

Multipliers and fiscal and monetary coordination for development in ARGENTINA, BRAZIL, CHILE, and Mexico

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Abstract:

The objective of this paper is to examine the relationship between fiscal and monetary policy coordination and fiscal multipliers in Argentina, Brazil, Chile, and Mexico. To do so, we first look at the theoretical framework of the New Consensus Macroeconomics (NCM), and then analyze the trends in the four countries for variables including consumption, investment, government spending, and interest rates. Finally, we present an estimate of the spending and monetary multipliers with proxy variables. The contribution of this paper consists of one, showing the inexistence of the crowding out effect, and two, quantifying the multipliers for the aforementioned countries.

Key Words: Fiscal and monetary policy, fiscal multipliers, consumption, investment, interest rates.

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I. Introduction

Despite the fact that the most severe effects of the 2008 crisis, such as the lack of liquidity and financial fragility, have receded, Latin America is facing the end of a growth period. The slow recovery of the North American economy, the depreciation of exchange rates as a result of the Federal Reserve's (Fed) monetary policy changes, low momentum in emerging countries, and prolonged stagnation in the European Union are all producing adverse repercussions in the region. The countries examined in this study, Argentina, Brazil, Chile, and Mexico, are exhibiting concerning symptoms, such as excessive price hikes. In particular, Brazil is experiencing low growth; Argentina has debt problems and high inflation; in Mexico, the economy is stagnating and the currency depreciating; and in Chile, Gross Domestic Product (GDP) growth and exports have fallen dramatically.

Although Latin American countries are not in the same position as they were in the 1980s, when they faced external imbalances and high debt, it is likely that the terms of exchange will deteriorate and that these countries will see deficits in their balances of payments. Economists such as Fanelli and Jiménez (2009) have postulated that monetary and fiscal policy must be better coordinated in order for Latin American countries to deal with potential shocks from the international economy. Both the application of non-conventional monetary policy that contributed to the slow recovery in the United States and the failure of fiscal and

monetary policy in Europe have bolstered the argument for coordination between these two types of policies to boost growth with price stability in light of low growth expectations.

Since the 1990s, various Latin American countries, in general, began to introduce an inflation targeting policy. Chile was the first to adopt this plan in 1990, followed by Mexico and Brazil in 1999, while Argentina has preferred a monetary targeting regime (Gómez-Mera, 2011: 243). These policies are still being implemented up to the present day, despite the high cost, in terms of growth, entailed by keeping a tight lid on inflation. Since its launch, Mexico's fiscal policy (to give one example) has been limited to maintaining budgetary balance at any cost, even if this means sacrifices must be made by economic agents.

Policy experts and designers in Mexico wonder whether an increase in the public deficit could provoke a proportionally greater increase in consumption, investment, and output. In theory, this should happen, given certain conditions; that is, output should be driven by the multiplicative effect. However, in practice, as will be seen in these cases, the fiscal multipliers are quite low. This symptom could well explain the low levels of economic growth seen in the aforementioned Latin American countries.

Various economists' viewpoints towards the inflation targeting scheme and monetary policy as the fundamental means to drive it are changing, but in reality, if anything survived the great crisis of 2008, it is this scheme (King, 2014). As such, we have sought to research to what extent these four countries have made an effort to coordinate their monetary and fiscal policies, or, on the contrary, if their central banks have maintained their inflation control policies, working not only with the independence that characterizes them in this age, but also in isolation from the fiscal policy.

The central hypothesis is that government spending multipliers estimated with proxy variables could be very low in these four countries, in some cases less than 1. One of the possible reasons for this situation is the lack of coordination between monetary and fiscal policies. This coordination is missing due to the sacrifices entailed by an inflation targeting policy (ITP).

