or developed countries have also yet to provide conclusive results on the inflation-deficits relationship. King and Plosser (1985) conclude that it is difficult to see the significant relationship between government deficits and inflation in the post-war period in the U.S. or other countries. Giannaros and Kolluri (1986) also argue that the determinants of monetary growth or inflation does not include government budget deficit. Barnhart and Darrat (1988) conduct the empirical analysis for seven major OECD countries and state that there is no significant relationship between government deficits and long-run changes in money growth. The study by Protopapadakis and Siegel (1987) propose that little evidence was found in explaining the positive relationship between the growth in government debt and money growth as well as inflation rate for ten industrialized countries over the post-World War II period. Meanwhile, they find out that the level of government debt is significantly related with inflation during the period between 1974 and 1983. This illustrates that the central banks in developed nations are able to perform independent monetary policy for longer period so that it helps stabilize inflation despite fiscal deficits.

In line with the arguments above, empirical studies on developing countries generally provide a significant causality from fiscal deficits to inflation, especially in countries where high-inflation is persistent. De Haan and Zelhorst (1990) argue that there is stronger positive relationship between government deficits and money growth in the years of high inflation in

developing countries. For example, as for Turkey, the budget deficits significantly affected inflation from 1950 to 1987 when the country was severely suffered from high inflation and conducted monetization of public sector deficits (Metin 1998). More recent study by Loungani and Swagel (2003) argue that sources of inflation in developing countries are quite diverse across the regions. They propose that fiscal variables matter with inflation and are especially predominant factors in those South American countries with higher average inflation rates. Domaç and Yücel (2005) investigate 24 inflation episodes in 15 emerging countries from 1980 to 2001. This empirical study finds that expansionary fiscal policy is one of the factors that raise the probability of inflation starts. Catão and Terrones (2005) also propose that it is usually developing countries where inefficient tax collection and political instability persist that the positive relationship between fiscal deficits and inflation is stronger. This study uses a data set of 107 countries over the period between 1960 and 2001.

Explicit fiscal balance or primary balance cannot catch the whole picture of fiscal policy stance. Quasi-fiscal operation is implemented by central bank or state-owned enterprises in order to carry out specific fiscal objectives outside the budget and is often not transparent as it is generally an off-balance sheet item on fiscal balance (Mackenzie and Stella 1996). It includes, for example, subsidized lending, foreign exchange rate guarantees, or multiple exchange rates and these operations cause either expansionary monetary policy or fiscal deficits. Dornbusch (1992) argues that it is necessary to take the quasi-fiscal operations by central bank into the fiscal accounting because extreme inflation inevitably reflects deficits arisen from quasi-fiscal activities. More recent studies by Goodfriend (2011) and Park (2012) also argues that quasi-fiscal operations by the monetary authorities can undermine the credibility of monetary policy, so it may negatively affect inflation.

Empirical studies show that quasi-fiscal deficits contribute inflation due to money

creation in Zimbabwe in 2006 (Muñoz 2007) and in other developing countries such as China, Yugoslavia or Brazil in the past (Dornbusch 1992). In this sense, fiscal credibility or transparency matters on reducing inflation and thus achieving fiscal credibility is critical to decrease inflation rate from high ranges (Celasun et al. 2004).

Other than fiscal variables, there are several factors that influence inflation. For example, earlier study by Phillips (1958) proposes that there is a negative relationship between unemployment rates and inflation rates. This illustrates that decrease in unemployment will influence higher inflation rates. Recent studies such as Casares (2010), for example, also show that the fluctuations of wage inflation rate are negatively correlated with the unemployment rate and also with next period's expected wage inflation.

Exchange rate variability also influences inflation variability. Arize, Malindretos and Nippani (2004) conduct an empirical investigation in 82 countries to find out the relationship between exchange rate variability and inflation variability. The study shows that there is a statistically significant positive relationship and the exchange rate actually influences inflation rate. Also, the response to real exchange rate is especially strong in those heavy commodity-export countries following inflation targeting framework (Aizenman, Hutchison and Noy 2011). This is plausible because those countries are susceptible to real exchange rate volatility and terms of trade.

Brazil's high inflation is also attributable to fiscal deficits. Several literatures state about the relationship between inflation and fiscal policy in Brazil. Before the mid-2000s, the inflation in Brazil was relatively well controlled thank to prudent fiscal policy. Blanchard (2004) stated that fiscal policy is a crucial tool to lower inflation in Brazil and a discreet conduct of monetary policy along with fiscal policy in the early-2000s has played an

important role in having inflation expectations tied with the inflation target. More recent study on the issue also found out that inflation expectation in Brazil is anchored with the fiscal policy. Celasun, Gelos, and Prati (2004) examine eleven disinflation events in emerging nations including Brazil from 1994 to 1998. They propose that future inflation expectations perform a more critical role than past inflation in forming the inflation process. This illustrates that enhancements in fiscal balances meaningfully lower inflation expectations and the effect of fiscal variables is found to be more noticeable in Brazil's case than in other nations.

