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## Policy Response to External Shocks: Lessons from the Crisis<sup>\*</sup>

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**Abstract:** Emerging economies have been subject to abrupt reversals in capital inflows, which have adverse consequences for economic activity and financial stability. An important question for policymakers is how to respond to a sudden loss of external financing and its negative effects on the domestic economy. The experience of emerging economies through the recent financial crisis shows that those economies with relatively better economic fundamentals were able to implement countercyclical policies. This paper provides a simple analytical framework to rationalize this evidence. In particular, it addresses this issue by developing a small-scale macroeconomic model of the New Keynesian type. Numerical exercises illustrate how both credible monetary and fiscal policies increase policymakers' degrees of freedom to respond to adverse external shocks.

**Keywords:** Reversals in capital flows, emerging economies, monetary policy, fiscal policy.

**JEL Classification:** E52, E62, F32, F41.

**Resumen:** Las economías emergentes han estado sujetas a reversiones abruptas de flujos de capital, las cuales tienen consecuencias adversas sobre la actividad económica y la estabilidad financiera. Una pregunta importante para los hacedores de política es cómo responder a una pérdida repentina de acceso al financiamiento externo y sus efectos negativos sobre la economía doméstica. La experiencia de las economías emergentes durante la reciente crisis financiera muestra que aquellas economías con relativamente mejores fundamentos fueron capaces de implementar políticas contra-cíclicas. Este artículo proporciona un marco analítico simple para racionalizar dicha evidencia. En particular, aborda dicho tema mediante un modelo macroeconómico de pequeña escala de tipo Neo-Keynesiano. Ejercicios numéricos ilustran la manera en que políticas monetaria y fiscal creíbles incrementan los grados de libertad de los hacedores de política para responder a choques externos adversos.

**Palabras Clave:** Reversiones en los flujos de capital, economías emergentes, política monetaria, política fiscal.

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# 1 Introduction

The globalization process has tightened financial and commercial linkages among economies. An element of this process has been a large increase in private financial flows across countries. For instance, a number of studies have documented that cross border financial claims and direct foreign investment have experienced a significant growth in the last two decades (Kose et al., 2006) and, according to the IMF, the amount of net private capital flowing to emerging economies increased from 90 billion U.S. dollars in 2002 to 600 billion in 2007 (IMF, 2010).

In general, capital inflows to emerging economies yield several benefits for the recipient economies (Bosworth and Collins, 1999). Among the most important, they allow economies with insufficient savings to have access to external resources in order to finance investment and promote growth. However, large surges of capital flows also pose significant challenges to the recipient countries. Apart from the concerns about excessive appreciation and unsustainable credit expansions, there is a risk of a sudden reversal in capital flows, with negative consequences for both financial stability and economic activity.

Emerging economies have often been subject to sharp reversals in capital flows, which sometimes reflect global factors such as sudden shifts in market sentiment among international investors, and sometimes reflect domestic factors, such as weak economic fundamentals in the recipient economies. Effectively, empirical evidence has shown that such reversals, known as “sudden stops” in the economic literature, have had an adverse impact on domestic economies (Calvo, 1998). In particular, such reversals in foreign financing force sharp contractions of domestic expenditure and production, real exchange rate depreciations, and reductions in both asset prices and credit to the private sector (Arellano and Mendoza, 2002).

During the international financial crisis, the sudden increase in risk aversion among market participants following the events of September 2008, along with the deleveraging process in developed economies, led to a period of lesser access to international financial markets for emerging economies. This reversion in financial flows, coupled with a reduced demand for these economies’ exports, negatively affected economic activity in emerging markets. After the sharp contraction of financial flows in late 2008 and early 2009, from mid-2009 onwards significantly loose liquidity conditions in the global economy, and better economic perspectives in emerging markets, contributed to a new episode of massive capital flows to these economies. This surge has raised concerns in the recipient economies. In particular, there are worries that these capital inflows could suddenly reverse. This could take place when the advanced economies start to withdraw the monetary stimulus, or when a new episode of financial stress raises the level of uncertainty and risk aversion and therefore induces capital to move to safer places, suddenly affecting capital inflows to emerging economies. Indeed, since the beginning of august 2011, the sovereign debt crisis in Europe has led to a period of considerable stress in international financial markets. As a result, there has been some reversal of capital flows in emerging markets. In this context, although a scenario of a sudden stop has not yet materialized, the probability of it happening has significantly increased.

In this setting, an important issue for emerging economies’ policymakers is how to respond to

a sudden halt of external financing and its negative consequences for the domestic economy. In particular, the circumstances under which the authorities would be able to implement expansionary policies, such as loosening monetary conditions and fiscal stimulus packages, to attenuate the adverse impact on economic activity. Using data for 104 countries for the period 1960-2003, Kamisky, Reinhart and Vegh (2004) found evidence that in emerging and developing economies, episodes of capital outflows are associated with contractionary macroeconomic policies and episodes of capital inflows with expansionary macroeconomic policies. These authors document that both monetary and fiscal policies tend to be procyclical in these economies, specially in times of financial stress, which exacerbates the output contraction. In the case of monetary policy, during a period of capital outflows it was a common practice among central banks in emerging economies to raise the policy rate in order to defend a fixed exchange rate (Kaminsky et al. 2004). As for procyclicality of fiscal policy, in an environment of weak institutions, Lane and Tornell (1999) and Frankel (2011) document that governments are usually not able to resist the political pressures to increase public spending, some times more than proportionately, during economic expansions. In turn, when foreign financing disappears, they are typically forced to follow contractionary fiscal policies. These procyclical macroeconomic policies tend to exacerbate output volatility instead of moderating it (Frankel, 2011).

However, during the recent financial crisis a number of emerging economies, specially those that have adopted sound monetary and fiscal policies in the years prior to the crisis, were able to implement countercyclical macroeconomic policies. Thus, the experience of these economies during the recent crisis suggests that economies with relatively strong fundamentals enjoyed more space to provide monetary and fiscal stimulus. In this context, the crisis reinforced the idea that an economy that follows prudent macroeconomic policies in normal times tends to be in a relatively better position to cope with the adverse consequences of a crisis (Fisher, 2011). More generally, improved institutional frameworks built in normal times may be the key to reduce the procyclicality of macroeconomic policies, and to increase the room to follow countercyclical policies in times of distress.

In order to address the above issues, this paper develops a small-scale macroeconomic model of the New Keynesian type, which incorporates the possibility of a sudden reversal in capital flows as well as a fiscal policy rule. This model provides a simple analytical framework to get some insights regarding those factors that tend to increase policymakers' degrees of freedom to respond to adverse external shocks, such as a "sudden stop" in foreign financing. Numerical exercises illustrate how the margin of maneuver to cope with negative shocks depends crucially on the levels of credibility that monetary and fiscal authorities enjoy, as well as on the initial conditions of the economy when the shock hits.