This paper is divided into the following sections. Section I. Introduction. Section II presents the Theoretical Framework of the New Consensus Macroeconomics (NCM), which consists of neo-Keynesian tenets and the new classical economics, which justifies a monetary targeting or inflation targeting policy. The purpose of Section III is to present an analysis of multipliers based on the specific conditions of the four countries listed. Section IV introduces the stylized facts for the countries considered from 1995 to 2012. Section V estimates spending multipliers in a context of stable prices and balanced public finances using an econometric model drawing on the generalized moments model and proxy variables. With this methodology, we present the values of the fiscal and monetary multipliers, making use of instrumental variables, which, although not incorporated in the principal model, are used as additional information in the relevant estimates.

II. Theoretical framework of the new consensus macroeconomics (NCM)

The macroeconomic theory applied since the 1990s in Mexico, Brazil, Chile, and partly in Argentina, is based on a theoretical framework that combines new classical macroeconomics

and new Keynesian macroeconomics. The analytical structure is commonly known as the NCM. This model, according to Mantey (2009), was developed based on the Fisher interest rate theory, which establishes that money is neutral and therefore does not influence production, employment, investment and, in general, the economic activity level. As such, the demand for money depends on how much households and banks need. When the Central Bank surpasses this demand, the only impact on the economy will be widespread price increases. As such, the main objective of monetary and fiscal policy must be to control price levels.

The NCM is also characterized by other common points. It accepts Say's law of markets, where effective demand does not play a major role in economic activity levels. There is full use of resources, but the NCM recognizes that the existence of information asymmetries could lead to voluntary, frictional, or structural unemployment. The level of economic activity fluctuates around the Non-Accelerating Inflation Rate of Unemployment (NAIRU). An independent Central Bank manages monetary policy by way of the interest rate, which is a short-term driver to control inflation and in the long term, can influence the gap between real and potential output. There must be transparency in monetary policy management so that at times of abrupt economic changes, decisions can be made discretionally.

In mathematical terms, the formulation for a closed economy was set forth by Meyer (2001) in three simple equations in a dynamic model:

$$Y_t^g = aY_{t-1}^g + bE(Y_{t-1}^g) - c[R_t - E(p_{t+1})] + x_t \quad (1)$$

$$p_t = d(Y_t^g) + w_1 p_{t-1} + w_2 E_t(p_{t+1}) + z_t w_1 + w_2 = 1 \quad (2)$$

$$R_t = r^* + E(p_{t+1}) + fY_{t-1}^g + g(p_{t-1} - p^T) \quad (3)$$

Where Y^g is the percentage that measures the gap between the real and potential output, R is equal to the nominal interest rate, r is the equilibrium interest rate, p is equal to inflation, p^T is the inflation target, x and z represent stochastic shocks, E the expectations, and finally, d, w, f , and g are coefficients, all with a positive sign. According to Meyer (2001), Equation (1) contains a dynamic version of the Hicks model IS curve, where the output level (which in this case is the output gap) depends on the interest rate. Equation (2) relates inflation to the output gap, which represents the Phillips curve. Finally, Equation (3) expresses a monetary policy rule.

The foregoing model does not consider relationships with the rest of the world. However, it does provide the basis for an open economy case, which was developed by Arestis and Sawyer (2008) in the following six equations:

$$Y_t^g = a_0 + a_1 Y_{t-1}^g + a_2 E_t(Y_{t-1}^g) + a_3 [R_t - E(p_{t+1})] + a_4 rer_t + s_1 \quad (4)$$

$$P_t = b_1 (Y_t^g) + b_2 p_{t-1} + b_3 E_t(p_{t+1}) + b_4 [E(p_{t+1}) - E_t \Delta er_t] + s_2 \quad (5)$$

$$R_t = (1 - c_3) \left[RR^* + E_t(p_{t+1}) \right] + c_1 Y_{t-1}^g + c_2 (p_{t-1} - p^T) + c_3 R_{t-1} + s_3 \quad (6)$$