Cerisola and Gelos (2009) conduct empirical research in Brazil and show that a discreet maneuver of fiscal policy has contributed to reinforcing the credibility of the monetary regime and thus inflation targeting as well. This is also in line with the argument that the inflation targeting credibility has improved thanks to persistent adherence to a strong fiscal policy as well as a prudent conduct of monetary policy.

CHAPTER 3. HYPOTHESIS

This study develops several research hypotheses and there are four main research hypotheses among others as follows: 1) the primary fiscal surplus influences the inflation expectations negatively; 2) the earmarked loans as a proxy for quasi-fiscal operations influences the inflation expectations positively; 3) the earmarked loans influences the inflation expectation more severely in the post-2008 than the pre-2008 period; 4) the Selic policy rate affects the inflation expectation negatively. These four research hypotheses are crucial as they provide important implications on the relationship between fiscal operations and inflation expectation as well as on the monetary policy effectiveness in stabilizing inflation expectation in Brazil.

Other than four hypotheses, there are general research hypotheses that are needed to be verified as in the followings. First, the level of current inflation affects inflation expectation positively. According to adaptive expectation hypothesis¹⁰, current inflation rate influences future inflation expectation. This illustrates that there is an inflation inertia which makes people adjust their future expectation on price based on past information or inflation rate. Thus, the higher the current inflation rate is, the higher its inflation expectation is.

Second, the inflation target rate influences inflation expectation positively. Central bank's decision on inflation target rate is important in stabilizing future inflation (Bernanke and Mishkin 1997). Thus, it shows that the level of inflation target rate affects the inflation expectation.

¹⁰ Mankiw (2007) mentions that adaptive expectations assume that the expectations on inflation is formed based on recent identified inflation.

Third, real effective exchange rate affects inflation expectation positively. The exchange rate movement is also important in current inflation and this relationship is especially strong in heavy commodity-export countries such as Brazil (Arize, Malindretos and Nippani 2004; Aizenman, Hutchison and Noy 2011).

Fourth, real wage influences inflation expectation positively. Dating back to the study by Phillips (1958), it shows that there is a negative relationship between unemployment rate and inflation rate. Recent studies such as Casares (2010), for example, also show that the fluctuations of wage inflation rate are negatively correlated with next period's expected wage inflation.

All explanatory variables except inflation target rate are 12-month lagged variables. Because there is a time lag in implementing the policies such as monetary or fiscal policy and in seeing effects of those policies,¹¹ the lagged explanatory variables are more appropriate to use to see the effect on dependent variable. Policy time lags are varied across the country, the period and the economic situation. Araújo, Azevedo and Costa (2012) show that the transmission timing of fiscal consolidation generally takes four to five quarters to influence the inflation with maximum effects in Brazil. The 12-month lagged explanatory variables are used in order to reflect the time lag of monetary and fiscal policy effect. Other independent variables such as real effective exchange rate and real wage are also lagged variables in order to be in line with fiscal balance variables as well as monetary policy variable, the real interest rate.

In the course of conducting research, the comparison between state-owned bank,

¹¹ Generally, economists believe that there are long and different time lags in monetary and fiscal policy implementation. For example, Mankiw (2007) explains this time lag as inside lag and outside lag. The former means the time spent for recognizing the economic shock while the latter means the time needed for feeling actual policy effects.

BNDES, and the private banks is also analyzed. Given that a large proportion of subsidized lending is originated by BNDES, the comparison is helpful to figure out whether the impact of each category's loan on inflation is different.

CHAPTER 4. EMPIRICAL RESULTS ON DETERMINANTS OF INFLATION EXPECTATIONS

4.1 Specification of Model

The literatures that explore the determinants of inflation expectation empirically in emerging market economies are limited. Most of the literatures have either focused on inflation target credibility such as the study by Minella et al. (2003) or the role of fiscal expectation such as the research by Celasun, Gelos and Prati (2004). Cerisola and Gelos (2009) encompass both of the aspects and include inflation target variable and fiscal balance variable in the analysis. They propose the model with forward-looking behavior as Sargent and Wallace (1981) argue. In this regard, they argue that today's inflation is typically associated with overall direction of expected future fiscal deficits and the present stance of fiscal policy may be interpreted as the governments' commitment to expected future path of fiscal balance. Thus, it can be functioned as a good proxy of the fiscal sustainability, at least, in the short term as well as in the medium term. As mentioned previously, Celasun, Gelos, and Prati (2004) propose that future inflation expectations are regarded as more important factors than inflation in the past in forming the inflation development process.

With this regard, Cerisola and Gelos (2009) use one dependent variable, expected inflation rate, and six explanatory variables such as current inflation rate, inflation target rate, primary fiscal balance, real policy interest rate, real effective exchange rate and real wage.