In the case of monetary policy, a credible central bank's compromise to maintain an environment of price stability over time increases the degrees of freedom to use monetary policy to ameliorate the negative impact on output. In particular, if there is no commitment or capacity by the monetary authority to maintain inflation low and stable, then loosening monetary policy may raise concerns

about inflation, which then, possibly by rising inflation expectations, could eventually generate high inflation rates. This constrains the role that monetary policy can play in response to adverse external shocks. On the contrary, if the central bank's compromise is credible, and if this is reflected in a smaller pass-through from a nominal depreciation to the inflation rate, as for instance authors such as Taylor (2000) have argued, then the monetary authority may be able to implement larger policy cuts without significant worries about a further deterioration in the inflation outlook.

As for fiscal policy, it is also crucial to follow sound policies over time. That is, weak fiscal accounts and large public debt levels can significantly constrain policymakers' capacity to implement fiscal stimulus packages. Under these circumstances, an expansionary fiscal policy can raise concerns about the long-term sustainability of public finances, which may have a negative impact on financial conditions. What is needed is an institutional framework that would induce authorities to save the extraordinary revenues associated with economic expansions, in order to use them during economic downturns. For instance, a higher degree of transparency in fiscal management would make those authorities in charge of fiscal policy more accountable, and may reduce the influence of interest groups on the allocation of public sector resources. This may help to reduce the procyclicality of fiscal policy and increase the room to adopt countercyclical policies (Cuadra and Sapriza, 2011, Cuadra et al. 2010). An example of a fiscal policy framework that can allow authorities to implement a countercyclical policy without raising worries about the sustainability of fiscal accounts may be a structural balance fiscal rule.

Apart from the above issues, another factor that also influences the space to provide economic stimulus are the conditions prevailing in the domestic economy at the time a sudden reversal of foreign financial flows takes place. For instance, an initial inflation rate above the central bank's target can severely limit the monetary authority's margin of maneuver to relax the monetary policy stance to prevent a drop in output related to an abrupt loss of access to international financial markets. Clearly, under an economic environment characterized by an inflation rate in line with price stability (or a country's inflation target), central banks have more degrees of freedom to respond more aggressively, or at least to adopt a less restrictive monetary policy.

This article is organized as follows. Section 2 briefly describes the experience of emerging economies during the recent financial crisis. Section 3 presents a small scale model with an external risk premium and a fiscal policy rule. Section 4 analyzes a number of exercises using this model and provides some insights about the policy response to external shocks. Section 5 presents the final remarks.

## **2 The Financial Crisis**

Emerging market economies entered the recent international financial crisis with different initial conditions (Ghosh et al. 2009). For instance, there are a number of economies, mainly in Asia and some in Latin America, which in the decade before the crisis had substantially improved their macroeconomic policy frameworks with sound fiscal and monetary policies, flexible exchange rate

regimes, sustainable external accounts and, in many cases, large holdings of international reserves (BID, 2008). In some cases, favorable terms of trade in that period also helped considerably to strengthen these economies' fundamentals.

As for macroeconomic policies, prudent fiscal policy management in some countries helped to eliminate the large and persistent budget deficits that many of these economies had experienced in the past. This also contributed to reduce the public debt to GDP ratio in these economies. Moreover, since the decade of the 1990s several emerging economies abandoned fixed exchange rate regimes. Instead, they adopted monetary policy frameworks oriented to achieve price stability. For instance, some economies introduced an inflation targeting regime. These frameworks, along with fiscal policy discipline, helped to reduce inflation and its volatility, as well as to anchor inflation expectations.<sup>1</sup>

Under these circumstances, it can be argued that when the crisis first emerged in 2007, these economies were in a relatively better position to deal with an adverse external environment than in previous financial crises and recessions. Unfortunately, progress in improving macroeconomic policy frameworks and, more generally, economic fundamentals, was not a generalized phenomenon. For instance, prior to the crisis some emerging countries, especially in Eastern Europe, experienced un-sustainable private credit booms, usually fueled by external financing, that led to both huge debt levels and foreign currency exposures on their domestic balance sheets, making them highly vulnerable to capital outflows (Ghosh et al. 2009).

Although the recent financial crisis affected most emerging market economies, for instance practically all of them faced tighter conditions to access external financing, the most affected countries were those with the worst economic fundamentals. For example, Figure 1 illustrates that those countries with higher inflation rates and larger current account deficits before the crisis tended to experience a greater widening in sovereign risk indicators following the sharp increase in uncertainty in mid-September 2008.

Hence, although the crisis was triggered by external factors, the severity of the impact of the shocks on each economy seems to be related, to some extent, to domestic elements. For instance, in light of the sharp rise in risk aversion among international investors, the larger the current account deficit, the more likely external accounts would be perceived as unsustainable, leading also to a more severe adverse effect. In the same way, the higher the domestic inflation the more likely market participants would lose confidence in the value of the domestic currency, which would intensify the negative impact.

It seems that market participants discriminated among economies and penalized more those that were in worse shape at that time. This evidence is consistent with the findings of Rangel and Ramos-Francia (2011) and Llaudes et al. (2010). Controlling for a number of factors, these authors find that those countries considered less externally vulnerable in 2007 suffered a less dramatic increase in sovereign spreads than countries regarded as more vulnerable. For instance, inflation targeting economies with a lower cumulative inflation in the years before the crisis tended to experience a

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<sup>1</sup>See Capistrán and Ramos-Francia (2009 and 2010).

smaller increase in spreads.

It is also clear that those countries that have created a sound macroeconomic framework based on fiscal and monetary discipline were the ones that were able to respond more aggressively to the external shocks. In particular, it seems that policymakers in countries with weak fundamentals had less room to provide either fiscal or monetary stimulus. In the case of monetary policy, Figure 2 shows that those countries with low inflation rates and small current account deficits seem to have responded more aggressively. In particular, they implemented larger policy cuts during the two quarters after the events of September 2008. As for the fiscal policy, Figure 3 illustrates that economies with stronger fiscal positions and lower public debt levels appear to have been able to provide more fiscal stimulus.

Based on the above considerations, it seems that initial conditions were an important factor in explaining why some economies were relatively less affected by the crisis, were able to implement countercyclical policies, or both. More generally, it can be argued that better macroeconomic policy frameworks in a number of economies increased the level of credibility of the monetary and fiscal authorities. As a result, at the time the crisis hit these economies, policymakers enjoyed more degrees of freedom to stimulate the economy. In the next sections, these issues are illustrated through a number of numerical exercises with a small-scale macroeconomic model, which helps to rationalize emerging economies' experience during the recent crisis.