$$rer_t = d_0 + d_1 \{ [R_t - E_t(p_{t+1})] - [R_w - E_t(p_w)] \} + d_2 CA_t + d_3 E_t(rer_{t+1}) + s_4 \quad (7)$$

$$CA_t = e_0 + e_1 rer_t + e_2 Y_w^g + s_5 \quad (8)$$

$$er_t = rer_t + P_w - P_t \quad (9)$$

In terms of notation, Y^g , p , p^T , and E have the same meaning as in the previous three-equation model. Y_w^g is the output gap of the world, R_w and p^w are the international nominal interest rate and inflation, respectively, RR^* is the interest rate consisting of the output gap when equal to zero, which means that in the second equation the inflation rate is constant (Arestis, 2009: 4). Additionally, rer represents the real exchange rate and er the nominal exchange rate measured by the foreign currency in terms of the local currency, p_w refers to the log of international prices, CA is the current account of the balance of payments, and s_1 , s_2 , and s_3 are stochastic shocks. The variations in the nominal exchange rate derived from Equation (9) are formulated as: $\Delta er_t = \Delta rer_t + P_w - P_t$.

Following Arestis and Sawyer (2008), Equation (4) is an aggregate demand equation, where the output gap is determined by the past and future gaps of the same output. Equation (5) is a Phillips curve, determined by the current output gap, previous and future inflation, changes in expectations for the nominal exchange rate, and expected international prices. Equation (6) expresses the monetary policy rule, with the nominal interest rate based on expected inflation, the output gap, the deviation of the inflation rate from its target, and the real “equilibrium” interest rate. In Equation (7), the exchange rate is determined as a function of the differentials of the real interest rates, the current account statement, and expectations that the exchange rate will rise (analyzing internal factors, such as the risk premium, domestic public debt, the credibility of the inflation target, etc.). Equation (8) expresses the relationship between the real exchange rate and the domestic and foreign output gaps. Equation (9) reflects the nominal exchange rate as a function of the real exchange rate.

Fiscal and monetary authorities throughout Latin America have based their economic policy decisions on the NCM. This can be seen in Carstens and Jácome (2005), who asserted that the institutional reforms that began in the 1990s to make central banks in Latin America more independent were theoretically grounded in the works of Kydland and Prescott (1977), Barro and Gordon (1983), and Rogoff (1985), all of whom were economists that in large measure created the NCM.

The way in which central banks in Mexico, Brazil, and Chile have operated monetary policy has been influenced by the inflation targeting regime and, therefore, by NCM. Equations (3) from the closed economy model and (6) in the open economy model are the guidelines for the inflation targeting scheme. The control of liquidity by central banks, together with the use of a short-term interest rate and the establishment of transparency policy rules, were all measures aimed at maintaining price stability as a priority objective. In fact, the one-day

interest rate, rather than a quantitative variable, was a measure that the majority of central banks adopted. The principal instrument to move the interest rate consists of open-market transactions that employ repo and reverse repo operations (Cartens and Jácome, 2005: 705). In the case of Mexico, Carstens and Werner (2000) asserted that the combined use of rules and maintenance of the inflation targeting scheme have helped Banco de México maintain growth of the monetary supply in line with the demand for means of payment. Meanwhile, the Brazilian Central Bank uses a policy rate to signal changes in its monetary policy, raising the policy rate (called SELIC) when inflationary pressures wax, and reducing it when these pressures wane (Carstens and Jácome, 2005: 705). The experience of the Brazilian inflation targeting regime has been different from that of Chile and Mexico because the Central Bank maintains the same level of priority for price stability objectives, growth and economic development, operation of the payment system, and financial system stability (Carstens and Jácome, 2005: 688). From 1999 to 2000, inflation registered acceptable figures in terms of Brazil's expected goals. However, in 2001 and 2002, various events, such as the 2001 energy crisis, the crisis in Argentina, and the crisis of confidence tied to the 2002 presidential elections caused a gap to open up between the proposed targets and real inflation rates (Arestis *et al.*, 2008: 11). According to Minella *et al.* (2003), the depreciation of the exchange rate in 2001 contributed 38% of the inflation spike. As a result of this situation, the monetary policy had to operate in consideration of the major significance of exchange rate effects. The case of Chile is perhaps the most relevant example in Latin America of the application of Equations (3) and (6) of the NCM, because this country is considered one of the pioneers, together with New Zealand, Canada, and Australia, in applying an inflation targeting policy. The policy was initially implemented intuitively, coinciding with the return to democracy, a solid fiscal position, and strong external accounts. However, inflation was at 27%. This was one of the biggest economic challenges facing the government for Chile to overcome. In the next phase, the inflation targeting policy operated to give full autonomy to the Central Bank to be independent from the government, both in terms of instruments and target-setting (Schmidt-Hebbel and Tapia, 2002: 129). Finally, Argentina is an example of a unique situation where the priority objective of the Central Bank is price stability, to which financial system stability is subordinated. However, the operative variable is not the interest rate, but rather the monetary base (Carstens and Jácome, 2005: 706).