This research adopts a regression model proposed by Cerisola and Gelos (2009) with some modifications such as adding one more explanatory variables and extending time period up to April 2014. The original equation is as follows:

$$\pi_t^e = \alpha_0 + \alpha_1\pi_{t-1} + \alpha_2\pi_t^T + \alpha_3pb_{t-3} + \alpha_4r_{t-3} + \alpha_5reer_{t-3} + \alpha_6wage_{t-3} + \mu_t \dots\dots\dots (1)$$

where π_t^e is current inflation expectation in next twelve months; π_{t-1} is inflation lagged twelve months; π_t^T is inflation target within next twelve months; pb_{t-3} is three-year lagged primary balance as a percent of GDP accumulated for twelve months which is a proxy for the stance of fiscal policy; r_{t-3} is three-year lagged real policy interest rate which is a proxy for the stance of monetary policy; $reer_{t-3}$ is a deviation of the real effective exchange rate from their trend value lagged three years and $wage_{t-3}$ is a deviation of real wage from their trend value lagged three years. The trends of real effective exchange rate and real wage are approximated through a Hodrick-Prescott filter. Their sample data range from April 2000 to July 2006.

In this research, given the importance of quasi-fiscal operations in Brazil, the earmarked loan is also explicitly included in the estimation as follows:

$$\pi_t^e = \alpha_0 + \alpha_1\pi_{t-1} + \alpha_2\pi_t^T + \alpha_3pb_{t-1} + \alpha_4r_{t-1} + \alpha_5reer_{t-1} + \alpha_6wage_{t-1} + \alpha_7earmark_{t-1} + \mu_t \dots\dots\dots (2)$$

where $earmark_{t-1}$ is earmarked loan as a percent of GDP lagged twelve months. Given frequent quasi-fiscal operation by state-owned banks in Brazil, the earmarked loan is additionally included in the equation as a proxy for subsidized low interest rate lending. The sample data range from November 2001 to April 2014, which is more updated.

Unlike the study by Cerisola and Gelos (2009) which uses three-year lagged

independent variables including primary balance, real interest rate, real effective exchange rate and real wage, this study uses other explanatory variables which are lagged twelve months. As Araújo, Azevedo and Costa (2012) show that the transmission timing of fiscal consolidation generally takes four to five quarters to influence the inflation with maximum effects in Brazil, this study adopts twelve-month time lag for explanatory variables.

With this equation, the regression will be done with two different time periods, the pre-2008 and the post-2008 period. This is because there has been continuous increase in earmarked lending since 2008 global financial crisis in order to overcome economic slowdown by fiscal and quasi-fiscal operation.¹² In this way, it is possible to compare the effect of earmarked loan on inflation expectation between two different periods.

Also, another modified model will use the independent variable of the loan originated by BNDES, the national development bank, and by private banks interchangeably instead of earmarked loan. This enables to compare the loan by state-owned banks with the loan by private banks on inflation expectation. The former equation is as follows:

$$\pi_t^e = \alpha_0 + \alpha_1\pi_{t-1} + \alpha_2\pi_t^T + \alpha_3pb_{t-1} + \alpha_4r_{t-1} + \alpha_5reer_{t-1} + \alpha_6wage_{t-1} + \alpha_7BNDES_{t-1} + \mu_t \dots\dots\dots (3)$$

where $BNDES_{t-1}$ is the loan by BNDES as a percent of GDP lagged 12 months. This independent variable is used instead of earmarked loan. As BNDES does not accept

¹² As in Figure 1.5, the earmarked loan as a percent of GDP has been increased rapidly since 2008.

deposits, the state-owned development bank gets its resources from Treasury in order to conduct earmarked loan activities, which is in other words related with quasi-fiscal operation.

The latter equation is as follows:

$$\pi_t^e = \alpha_0 + \alpha_1\pi_{t-1} + \alpha_2\pi_t^T + \alpha_3pb_{t-1} + \alpha_4r_{t-1} + \alpha_5reer_{t-1} + \alpha_6wage_{t-1} + \alpha_7prbloan_{t-1} + \mu_t \dots\dots\dots (4)$$

where $prbloan_{t-1}$ is the loan by private banks as a percent of GDP lagged 12 months. By comparing equation (3) with (4), this research will analyze whether the loan activity of state-owned bank affects inflation expectation more than that of private banks.

4.2 Empirical Results

The regression results with the equation (2) are provided in Table 4.1. To be precise, the full period ranges from November 2001 to April 2014, the early period is from November 2001 to December 2008 and the late period is from January 2009 to April 2014.

In Table 4.1 below, the coefficient estimate for primary surplus is negative and is statistically significant at 1 percent in all periods. This illustrates that, *ceteris paribus*, 1 percent point decrease in primary balance as a percent of GDP leads to 1.076 percent point increase in inflation expectation in next 12 months during the period between November 2001 and April 2014. In detail, its negative coefficient estimate is larger in the early period but becomes smaller after 2009.