### 3 The Model

This section describes the small-scale New Keynesian model used in this paper. It corresponds to the type of models termed “hybrid”, which include both forward- and backward-looking elements, and it is similar to that used by Sidaoui and Ramos-Francia (2008).<sup>2</sup> However, the model in this paper incorporates the possibility of a sudden reversal in capital flows, as well as a fiscal policy rule.

As previously mentioned, the lesser access to external financing associated with “sudden stop” episodes, entails a sharp contraction in domestic absorption and output, and triggers a depreciation of the real exchange rate. These episodes can be driven either by domestic factors, such as weak fundamentals, or global factors, such as an increase in risk aversion among international investors. The model assumes that the trigger is a deterioration in market participants' sentiment, which is reflected in a sharp increase in the risk premium. That is, the reversal in capital flows is incorporated as a shock to the risk premium, and it is consequently an exogenous event.<sup>3</sup>

The model consists of five behavioral equations and one identity: a Phillips curve for inflation (equation (1)); an IS equation for the output gap (equation (2)); an uncovered interest rate parity

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<sup>2</sup>It is now customary to add lagged variables to New Keynesian models, usually to improve their fit to the data. “Hybrid” New Keynesian models can be found in Adolfson et al. (2008); Christiano et al. (2005); Del Negro et al. (2007); Galí and Gertler (1999); Galí et al. (2005) and Rudd and Whelan (2006), among others.

<sup>3</sup>Similarly, Gomez (2004) includes this type of shock in a gap model to analyze the “fear of floating” phenomenon under inflation targeting.



condition for the nominal exchange rate (equation (3)); a Taylor-type rule for the nominal interest rate (equation (4)); a structural balance fiscal rule (equation (5)); and an identity for the real exchange rate (equation (6)). Finally, the dynamics in the model are driven by a risk premium shock that follows an  $AR(1)$  process (equation (7)). It should be noted that this is a gap model where lowercase letters indicate percentage deviations from steady state values:

$$\pi_t = a_1\pi_{t-1} + a_2E_t(\pi_{t+1}) + a_3x_t + a_4(e_t - e_{t-1}), \quad (1)$$

$$x_t = b_1x_{t-1} + b_2E_t(x_{t+1}) - b_3(i_t - E_t(\pi_{t+1})) + b_4q_t - b_5\theta_t - b_6f_t, \quad (2)$$

$$e_t = E_t(e_{t+1}) + i_t^* + \theta_t - i_t, \quad (3)$$

$$i_t = c_1i_{t-1} + c_2\pi_t + c_3x_t, \quad (4)$$

$$f_t = \tau x_t, \quad (5)$$

$$q_t \equiv q_{t-1} + (e_t - e_{t-1}) - \pi_t + \pi_t^*, \quad (6)$$

$$\theta_t = \rho\theta_{t-1} + \varepsilon_t, \quad (7)$$

where,  $\pi$  is the inflation rate,  $\pi^*$  the external inflation rate,  $x$  is the output gap,  $e$  is the nominal exchange rate,  $q$  is the real exchange rate,  $i$  is the nominal interest rate,  $i^*$  is the external nominal interest rate,  $\theta$  is the risk premium, and  $f$  is the fiscal balance. Notice that in this model trend inflation is assumed to be constant and equal to zero, which can be interpreted as the result of a successful inflation targeting central bank with an inflation target equal to zero.

In the model, the risk premium shock affects the economy through the following channels:

1. An increase in the risk premium triggers a nominal exchange rate depreciation (equation (3)). In turn, a higher level of the nominal exchange rate tends to increase the inflation rate (equation (1)). The pass-through from the nominal exchange rate to inflation depends on the value of  $a_4$ , which is assumed to be positive and lower than one.
2. Since there is not a complete pass-through from the nominal exchange rate to inflation, there is also a depreciation in real terms (equation (6)). In turn, the real exchange depreciation tends to increase the output gap (equation (2)). This positive effect can be rationalized by assuming that the change in relative prices associated with the real depreciation boosts net exports, which has a favorable impact on economic activity. The increase in output generates inflationary pressures (equation (1)).
3. There is also a direct negative effect of the risk premium shock on the output gap (equation (2)). Given the sudden increase in the cost of foreign financing, it can be argued that domestic agents have to adjust their spending patterns, which negatively affects output. In fact, a number of studies have documented a negative correlation between economic activity and sovereign risk indicators (e.g., Neumeyer and Perri, 2005; Uribe and Yue, 2006). By depressing economic activity, the risk premium shock exerts downward pressures on inflation.

In principle, depending on which of the above effects dominates, an increase in the risk premium

can lead to different outcomes, such as inflation and a negative output gap, deflation and a negative output gap, and even inflation and a positive output gap.

As for the fiscal policy, the government follows a structural balance fiscal rule. Following Medina and Soto (2007), the structural balance (SFB) is defined as the fiscal balance minus the cyclical fiscal income. The latter is the difference between the observed fiscal revenues and those revenues corresponding to the economy being at its potential level:<sup>4</sup>

$$\begin{aligned} SFB &= f - \tilde{T}, \\ \tilde{T} &= \tau (X - X^{ss}). \end{aligned}$$

The uppercase letters  $X$  and  $X^{ss}$  represent the levels of current output and potential output, respectively. According to this rule, fiscal authorities run a balanced structural budget over the business cycle. This implies a surplus (deficit) in fiscal accounts whenever the output gap is positive (negative):

$$\begin{aligned} SFB &= 0, \\ f &= \tau (X - X^{ss}). \end{aligned}$$

Given the structural balance fiscal rule, a negative (positive) output gap leads to a deficit (surplus) in the fiscal accounts. In turn, a fiscal deficit, which is associated with an expansionary fiscal policy, has a positive impact on economic activity (equation (2)).<sup>5</sup> It can be argued that a parameterization with the fiscal balance,  $f$ , equal to zero can be interpreted as an economy where authorities keep a balanced budget over the business cycle, which would correspond to a balanced fiscal budget rule (or, equivalently in this model, a  $b_6$  equal to zero).

The values of the parameters use in the numerical exercises fulfill the following criteria: first, the parameter values in this paper are similar to those used in the economic literature (Galí 2008, Sidaoui and Ramos-Francia 2008). Thus, they are in line with empirical studies and consequently have economic sense. Second, the parameters of the Phillips curve and the IS equation used in this paper are chosen such that an increase in the risk premium triggers a nominal exchange rate depreciation, an increase in inflation, and a negative output gap. Third, they satisfy the Blanchard-Khan conditions when the numerical exercises imply modifying the value of one parameter. Finally, it is worth mentioning that the aim is to perform numerical exercises to get insights about those factors that increase policymakers' margin of maneuver to respond to shocks, rather than calibrate the model to a specific economy. Table 1 shows the parameter values used in this paper.

Figure 4 depicts the dynamics of the model. Consider an initial situation where the economy is at its steady state, with an output gap equal to zero and inflation equal to the central bank's objective (zero in this model). Then, a sudden increase in the risk premium hits the economy.