The macroeconomic NCM and its economic policy implications have been subject to criticism. The first of these critiques is that price stability comes at a high cost for exchange rate stability. For example, Galindo and Ros (2008) asserted that the inflation targeting regime tends towards monetary overvaluation, due to an asymmetric foreign exchange policy that neutralizes the pressures of devaluation and tends not to neutralize the pressures of monetary overvaluation; as a result, after very low levels of inflation, devaluation could occur. These authors suggest that in order to resolve external restrictions on growth and avoid overvaluation of the exchange rate, an exchange rate regime should be maintained that permits the devaluation of the nominal exchange rate in order to hold steady a real and stable exchange rate (Mántey, 2013: 11).

The second critique is related to the contradiction found between NCM in theory, which refers to a free floating currency, and NCM in practice, as central banks that have adopted the inflation targeting regime still intervene in the foreign exchange markets. In regard to this paradox, Capraro and Perrotini (2011) found, using EGARCH and EFT models, that even though banking institutions deny that their interventions truly have an impact on the currency markets, consistent with the inflation rule, in the case of Mexico, this is not true. The results

of these models show that sterilized interventions in the currency market have proved effective in controlling the rates and, therefore, inflation. In line with this critique, García and Perrotini (2014) obtained econometric results for Brazil, Chile, and Mexico that suggest dependency between inflation control and currency appreciation. In summary, the currency appreciation policy is employed to stabilize prices, even if it destabilizes the currency afterwards.

III. Literature review regarding coordination and the economic particularities of multipliers

It is in the European Union where innovations, operations, and agents that play a role in coordination between monetary and fiscal policy have appeared. Analyzing the concept of coordination has become increasingly popular in the wake of the 2007 crisis, and authors have proposed various forms of coordination that can be reviewed in a paper by Panico and Purificato (2013). However, this debate is not new; it rather finds its origin in the work of the great economist J. M. Keynes (1936), who asserted that the effects of an isolated monetary policy would be null. Some time after Keynes we have Samuelson (1956), who argued that the Central Bank and the Treasury should be coordinated for the good of the country, that is, to attain economic stability. The topic is even more important when dealing with the relationship between spending multipliers and coordination. According to a simulation conducted by Eggertson (2006), when the monetary and fiscal policies are coordinated, the spending multiplier is higher than when coordination is non-existent.

In addition, when the concept of the government spending multiplier emerged, it was not yet clear if it would apply at all times and in all places in order to explain how a spending increase would generate a more than proportional stimulus on effective demand, GDP, and employment. Recently, economists have deduced the results of the multiplier based on the particularities of each economy. The diversity of outcomes has depended on various factors of the economy under study, such as whether the study looks at the long or short term, if the economy is open or closed, if the economy is depressed, if the country is underdeveloped or developed, if debt exceeds a certain threshold and, finally, if there is coordination between the fiscal and monetary policies.