The coefficient estimate for earmarked loan is positive and is statistically significant

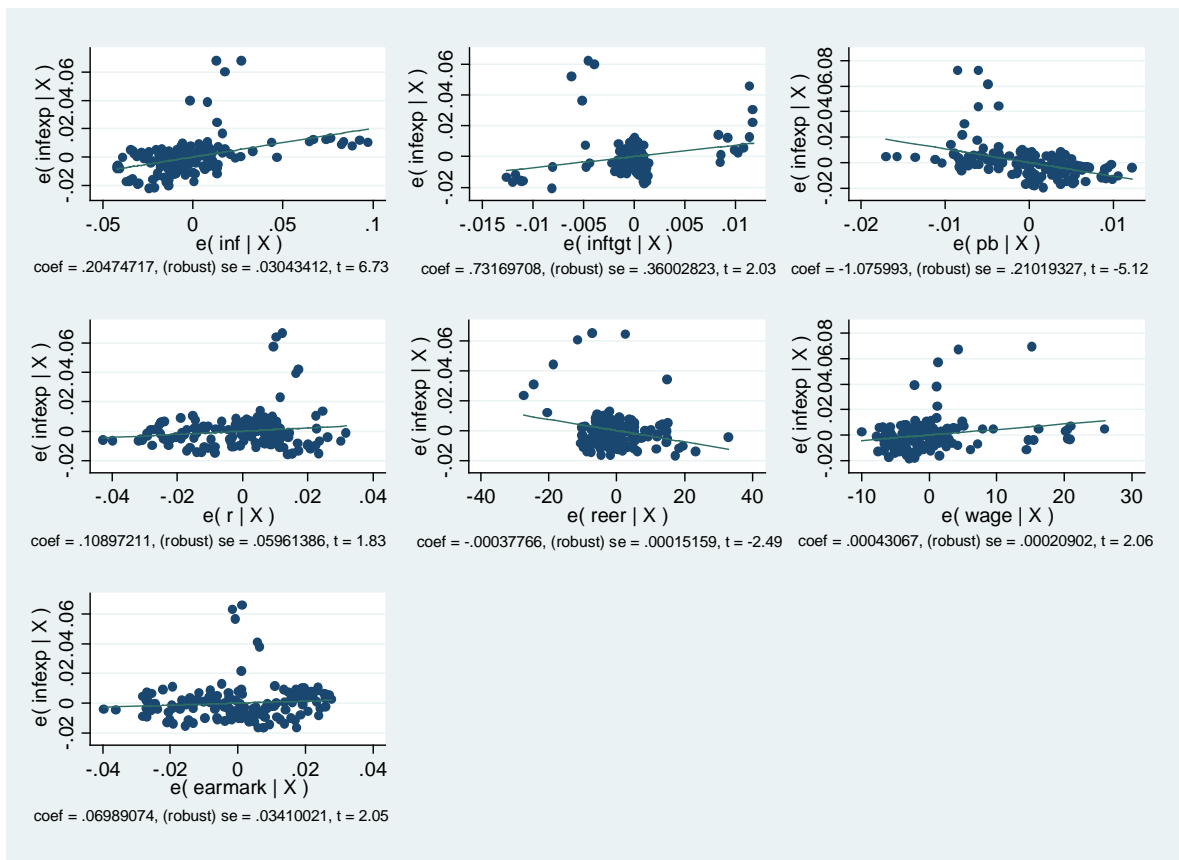
at 5 percent in all periods. This shows that, ceteris paribus, a percent point increase in earmarked loan is associated with 0.07 percent point increase in inflation expectation in next 12 months. Especially, the magnitude of coefficient becomes larger after 2009 and records 0.194 with 1 percent significance level. In other words, the effect of earmarked loan on propelling inflation expectation has been stronger since 2009, while the effect of primary balance surplus on inflation expectation has become weaker.

Table 4.1: Estimated Equations for Inflation Expectations in Brazil: Pre-2009 VS. Post-2009

	Models		
	Full period	Pre-2009	Post-2009
Constant	0.023(0.236)	0.247(0.008)	0.029(0.000)
Inflation(t-1)	0.205(0.000)***	0.144(0.000)***	-0.029(0.566)
Inflation Target	0.732(0.044)**	0.179(0.772)	-
Primary Surplus(t-1)	-1.076(0.000)***	-2.620(0.000)***	-0.203(0.000)***
Real Interest Rate(t-1)	0.109(0.070)*	-0.088(0.268)	0.031(0.332)
Real Effective Exchange Rate Gap(t-1)	-0.000(0.014)**	-0.000(0.013)**	-0.000(0.064)*
Real Wage Gap(t-1)	0.000(0.041)**	0.000(0.106)	-0.000(0.415)
Earmarked Loan(t-1)	0.070(0.042)**	-1.266(0.018)**	0.194(0.000)***
R-squared	0.3319	0.5291	0.9035

Note: * is statistically significant at 10 percent, ** at 5 percent and *** at 1 percent. The coefficient estimate of inflation target variable in the post-2009 period is omitted because it has not been changed since 2009.

Figure 4.1: Plots for All Independent Variables



With regard to negative coefficient estimate of earmarked loan before 2009, it is counterintuitive that an increase of loan is associated with a decrease in inflation expectation. The reason behind this relationship comes from atypical inflation rate jump in the late 2002 along with a sudden drop in earmarked loan as a percent of GDP and its low level in 2002 and 2003.

In 2002, the sudden stop of capital inflows and consequent currency depreciation happened as the election prospect of leftist candidate Lula became stronger in the October presidential election (Bevilaqua, Mesquita and Minella 2007). As opposed to previous Cardoso administration, which was considered as relatively conservative and more market-

friendly, foreign investors and financial market reacted negatively to Lula's strong emergence. The concerns were subsided after Lula took office and the administration reaffirmed their plan to sustain the orthodox macroeconomic policies.