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<sup>4</sup>For simplicity it is assumed that potential output coincides with the steady state level of output. For the same reason, the tax rate is assumed to be fixed.

<sup>5</sup>It is implicitly assumed that a fiscal policy framework based on this rule, allows authorities to run a fiscal deficit in bad times without raising concerns about the long-run sustainability of fiscal accounts.

This shock leads to a nominal depreciation, which tends to move inflation above the target. At the same time, the incomplete pass-through from the nominal exchange rate to inflation leads to a depreciation in real terms.

Although it is assumed that a real exchange rate depreciation has a favorable effect on economic activity, the negative direct effect of the risk premium dominates the positive effect through the real exchange rate. As a result, there is a contraction in output. The central bank responds by loosening monetary conditions. However, given the initial hike in inflation, the initial policy rate cut is moderate. Later, the severe output contraction exerts downward pressures on inflation. In this way, the drop in inflation allows the monetary authority to implement a further reduction in the policy rate. Both inflation and the output gap overshoot their initial values, and finally all variables tend to converge to the steady state.

## 4 Policy Response to Sudden Reversals in Capital Inflows

In this section a number of numerical exercises are performed in order to illustrate how credible monetary and fiscal policy frameworks, as well as favorable initial conditions, can facilitate the adoption of countercyclical policies.

### 4.1 Experiment 1: Credible Monetary Policy

This section uses the baseline model to illustrate how a more credible central bank enjoys more degrees of freedom to respond to the adverse effects related to an episode of a sudden reversal in capital flows, and the corresponding increase in risk premium. The case of a monetary authority with a high degree of credibility may be characterized by an economy with a lower pass-through from the nominal exchange rate to inflation than in the baseline scenario.

In open economies, the exchange rate may affect inflation through different channels. First, economic agents consume not only domestically produced goods and services but also imported goods. To the extent that the latter are included in the consumer price index, there will be a direct effect of the exchange rate to the inflation rate. Second, in many cases imported intermediated goods are used to produce domestic goods. Thus, fluctuations in the nominal exchange rate can affect the inflation rate through changes in the price of these intermediated goods. These can be interpreted as the first round effect of movements in the exchange rate on inflation.

However, apart from the above effects, if the central bank's commitment to price stability is not credible and inflation expectations are not well anchored, a nominal depreciation may also influence domestic prices and thus inflation through second round effects. That is, if economic agents do not trust the monetary authority's compromise to maintain an inflation rate in line with price stability (or with its target, in case it has one) then, given the rise in prices due to first round effects, they may revise their inflation expectations upwards, leading to a widespread rise in prices and consequently to higher inflation levels.

In this context, it can be argued that the higher the degree of central bank's credibility, the lower

the persistence of inflation and the lower the pass-through (Taylor, 2000). In fact, the decrease in the pass-through in developed economies in the last two decades and more recently in some emerging economies, has been attributed by some authors to the adoption of more stable and predictable monetary policies around the world (Mishkin, 2008).

In this section, an economy without pass-through is regarded as an economy with a fully credible monetary authority. Figure 5 illustrates the impact of the risk premium shock on inflation, output gap and real exchange rate, as well as the monetary policy response, for both the baseline model and the model without pass-through. In the latter, the depreciation of the nominal exchange rate does not lead to a rebound of inflation. In fact, inflation falls due to the contractionary impact of the adverse risk premium shock. As for the output gap, the initial drop in economic activity is less severe in the case of the model without pass-through. In particular, given the nominal depreciation, the lower inflation leads to a larger depreciation in real terms, which tends to attenuate the fall in the output gap.

Even though the output contraction is less acute, an inflation rate below the target allows the monetary authority to respond more aggressively by a larger policy rate cut. The central bank starts to increase the policy rate as inflation tends to return to its target and the output gap begins to close. In contrast to the baseline scenario, the dynamics of inflation and the output gap do not imply an important overshooting in these variables. That is, economic activity exhibits a more stable path, which may be associated with a smaller welfare loss due to the adverse external shock.

These results suggest that a central bank that is credibly committed to provide an environment of low and stable inflation over time can enjoy a higher margin of maneuver to respond to adverse external shocks. In particular, it seems to be able to implement larger policy rate cuts that would otherwise be possible without significantly raising inflationary concerns. Furthermore, a credible monetary policy framework should seek to eliminate the trade-off monetary authorities face when assessing the appropriate policy response to an external shock that tends to depreciate the nominal exchange rate. On the one hand, tightening monetary conditions would contain inflationary pressures, but it may intensify the fall in output. On the other hand, a policy cut can contribute to boost economic activity, but it may lead to a higher inflation rate.

In this setting, it can be argued that the higher degree of credibility that monetary authorities can get with their actions aimed at maintaining inflation in line with their price stability objective, not only contributes to the success of monetary policy in normal times, but also allows central bank to respond more aggressively in times of crisis (Orphanides, 2010). Nevertheless, it is clear that central banks' credibility cannot be taken for granted. Thus, it must be permanently defended. In particular, there is no better way to establish a good reputation than for economic agents to see central banks delivering price stability over time.

Hence, one lesson from the crisis is that those institutional arrangements, such as central banks' independence and a monetary policy focused on price stability, that have been successful in anchoring inflation expectations and delivering an environment of low and stable inflation should be

preserved.<sup>6</sup> Otherwise, these institutions may lose the credibility gained by their favorable track record in the last decades.

## 4.2 Experiment 2: Credible Fiscal Policy

The adoption of fiscal stimulus packages to attenuate the adverse impact of external shocks on domestic economies has been an important issue in the policy debate, especially during the recent international financial crisis (Eyzaguirre et al. 2009). In particular, it can be argued that a sudden reversal in capital flows may lead to a sharp adjustment in domestic absorption, and consequently to a severe economic recession. Under these circumstances, an expansionary fiscal policy can partially offset the contraction in private expenditures, and thus ameliorate the drop in economic activity.

Nevertheless, despite the above considerations, a relevant question is how to finance a fiscal stimulus program precisely at a time when external borrowing is more expensive and consequently there is a lesser access to international financial markets. That is, authorities may be significantly constrained by limited access to financing and, in many cases, given a weak fiscal position and high public debt levels in the economy, a fiscal stimulus may not be feasible at all.

Furthermore, the mere intention to run an expansionary fiscal policy may have an adverse effect on financial conditions and interest rates. For instance, the recent crisis has made clear that the increases in fiscal deficits and public debt to GDP ratios associated with the adoption of fiscal stimulus packages can raise concerns about the long-run sustainability of fiscal policy, leading to an even further increase in sovereign risk. This is particularly relevant since a widening in sovereign spreads could reduce the effectiveness of fiscal policy to boost economic activity and preclude the adoption of additional fiscal measures to support the economy.