Locarno *et al.* (2013) stated that in the short term, multipliers related to taxes are lower than those tied to public spending. The spending multiplier will be greater than 1 when the monetary policy rate is held constant at the Zero Lower Bound (ZLB).¹ In this sense, government spending can drive economic activity only if hours worked rise. The capital stock cannot be adjusted instantaneously, and technical progress does not respond to fiscal stimuli. Thus, the short-term output can only rise if there is an increase in the labor used. The value of the fiscal multiplier therefore depends on: 1) duration of stimulus measures; 2) how spending is funded; 3) whether monetary policy responds or not; and 4) the initial conditions in the country.

¹ Zero Lower Bound refers to a macroeconomic situation in which the short-term interest rate is equal or close to zero, which causes a liquidity trap and limits the capacity of central banks to stimulate economic growth.

Gali *et al.* (2007) showed that demand stimuli increase the multiplier as long as two ingredients are added: 1) a sufficiently high weight of rule-of-thumb consumers, who help to maintain marginal propensity to consume and 2) an elastic labor supply that indicates a certain trend towards an increase in the number of workers willing to offer the higher number of hours that companies demand.

In the case of severely depressed economies, when the interest rate is close to ZLB level, governing spending is able to increase aggregate demand to a greater extent in times of recession than in times of prosperity, in particular, when the monetary policy interest rate is stuck. Examples of this situation can be seen in works by Christiano *et al.* (2011) and Woodford (2011). Moreover, in a depressed economy, hysteresis is important. Once the impact of additional government purchases on production has been accounted for, they become big enough to finance themselves. Blanchard and Summers (1986) and De Long and Summers (2012) asserted that temporary scarcity of aggregate demand can permanently reduce supplies. As such, any policy that can avoid this result is worthwhile to implement, in particular, a temporary increase in public spending not only can have a great impact on production and help bring recessions to an end, but also can guarantee permanent increases in production at no cost.

In terms of the relationship between multipliers and debt, Blanchard (1990) proposed a model that establishes that the fiscal multiplier can be inversely proportional to gross debt and GDP. When a government consolidates its budget standing, it affects expectations, and therefore, consumption, in two ways. First, looking at the inter-temporal distribution of future taxes at present value, it is likely that the fiscal burden on current taxpayers will rise and consumption will fall. This is a conventional effect and its strength depends on how the economy moves away from the Ricardian equivalence benchmark. Second, by adopting certain measures, the government eliminates the need for big adjustments, which are much more disruptive in the future. As a result, it does away with the danger of a low rise in consumption. Third, consolidation can be associated with a substantial drop in uncertainty, which leads to a reduction in the following: 1) precautionary savings and 2) the value of the choice to wait, for consumers and companies.

One very important situation for our research is the distinction between the value of the multiplier in developed and underdeveloped countries. Ilzetzki *et al.* (2010) estimated fiscal multipliers for 44 countries, 20 of which were developing and 24 developed. They found that government consumption has a lower effect in the short term and a less persistent effect on output in developing countries than in high-income countries. The short-term government consumption multiplier is lower in terms of impact, but the long-term fiscal multiplier varies considerably. In economies closed to international trade or with fixed exchange rates, they found substantial effects of government consumption on gross output in the long term. By contrast, in open economies or those operating with flexible exchange rates, fiscal expansion brings with it insignificant gains for output. On the other hand, they found evidence that fiscal stimuli are counterproductive in highly indebted countries, specifically, in developing countries with ratios of 50% or more of gross output. Abrupt changes in government consumption have strong negative effects on output and employment.

Decisions to increase spending, debt, or the deficit must take into account an estimate of fiscal multipliers, especially if the idea is to drive growth in economies that have long been stagnated. It is known that in developed economies, increasing public spending can have greater multiplicative effects than in underdeveloped economies. According to *The Economist* (2013), in Nordic countries, the governments cost less, which could mean less

capital waste and higher multiplicative effects for spending. There is a relationship between the characteristics unique to a country and the multiplier. In the following section, we will address this problem.