Among all other independent variables, inflation expectation has been the most sensitive to the changes in primary surplus during the period between 2001 and 2014. However, earmarked loan becomes the second influential variable after primary balance in the post-2009 period. This illustrates that earmarked loan gains important weights in influencing the inflation expectation.

On the other hands, the coefficient estimate for real interest rate is even positive and is statistically significant only at 10 percent in the full period. As real interest rate, r_{t-1} , is used as a proxy for the stance of monetary policy, this illustrates that the effectiveness of monetary policy in Brazil has been low in controlling inflation expectation.

The estimation result shows that past inflation, inflation target and real wage are positively associated with inflation expectation while real effective exchange rate gap shows negligible coefficient estimate on inflation expectation.

Those estimation results from this study are generally in line with the ones by Cerisola and Gelos (2009). A common finding from both studies is that a prudent fiscal policy helps stabilize future inflation expectation as the estimation results of both researches indicate the negative coefficient estimates. It means that the inflation expectation moves in the opposite direction to the primary surplus. Also, with regard to inflation targeting, the estimation results of both studies give similar implications that the adoption of inflation targeting helps anchor future inflation expectation.

However, this study figures out different implications on the determinants of Brazil's

inflation expectation from the results of the study by Cerisola and Gelos (2009). By extending the time period and dividing it into two periods, the estimation results show that the effect of prudent fiscal policy wanes after 2009 but instead the effect of earmarked loan on inflation expectation gets larger.

Same logic applies to monetary policy. Although it is not statistically significant, a sign of the coefficient estimates of real interest rate is changed from negative to positive, which means that the effectiveness of monetary policy becomes weak. Inflation targeting whose target level has not been changed since 2009 has no influential power on stabilizing the inflation expectations in the post-2009 period.

The regression results of equation (3) and (4) are shown in Table 2 and Table 3 respectively. In Table 4.2, the coefficient estimate for BNDES loan is positive and is statistically significant at 5 percent. On the contrary, in Table 4.3, the coefficient estimate for private bank loan is negative and is statistically significant at 1 percent. After 2009, the coefficient estimate of BNDES loans becomes much larger and that of private banks loans is also turned to be positive but is still lower than that of BNDES loan. This illustrates that the loan by the state-owned bank is correlated with inflation expectation more positively than private bank loan.

Table 4.2: Estimated Equations for Inflation Expectations in Brazil: BNDES Loans

	Models	
	Full period	Post-2009
Constant	0.049(0.000)	0.031(0.000)
Inflation (t-1)	0.141(0.000)***	-0.042(0.445)
Primary Surplus (t-1)	-0.228(0.003)***	-0.061(0.306)
Real Interest Rate (t-1)	-0.099(0.002)***	-0.058(0.027)**
Real Effective Exchange Rate Gap (t-1)	-0.000(0.958)	0.000(0.523)
Real Wage Gap (t-1)	0.000(0.045)**	-0.000(0.112)
BNDES Loans (t-1)	0.089(0.045)**	0.330(0.000)***
R-squared	0.6491	0.9058

Note: * is statistically significant at 10 percent, ** at 5 percent and *** at 1 percent.

Table 4.3: Estimated Equations for Inflation Expectations in Brazil: Private Bank Loans

	Models	
	From 2004 to 2013	Post-2009
Constant	0.086(0.000)	-0.015(0.411)
Inflation (t-1)	0.092(0.000)***	-0.012(0.873)
Primary Surplus (t-1)	-0.157(0.075)*	-0.234(0.006)***
Real Interest Rate (t-1)	-0.254(0.000)***	-0.111(0.027)**
Real Effective Exchange Rate Gap (t-1)	-0.000(0.706)	-0.000(0.001)***
Real Wage Gap (t-1)	0.000(0.043)**	-0.000(0.645)
Private Bank Loans (t-1)	-0.082(0.000)***	0.304(0.000)***
R-squared	0.6859	0.7791

Note: * is statistically significant at 10 percent, ** at 5 percent and *** at 1 percent.

4.3 Robustness Analysis

To test the multicollinearity or, in other words, whether more than two independent variables are near perfect linear combinations of one another, the variance inflation factor is measured for the regression model (2). The variance inflation factor measures how severe the multicollinearity is in an ordinary least square regression.¹³ In Table 4.4, all the independent variables show the variance inflation factors less than 10, which means that the variables

¹³ One of the ways to quantify the multicollinearity is the variance inflation factor. Many sources and textbooks refer to this method. For example, refer to <https://onlinecourses.science.psu.edu/stat501/node/83>.

could not be considered as a linear combination of other independent variables.

Table 4.4: Variance Inflation Factor(VIF) and Tolerance Value(1/VIF)

Variable	VIF	Tolerance Value(1/VIF)
Inflation	1.13	0.8840
Inflation Target	1.05	0.9546
Primary Surplus	1.28	0.7791
Real Interest Rate	4.37	0.2287
Real Effective Exchange Rate Gap	1.05	0.9514
Real Wage Gap	1.05	0.9510
Earmarked loan	4.35	0.2299
Mean VIF	2.04	-

Note: A variable whose VIF value is less than 10 is not regarded as having multicollinearity.