These considerations are relevant for a number of emerging economies that experienced episodes of fiscal dominance in the past and do not have a long history of sound fiscal policies. Moreover, many times, in these economies temporary surges in government revenues, such as oil windfalls, have been accompanied by sharp increases in public spending and external borrowing.<sup>7</sup> Under these circumstances, it is necessary a fiscal policy framework that allows authorities to save the extraordinary resources associated with surges in fiscal revenues during economic expansions, and to use them to finance expansionary policies during recessions.

A possibility is a structural balance fiscal rule. As mentioned, the structural balance removes the cyclical component of fiscal revenues. Thus, a rule aimed at maintaining a balanced structural budget over the business cycle would operate as an automatic stabilizer. For instance, whenever

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<sup>6</sup>In light of the severity of the recent financial crisis, currently there is a debate about the convenience of central banks having a financial stability objective besides their price stability mandate. Effectively, central banks should consider developments in the financial sector when assessing the proper monetary policy stance, and may have to adopt measures such as lengthening the monetary policy horizon in order to be able to take into account such developments. However, this must not come at the cost of having a monetary authority less committed to price stability.

<sup>7</sup>According to Lane and Tornell (1999), the lack of strong legal and political institutions in emerging economies led to a “voracity effect.” That is, in good times a windfall in fiscal revenues intensifies the struggle for public resources among interest groups, leading to an excessive expansion in public expenditures and wasting extraordinary revenues.

fiscal revenues are above the level of fiscal income corresponding to potential output, the government would run a fiscal surplus and accumulate assets. In turn, during economic contractions when fiscal revenues are below the level consistent with the economy operating at its potential, the fiscal authority will run a deficit. In this way, this rule allows governments to run countercyclical fiscal policies without raising concerns about the sustainability of fiscal accounts.

Figure 6 illustrates the dynamics of the policy rate, the output gap, inflation and the real exchange rate when the economy is hit by a risk premium shock, for both the model with a structural balance fiscal rule, and the baseline model, which can be interpreted as a model with a balanced fiscal budget all the time. Since a structural balance fiscal rule implies a fiscal deficit whenever the output gap is negative, the fiscal authority automatically provides fiscal stimulus once the adverse shock deteriorates economic activity. As a result, the output contraction is less severe.

More interestingly, instead of immediately relaxing monetary conditions, the central bank temporarily increases the policy rate in order to contain the inflationary pressures related to the depreciation of the nominal exchange rate. Later, once inflation falls, the central bank relaxes the monetary policy stance, supporting the fiscal authority in providing economic stimulus. Finally, the output gap, inflation and the policy rate return to their initial levels.

These results may suggest that when an adverse shock, such as a sudden increase in risk premium, leads to both a negative output gap and an inflation rate above the target, the monetary authority can concentrate on the inflation problem, while the fiscal authority implements a countercyclical policy aimed at attenuating the adverse impact on output. Furthermore, when inflation is not a concern anymore, monetary policy can complement the economic stimulus provided by the fiscal authority. That is, both authorities would move in the same direction, and contribute to boost economic activity. In contrast to the baseline case, under the alternative, monetary policy is less expansionary, which is compensated by a fiscal expansion. Finally, this policy mix seems to be associated with a lower volatility in economic activity. That is, the use of two instruments in a coordinated way, the monetary policy rate and the fiscal budget, contributes to the stabilization of the economy.

### 4.3 Experiment 3: Initial Conditions Away from the Steady State

In the previous numerical exercises it was assumed that the economy was at its steady state when the increase in the risk premium occurred. That is, inflation was at the central bank's target and the output gap was zero. However, it should be noted that an adverse external shock, such as a sudden and sharp reversal in financial inflows triggered by global factors, can take place independently of the phase of the business cycle the domestic economy is going through. For instance, an economy can be hit by an external shock at a time when the inflation rate is either above or below the monetary authority's target for inflation. Clearly, the policy response would be different in each of these two situations. Thus, the conditions prevailing in the economy when the sudden stop emerges also affect the scope to provide economic stimulus.

This sub section analyzes how initial conditions can influence central banks' ability to respond

to an episode of a sudden contraction in foreign financing. Figure 7 depicts how the economy evolves in two cases: when the initial inflation rate is above the central bank’s target, and when it is equal to the target. The latter corresponds to the baseline model.

When the economy has a high initial inflation when it is hit by an increase in the risk premium, the central bank is not able to relax monetary conditions immediately, even though the negative shock leads to a negative output gap. Furthermore, given the high level of inflation, the central bank increases the policy rate. Later, once inflation falls due to the output contraction and the monetary policy tightening, the central bank implements policy rate cuts to support economic activity. From that moment onward, the dynamics in both cases seems to be similar.

## 5 Final Remarks

Volatile capital flows is a feature of the global economy. In this setting, emerging market economies have been subject to “sudden stops” in capital flows, with negative consequences for economic activity and financial stability. In particular, these reversals in financial flows are associated with real exchange depreciation, adjustments in domestic absorption, lower output, fall in asset prices and credit contraction. In light of the recent episode of large capital flows going to emerging economies and the corresponding risk of an abrupt reversal in these flows, which has become more acute as a result of the European sovereign debt crisis, a relevant issue for emerging economies’ policymakers is how to cope with the negative impact of “sudden stops” episodes.

The recent experience of emerging markets economies during the global financial crisis suggests that those economies with better fundamentals were relatively less affected by the adverse external shocks, and were able to provide more monetary and fiscal stimulus. This paper presents a small-scale macroeconomic model in order to rationalize the above issues. The model incorporates both the possibility of a sudden reversal in capital flows and fiscal policy rules, and provides a simple analytical framework to study the policy response to adverse external shocks, such as “sudden stops” in capital flows. Through some numerical exercises we analyze the role of credible monetary and fiscal policy frameworks in increasing policymakers’ degrees of freedom to provide economic stimulus during episodes of financial crisis.

On one hand, a higher degree of central bank’s credibility associated with a lower pass-through from the nominal exchange rate to inflation, allows monetary authorities to implement larger policy rate cuts in bad times. On the other hand, a fiscal policy framework that induces authorities to save the extraordinary resources related to economic “booms” and to use them in bad times, allows policymakers to run a countercyclical fiscal policy. The increased margin of maneuver to provide monetary and fiscal stimulus leads to a more favorable evolution of economic variables. For instance, there is a less severe economic contraction, and also lower output gap volatility.

Based on the above considerations, one lesson from the crisis is the importance of strong macroeconomic policy frameworks, which not only help maintain a stable macroeconomic environment in normal times, but also allow authorities to provide more stimulus in times of financial crisis. In this

context, this paper represents a step forward in the analysis of the determinants of policymakers' margin of maneuver to cope with negative foreign shocks.