IV. Stylized facts

Pursuant to the theoretical and conceptual aspects of the coordination of monetary and fiscal policy that we examined earlier, fiscal policy cannot be subordinated to monetary policy. Low inflation combined with expansive fiscal policy can be achieved without sacrificing growth; in other words, driving effective demand to raise employment does not necessarily give rise to strong inflationary processes.

Figure 1 reveals that both Brazil and Argentina have experienced a change in economic policy since early 2000, where curbing inflation has not been a priority. As Moreno-Brid and Paunovik (2006) suggested, the governments in these countries seem to accept, within certain parameters, the existence of higher inflation as long as it comes with higher economic growth rates. On the contrary, the economies of Chile and Mexico have the lowest inflation, which would seem, at first glance, to indicate that the economic policy in these countries has prioritized price stability and to achieve it, their officials have rigidly adhered to the inflation targeting regime. In this sense, fiscal policy would be subordinated to monetary policy, restricting growth.

The case of Chile does not permit us to draw this conclusion, but in Mexico, this situation can be verified. The Chilean economy with low inflation grew on average more than the Mexican economy in the time period from 2003 up to the 2008 crisis (see Figure 2). In this comparison, it would not be outlandish to associate Chile's success with innovations in its economic policy design that bring it much closer to the concept of coordination. By contrast, policies in Mexico have tended closer to the trends set by the inflation targeting scheme. One powerful reason that authorities have used in justifying prioritization of inflation targeting over coordination is based on an expansionist government policy that produces the opposite of what is expected. A rising deficit increases the demand for credit and this pushes interest rates up. The bank resources that the private sector could use on investment and consumption are siphoned to the government and growth falls. As such, what occurs is something known in the literature as the crowding out effect.

While economists such as Barro (1986) uphold that an increase in public spending produces known effects, such as crowding out (falling household income and therefore a drop in consumption), other neo-Keynesian economists, such as Blanchard (2008), admit that there is no widespread empirical evidence that supports this theory. Nor can such effects be generalized to the four countries we are researching for the time period 2000-2013. For example, the positive relationship between the expansion of public spending, investment, and consumption in Brazil did not generate an increase in interest rates (see Figures 2 and 3). As shown in Figure 2, from 2000 to 2013, with the exception of recession years, when public spending rose, so too did investment and consumption. Despite the large demand for financial resources that this could entail, interest rates did not rise, but rather fell, a fact that can be observed in Figure 3.

Source: Created by the authors based on CEPALSTAT data.

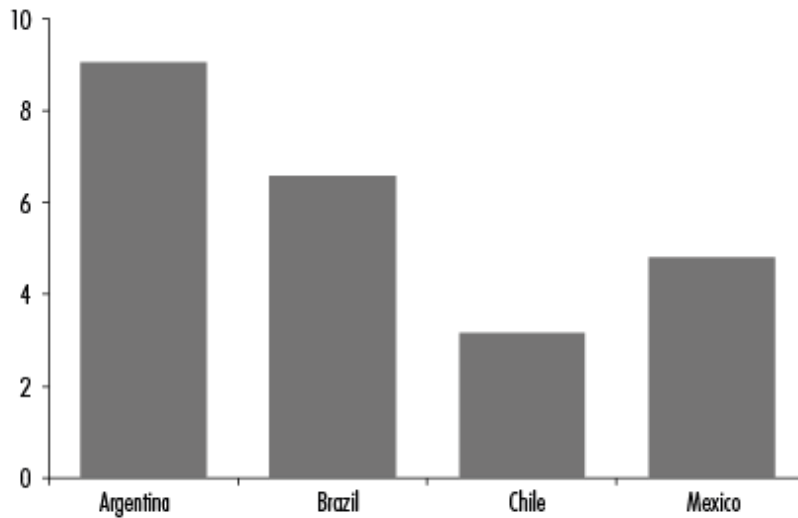


Figure 1. Average Inflation from 2000 to 2013 (2005=100)