In the previous section, Table 4.1 shows that the earmarked loan influences inflation expectation positively. This section conducts a robustness analysis whether this relationship is only the case for earmarked loan or for overall total loan as well. If the case is also applied to the latter, the analysis will study how much extent the positive relationship there will be.

Table 4.5: Estimated Equations for Inflation Expectations in Brazil: Case of Total Loans

	Models		
	Full period	Pre-2009	Post-2009
Constant	0.028(0.081)*	0.097(0.000)***	0.009(0.255)
Inflation(t-1)	0.214(0.000)***	0.132(0.000)***	-0.030(0.592)
Inflation Target	0.696(0.056)*	0.872(0.021)**	-
Primary Surplus(t-1)	-1.104(0.000)***	-2.071(0.000)***	-0.187(0.004)***
Real Interest Rate(t-1)	0.093(0.298)	0.037(0.733)	0.020(0.586)
Real Effective Exchange Rate Gap(t-1)	-0.000(0.013)**	-0.000(0.010)***	-0.000(0.000)***
Real Wage Gap(t-1)	0.000(0.039)**	0.001(0.165)	-0.000(0.381)
Total Loan(t-1)	0.018(0.373)	-0.109(0.035)**	0.111(0.000)***
R-squared	0.3281	0.4276	0.8780

Note: * is statistically significant at 10 percent, ** at 5 percent and *** at 1 percent. The coefficient estimate of inflation target variable in the post-2009 period is omitted because it has not been changed since 2009.

In Table 4.5, the independent variable of total loan is included instead of earmarked loan. The coefficient estimate of total loan is also positive during the full period but it is not statistically significant. As for the period after 2009, the coefficient estimate is increased to 0.111 and is statistically significant at 1 percent level. However, its magnitude is smaller than that of earmarked loan, 0.194. Thus, it is safely assumed that earmarked loan plays more significant role in forming inflation expectation than overall total loan, especially after 2009.

Table 4.6: Estimated Equations for Inflation Expectations in Brazil: Case of Selic Policy Rate

	Models		
	Full period	Pre-2009	Post-2009
Constant	0.023(0.236)	0.247(0.008)***	0.029(0.000)***
Inflation(t-1)	0.096(0.089)*	0.232(0.001)***	-0.060(0.342)
Inflation Target	0.732(0.044)**	0.179(0.772)	-
Primary Surplus(t-1)	-1.076(0.000)***	-2.620(0.000)***	-0.203(0.000)***
Selic Policy Rate(t-1)	0.109(0.070)*	-0.880(0.268)	0.313(0.332)
Real Effective Exchange Rate Gap(t-1)	-0.000(0.014)**	-0.000(0.013)**	-0.000(0.064)*
Real Wage Gap(t-1)	0.000(0.041)**	0.000(0.106)	-0.000(0.415)
Earmarked Loan(t-1)	0.070(0.042)**	-1.266(0.018)**	0.194(0.000)***
R-squared	0.3319	0.5291	0.9035

Note: * is statistically significant at 10 percent, ** at 5 percent and *** at 1 percent. The coefficient estimate of inflation target variable in the post-2009 period is omitted because it has not been changed since 2009.

Another robustness analysis is conducted by employing different independent variables, Selic policy rate, instead of real interest rate as a proxy for the stance of monetary policy. By using different proxies, the robustness of the original regression is proved as follows.

Table 4.6 shows the coefficient estimates of Selic policy rate. It is positive and

statistically significant at 10 percent in the full period. The pre-2009 period and the post-2009 period show negative and positive coefficient estimates respectively but both estimates are not statistically significant. It can be assumed that, like the original equation, the monetary policy has not been effective enough to stabilize the inflation expectation and the contractionary monetary policy even has propelled the inflation expectation.

CHAPTER 5. CONCLUSION AND POLICY IMPLICATION

5.1 Conclusion

The objective of this study is to identify the relationship between fiscal balance and inflation expectation as well as the relationship between earmarked loans as a proxy for quasi-fiscal operation and inflation expectation. In the course of analysis, this study compares two different time periods, the pre-2008 period and the post-2008, in order to see the effect of change in the amount of earmarked loan on inflation expectation. By doing this, the study discusses the policy implication to stabilize inflation in Brazil.

In order to identify the relationship, an empirical analysis was conducted by using seven explanatory variables and one dependent variable, inflation expectations. Among those seven explanatory variables, the fiscal operation was reflected by two variables, the primary fiscal balance and the earmarked loans as a proxy for quasi-fiscal operations. The regression model was the multiple regression with over twelve-year time series.

Following the empirical analysis results, the research hypotheses are verified. Among four main hypotheses, the first three hypotheses are proved to be statistically significant. First, it was statistically significant that the primary fiscal surplus influences the inflation expectations negatively. Second, it was found to be statistically true that the earmarked loans as a proxy for quasi-fiscal operations influences the inflation expectations positively. Third, the earmarked loans influence the inflation expectation more severely in the post-2008 than the pre-2008 period. However, the last hypothesis that the Selic policy rate affects the inflation expectation negatively was rejected. This illustrates that there is no effective binding power of monetary policy in stabilizing inflation expectations.