The results in this paper can be interpreted as a first step in the analysis of those factors behind the increasing margin of maneuver to respond to external shocks, that some economies enjoyed through the recent crisis. Effectively, this study should be complemented with additional work on these issues. In particular, more sophisticated models would allow a more detailed analysis of the propagation of external shocks, and the policy response to them. A richer model would also allow the analysis of other policy instruments such as macro-prudential measures.



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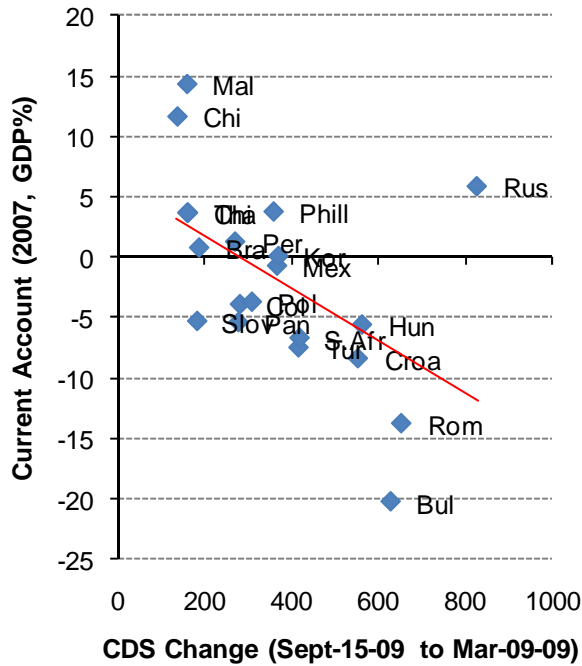
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## Appendix

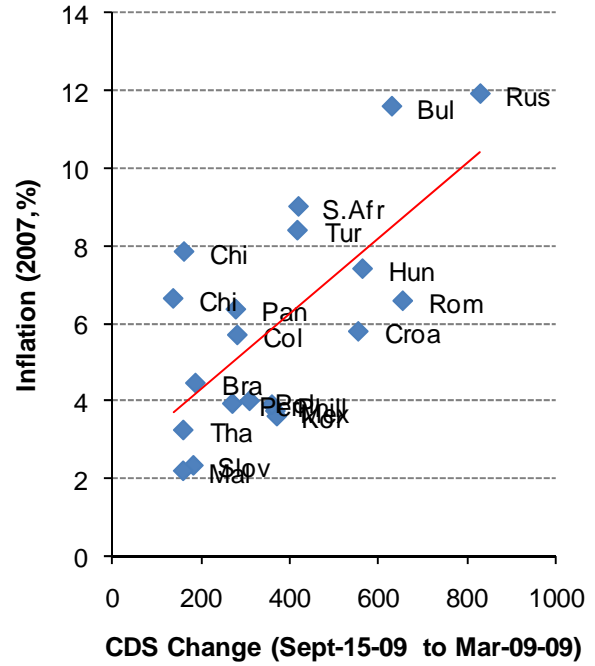
### Figures and Tables

Figure 1

a) Current Account vs CDS Change



b) Inflation vs CDS Change



Source: IMF, Bloomberg.

Notes: Countries included are: Brazil, Chile, Colombia, Mexico, Panama, Peru, Bulgaria, Hungary, Poland, Russia, Turkey, Croatia, Romania, Slovakia, China, Korea, Malaysia, Philippines, Thailand and South Africa.

**a) Current Account vs Policy Rate Change**

Y-axis: Current Account (2007, GDP%)

X-axis: Policy Rate Change

**b) Inflation vs Policy Rate Change**

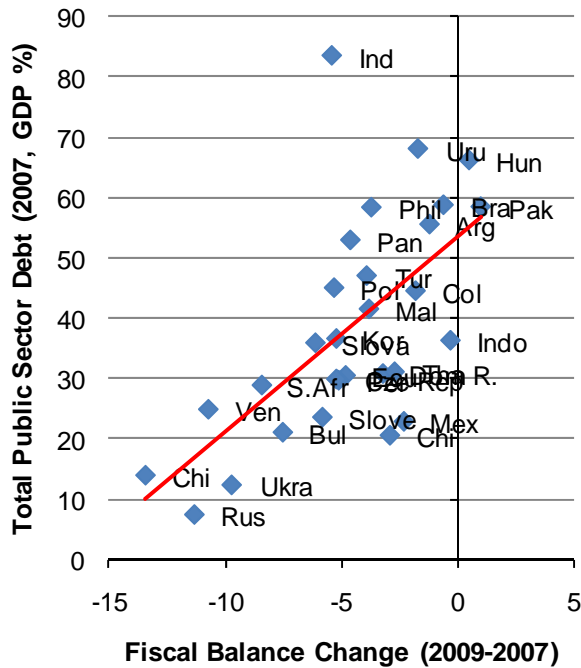
Y-axis: Inflation (2007, %)

X-axis: Policy Rate Change

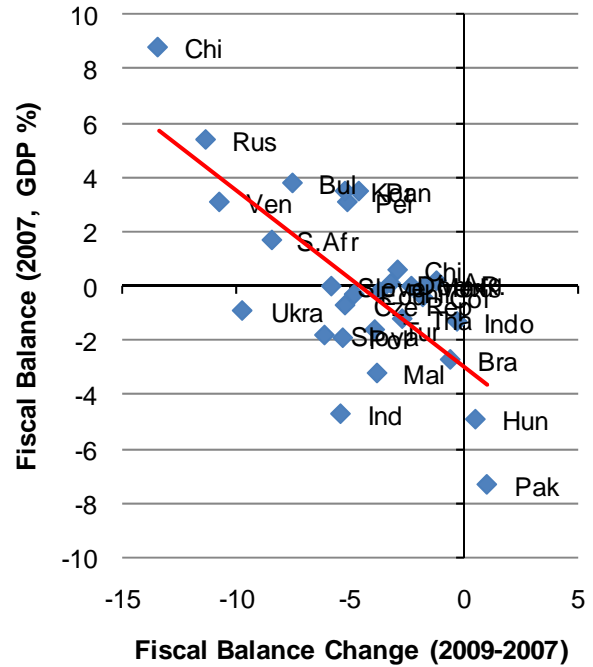
**Notes:** Countries included are: Argentina, Brazil, Chile, Mexico, Venezuela [in figure a], Czech Republic, Hungary, Poland, Russia, Ukraine, Latvia, Lithuania, Croatia, Romania, Slovenia, China, India, Korea, Pakistan, Philippines, Thailand, Singapore [in figure b], South Africa and Israel.

Figure 3

a) Public Sector Debt vs Fiscal Balance Change



b) Fiscal Balance vs Fiscal Balance Change



Source: IMF, JP Morgan.