Barro's thesis does not seem to be verified in Brazil, Mexico, and Chile, because rising public spending has coincided with falling interest rates. In the meantime, in all four countries, consumption, investment, and the GDP have maintained a "certain" growth level, except during times of recession. Rising rates in Argentina, by contrast, do not seem to be the result of spending increases, but rather due to decisions made by the Central Bank to mitigate pressures on the exchange rate as one of various measures to influence inflation.

Since 2005, at various points in time, alarm bells have sounded about potential financial unsustainability in Argentina. Paul Krugman (2014) referred to the most recent situation of instability as the return of macroeconomic populism in Argentina. At that time, he asserted that the monetary and fiscal stimulus policies (especially the inflation targeting policy) applied in the United States increased the money supply in circulation, but did not bring about price increases, while in Argentina, prices rose with these policies.

Source: Created by the authors based on CEPALSTAT data.

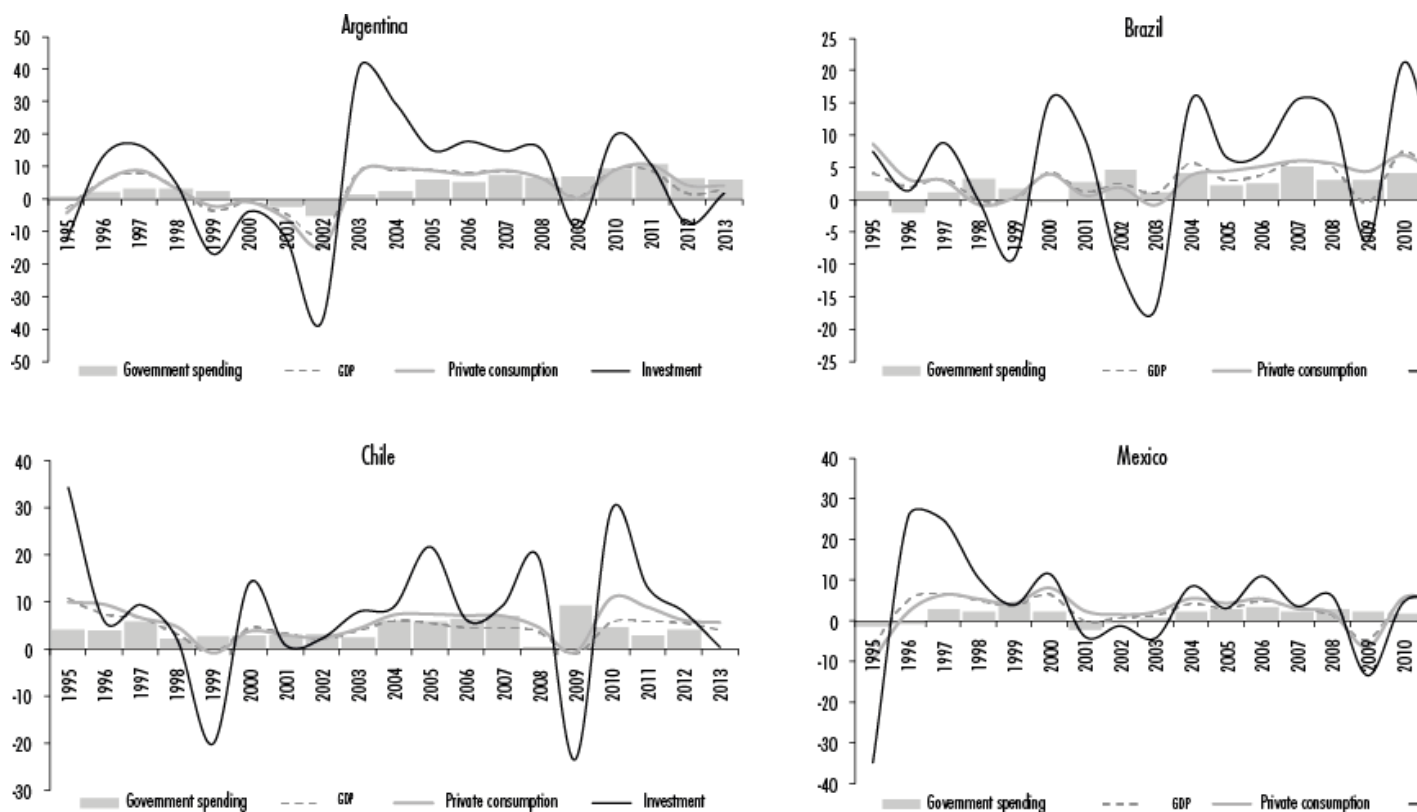


Figure 2. Growth of Government Spending, Consumption, Investment, and Real GDP (1995-2013)

Source: Created by the authors based on CEPALSTAT data.