In this regards, the verification of the first two main hypotheses provide policy implications on stabilizing inflation in Brazil. First, as the explanatory variables representing fiscal operation turn out to be statistically significant, the fact is clarified that expansionary fiscal policy influences the inflation expectation. Moreover, the subsidized lending as a proxy for quasi-fiscal activities also affects the inflation expectation positively. This shows that not only fiscal policy but also quasi-fiscal operation affects the inflation expectation in Brazil.

Second, the influence of subsidized lending on the inflation expectation has become larger since 2009 when the state-owned banks increases low interest lending. This illustrates that continuous high inflation over the target rate since 2010 is attributable to increased amount of subsidized lending. Third, as the real interest rate variable turns out not to be statistically significant, it cannot be verified that the monetary policy power has been effective to stabilize the inflation expectation.

5.2 Policy Implication

From the results of the empirical analysis, Brazilian authorities should take into account that expansionary fiscal operations cause the costs of inflation expectations. Historically, Brazilian government has focused on reducing poverty since 2003 by implementing social welfare program such as *Bolsa Familia*. Although it has been effective in reducing inequality as well as extreme poverty and has also improved education outcomes (Soares, Ribas and Osorio 2007), such a welfare program is usually accompanied with large direct cash transfers by the government. Various welfare programs that persist until now become a fiscal burden for the government.

Besides explicit fiscal expenditures, earmarked loans or state-owned bank's lending

is also referred to the fiscal operations which are not included in the calculation of fiscal balance. Especially, the lending by BNDES accounts for almost half of earmarked loans and thus takes up more than 20 percent of Brazil's overall loan market.¹⁴ Its main purpose is to provide low-interest funding for equipment investment in industries. As a development bank without deposit base, however, the government mostly supports the funding to the bank. Thus, more BNDES' loans to the market mean more Treasury loans to the BNDES and it eventually increases government debt because the government has to issue the bonds in order to finance the lending to BNDES. Moreover, the spread between higher Selic policy rate and lower TJLP rate is applied to outstanding Treasury loans to BNDES and this implicit interest subsidy, thus, becomes another fiscal burden.

The fiscal structure of Brazilian government is characterized by high revenue and high expenditure. Because of the huge informal sector and insufficient tax base, the government instead makes up for the low level of tax revenues with high tax rates.¹⁵ The corporate tax rate is one of the highest globally as of 2013, which is at 34%, and its indirect tax rate is relatively high as well.¹⁶ This shows that the tax burden in Brazil is far higher than in other Latin American peer countries. The general government expenditure is also high as its average expenditure recorded around 40% of GDP between 2011 and 2013.¹⁷

Rigid government spending such as social security expenditure and compensation for government officials typically account for a great portion of total government expenditure in

¹⁴ This information can be found at Central Bank of Brazil.

¹⁵ There are several reasons behind high tax burdens in Brazil. For more information, refer to the link at <http://thebrazilbusiness.com/reflection/why-are-the-taxes-in-brazil-so-high>.

¹⁶ Global tax rate information is compiled in KPMG Corporate and Indirect Tax Rate Survey. (<http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>)

¹⁷ This information can be found at IMF World Economic Outlook Database, October 2014.

Brazil because of the policy objective for diminishing income inequality gap until the late 2000s. In this regard, the improvement of fundamental public services like infrastructure was relatively in a low priority. Still those rigid expenditures take up a large portion of central government expenditure, so the government should take into account of the benefits and costs of the expenditure structure. As the costs of inflation expectations caused by expansionary fiscal operations and rigid expenditure structure persist, obeying the Fiscal Responsibility Law and promoting fiscal consolidation should be considered. Also, expenditure execution should be more transparent to encourage efficient use and distribution of funds.

As fiscal balance is deteriorating in 2014, the gap between fiscal and monetary policies widens. The Central Bank of Brazil raised the Selic policy rate to 11.0% from the record low of 7.25% in order to stabilize inflationary pressures through 2013 and 2014. However, this monetary action was not effective enough to bring down inflation rate to achieve the inflation target of 4.5%. Loose fiscal policy stance and rampant quasi-fiscal operations weakened the effect of the tight monetary policy. Slowing economy has diminished the room to further hike interest rates in 2014. In this regard, the current situation requires fiscal policy to be in line with monetary policy to bring inflation under control.

With regard to fiscal consolidation, Araújo, Azevedo and Costa (2012) quote the analysis of Central Bank of Brazil that a fiscal consolidation measure by reducing expenditure causes a bigger drop in inflation rate than the one of increasing tax rates. Specifically, the effect of expenditure cut on bringing inflation down was 1.6 times bigger than that of tax rate hike. Thus, as it is proven that one-off fiscal consolidation measure help bring inflation down, in Brazil with already high tax rates, a more efficient measure to tame inflation and enhance fiscal accounts will be cutting rigid spending, which accounts for much of the government expenditure, and thus reducing overall government expenditure.