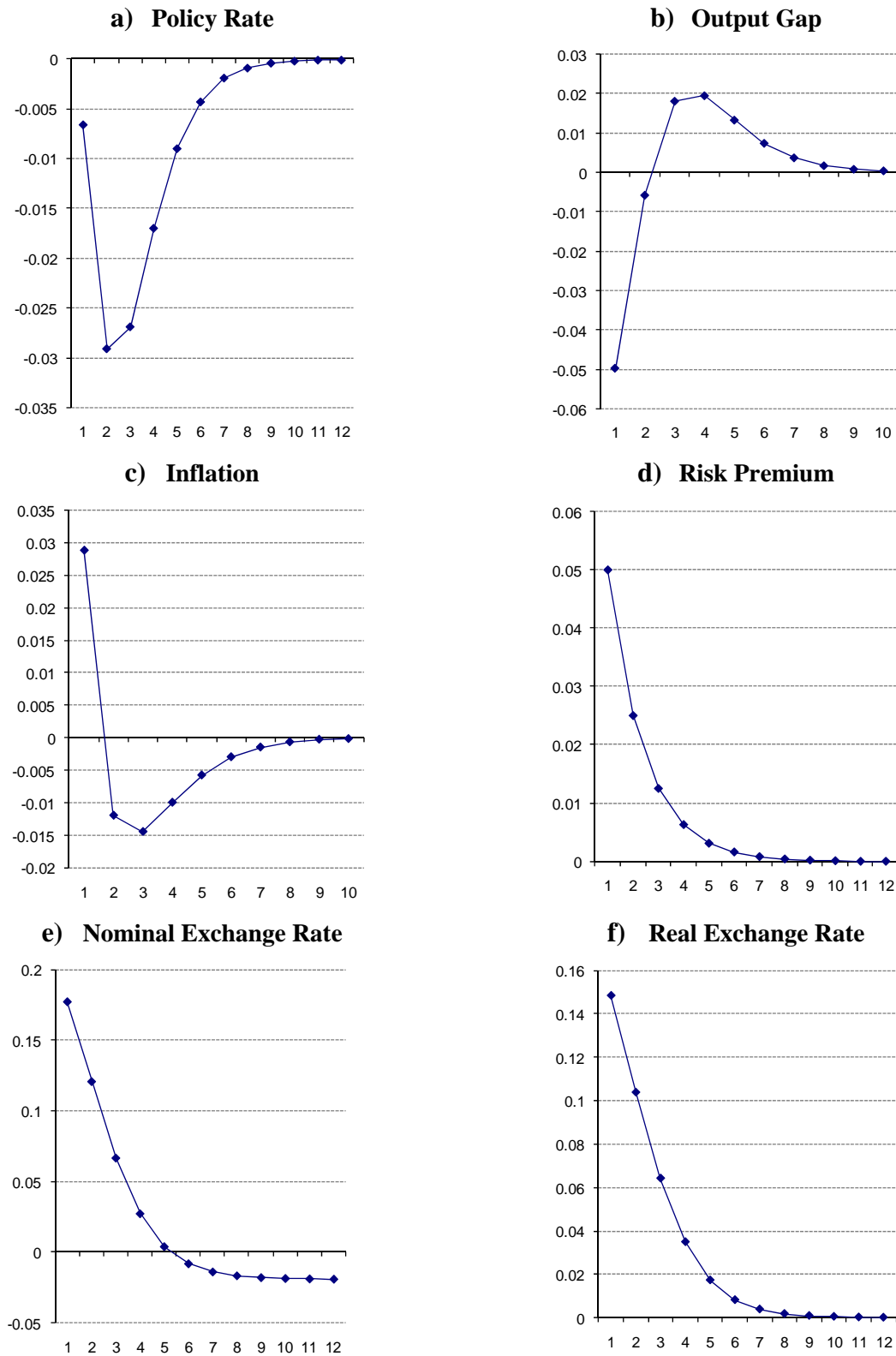
Notes: Countries included are: Argentina, Brazil, Chile, Colombia, Dominican Republic, Ecuador, Mexico, Panama, Peru, Uruguay, Venezuela, Bulgaria, Czech Republic, Hungary, Poland, Russia, Ukraine, Turkey, Slovakia, Slovenia, China, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, Thailand and South Africa.

**Table 1: Parameter Values**

<b>Phillips Curve</b>		
$a_1$	<b>0.25</b>	<b>Lag-Inflation</b>
$a_2$	<b>0.25</b>	<b>Expected Inflation</b>
$a_3$	<b>0.25</b>	<b>Output Gap</b>
$a_4$	<b>0.25</b>	<b>Nominal Depreciation</b>
<b>IS Equation</b>		
$b_1$	<b>0.3</b>	<b>Lag Output Gap</b>
$b_2$	<b>0.6</b>	<b>Expected Output Gap</b>
$b_3$	<b>-0.04</b>	<b>Real Interest Rate</b>
$b_4$	<b>0.7</b>	<b>Real Exchange Rate</b>
$b_5$	<b>-3</b>	<b>Risk Premium</b>
$b_6$	<b>-2</b>	<b>Fiscal Balance</b>
<b>Taylor Rule</b>		
$c_1$	<b>0.8</b>	<b>Lag Nominal Interest Rate</b>
$c_2$	<b>1.5</b>	<b>Inflation</b>
$c_3$	<b>1</b>	<b>Output Gap</b>
<b>Fiscal Rule</b>		
$\tau$	<b>0.3</b>	<b>Tax Rate</b>