The quasi-fiscal operation have also influenced inflation rate negatively. For instance, as state-owned bank have expanded low-rate earmarked loans, it diluted the effect of monetary policy. Currently, a large portion of the earmarked loans, especially loans by BNDES, use TJLP rate or subsidized lending rate which is much lower than the Selic policy rate. As the earmarked loans account for more than 40 percent of total credit, it means the low TJLP rate erodes the transmission effect of Selic rate and monetary policy. Moreover, the movement of TJLP has not been linked with the Selic rate movement and has never increased since 2003. Instead, the Selic rate applied for non-earmarked loans is needed to be raised further by the central bank in order to augment the effect of its monetary policy. Also, the government supports for funding state-owned bank's loans may deteriorate fiscal account and increase government debt burden in the future.

Therefore, it is important for the government to express its willingness for fiscal consolidation more strongly. First of all, the government should start to unwind the expansionary fiscal measures like various tax incentives that started from 2012. It is recommended that more government expenditure should be relocated for public services and infrastructure by reducing the rigid expenditure such as subsidies and transfers for narrowing wealth disparity.

Second, the government should reduce supports for the state-owned banks such as BNDES and encourage them to focus on their own specific policy objectives. Some of the subsidized loans by state-owned banks are used by sizable corporates which are not necessarily regarded as the targeted beneficiaries but only look for low interest loans. In this way, commercial banks whose lending rate is based on higher market rates will be able to do their part and government debt burden will be alleviated.

Third, the TJLP, long-term interest rate for the earmarked credit by state-owned banks, and other subsidized lending rate need to be tied to the benchmark Selic rate. This will enhance the transmission consequences of monetary policy as well as will alleviate the fiscal burden by saving the support of interest rate gap between two rates.

Given that the recent economic slowdown and current economic recession in the first half of 2014, those policy recommendations will be difficult to achieve. For example, as the growth rate has been subdued since 2012, the credit-fuelled consumer spending has become more cautious and the private commercial banks have been reluctant to lend money to consumers and corporates in order to avoid more risk. This situation led the government to supply more loans via state-owned banks channel and earmarked credit to revive the growth impulse instead. Same logic can be applied to the expansionary fiscal policy. However, all these measures were not effective enough to lift the growth rate but only affected negatively on fiscal account as well as inflation pressure. Furthermore, the institutional strength that Brazil has set up so far has been undermined, which is also harmful for sustainable economic growth in the future.

The Fiscal Responsibility Law and inflation targeting framework have been important factors that secure Brazil's macroeconomic stability. However, as verified in this study, its poor fiscal performance not only deepens the government's debt burden but also deteriorates future inflation expectations. Moreover, large amount of quasi-fiscal operations that are not explicitly captured in the fiscal balance and thereby curtail the binding force of the Fiscal Responsibility Law also propel the inflation expectation. As the subsidized lending hinders the transmission effect of monetary policy, it also reduces the effectiveness of inflation targeting which is regarded as another institutional strength. As these two institutions are related each other, the improvements in inflation targeting will be also

positive to fiscal discipline, which leads to more confident Fiscal Responsibility Law (Minea and Tapsoba 2014).

Thus, it is recommended for the government to work on improving fiscal balance as well as quasi-fiscal operation. This fiscal improvement will improve the deteriorating fiscal condition, enhance confidence in monetary policy, and tame future inflation pressures. Further research on finding out the fundamental reasons why Brazil especially depends on extensive use of earmarked loan will be also needed in order to figure out the country-specific factors. This will lead to more persuasive policy recommendations in terms of broader macroeconomic framework.

APPENDICES

Appendix 1. Correlation Matrix of Independent Variables

	inf	inftgt	pb	r	reer	wage	earmark
inf	1.000						
inftgt	0.1136	1.000					
pb	0.1751	0.0874	1.000				
r	0.1833	-0.0041	0.4408	1.000			
reer	0.1377	0.1381	-0.0406	-0.0382	1.000		
wage	-0.1744	-0.0141	0.0682	0.0231	-0.1153	1.000	
earmark	-0.2334	-0.0537	-0.4231	-0.8722	0.0068	0.0064	1.000

Appendix 2. Data Sources and Variable Definitions

Inflation Target and Inflation Rate:	Central Bank of Brazil
Inflation Expectations:	Forecast Consensus from the Market surveyed by Central Bank of Brazil
Primary Fiscal Surplus:	Central Bank of Brazil
Real Interest Rate:	12-month Selic Rate deflated by IPCA Inflation Rate
Real Effective Exchange Rate:	Central Bank of Brazil, Economic Department (DEPEC)
Real Effective Exchange Rate Gap:	Deviation from the trend calculated by Hodrick- Prescott Filter
Real Wage:	FIESP (Industrial Real Overall Wages in São Paulo)
Real Wage Gap:	Deviation from the trend calculated by Hodrick- Prescott Filter
Earmarked Loans:	Central Bank of Brazil
BNDES Loans:	Central Bank of Brazil, Economic Department (DEPEC)
Private Banks Loans:	Central Bank of Brazil, Economic Department (DEPEC)

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