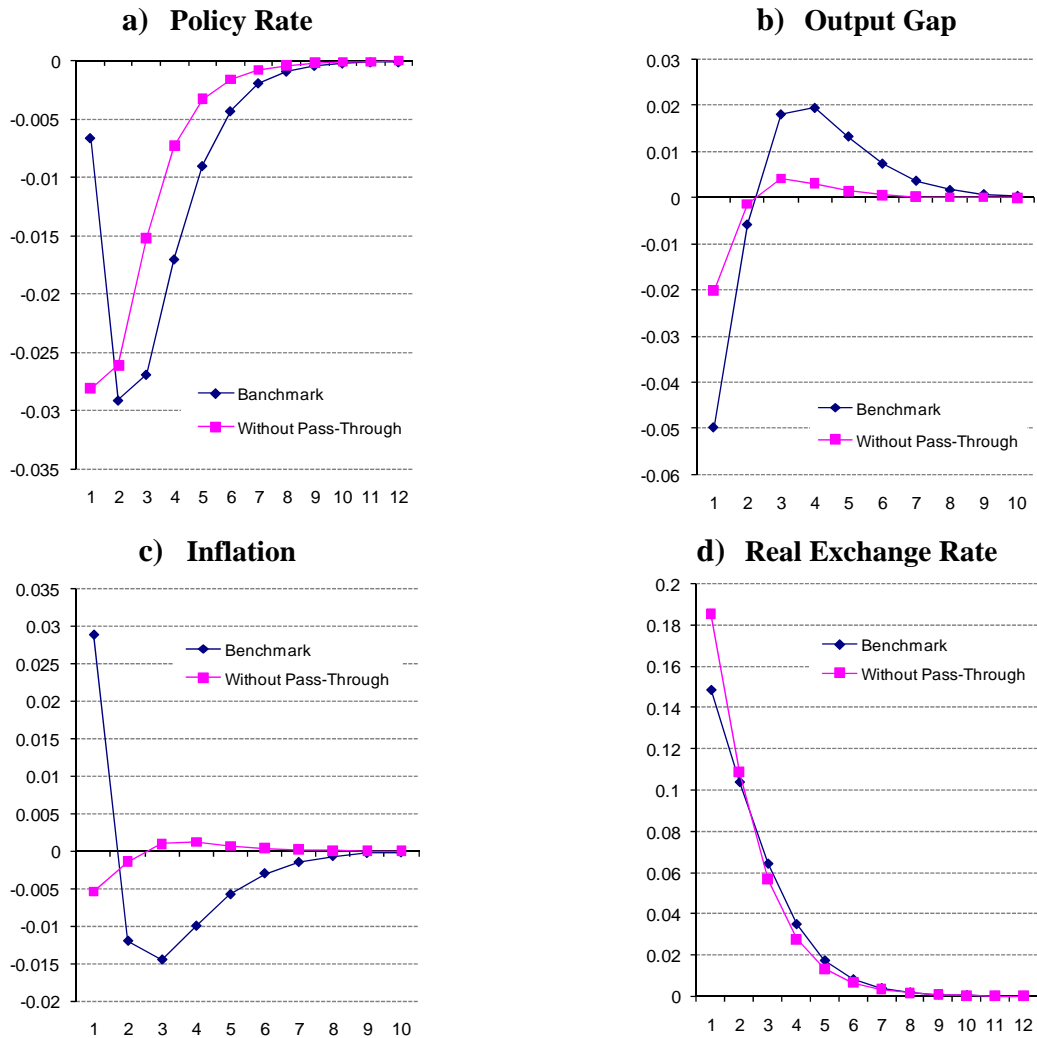
According to the parameter values for the Phillips curve, either a higher lag-inflation or a higher expected inflation tend to increase the current inflation rate. In the same way, an increase in the output gap and a nominal depreciation are associated with a higher inflation rate. As for the parameter values for the IS equation, an increase in either lag output gap or expected output gap, tend to increase current output gap. In turn, an increase in the real interest rate tends to decrease the output gap. A real exchange depreciation has a positive impact on the output gap, while an increase in the risk premium has a contractionary effect on output. Finally, increases in the fiscal surplus or decreases in the fiscal deficit are regarded as contractionary policies, that tend to reduce the output gap. Regarding the Taylor rule, a higher lag nominal interest rate is associated with a higher current nominal rate. Finally, the monetary authority responds to either an increase in inflation or in the output gap by increasing the policy rate.

**Figure 4. Benchmark Model**

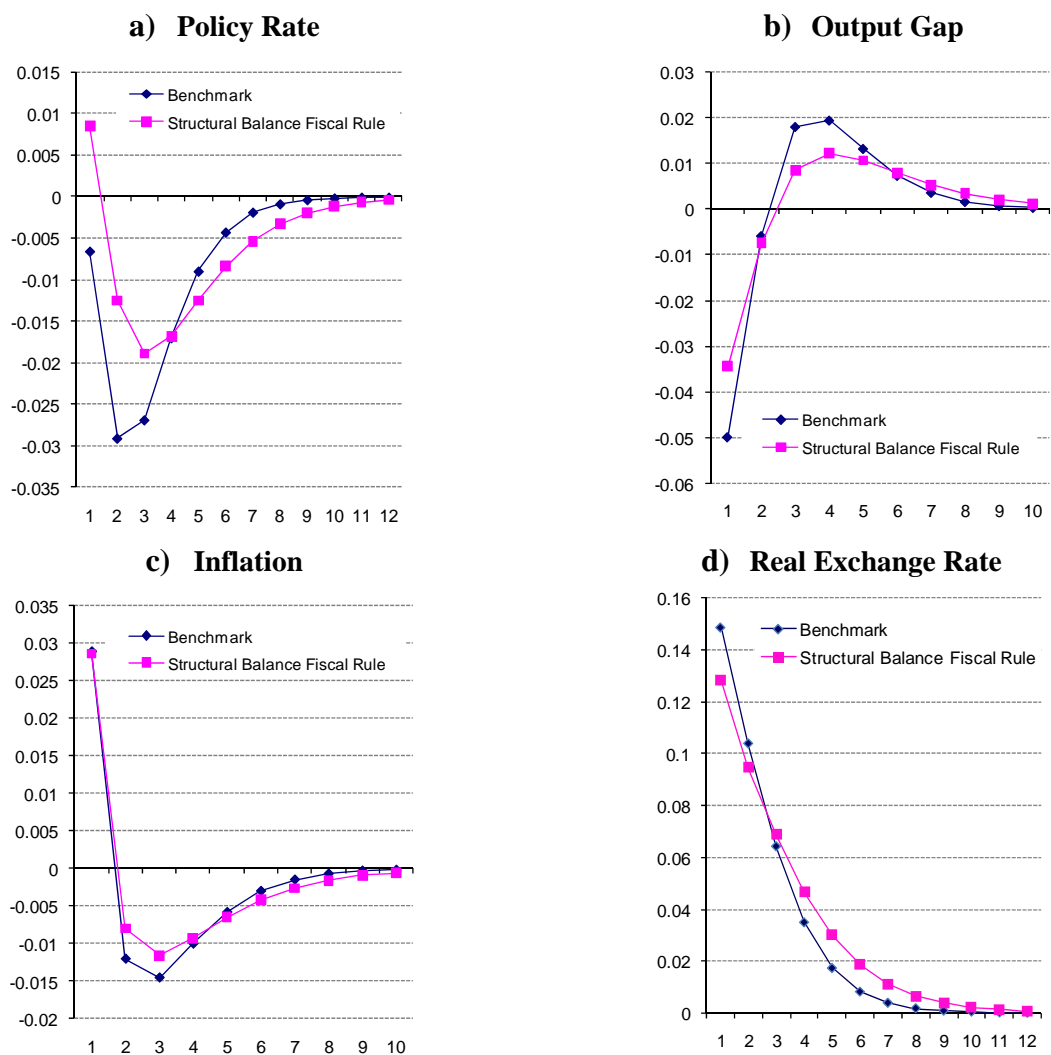




**Figure 5. Credible Monetary Policy**



**Figure 6. Credible Fiscal Policy**



**Figure 7. Initial High Inflation**