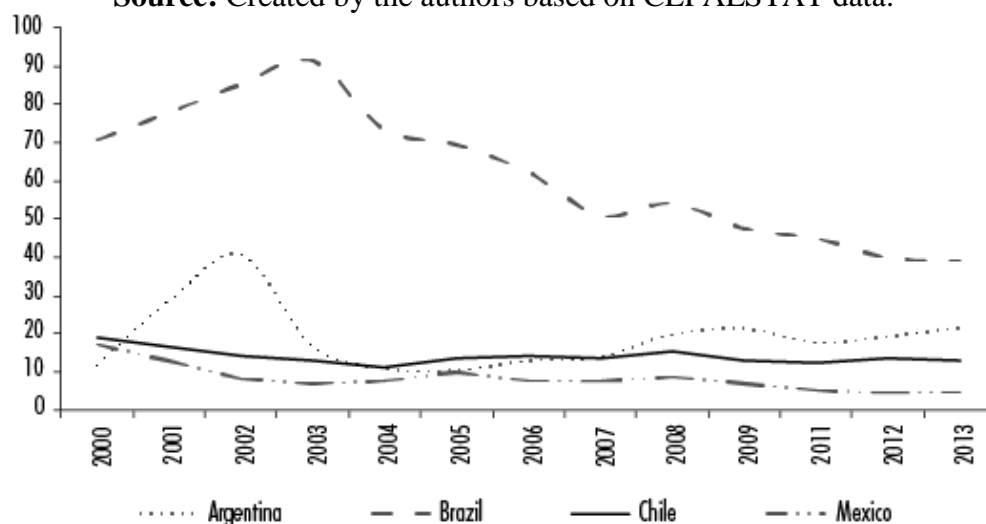


Figure 3. Interest Rates in Argentina, Brazil, Chile, and Mexico (2000-2013)

Opposite of forecasts, instability in Argentina eased and expectations of a devaluation faded. What happened? Why was there no crisis like at the end of the 1990s and beginning of the 2000s? Some analysts think that it was a matter of the training of the economic officials; in other words, the orthodox stance of the director of the Central Bank was compensated for by the Keynesian background of the Minister of Economy and the Treasury. When the Treasury

seeks to accelerate growth by expanding the deficit, the Central Bank raises interest rates to slow exchange rate speculation. It seems that, although this has not been simple, there are signs of implicit coordination between the two institutions. Neither of them is fighting with the other over which entity can offer more effective solutions.

What seems to have toned down the alarm bells of potential bankruptcy for the Argentine economy is the existence of a coordination mechanism, which, although it has not reduced inflation, has maintained growth. Economists such as Ocampo (2009) have found a mechanism that in Argentina worked well before the crisis, which consists of complementarities between the objective of sustaining the competitiveness of the exchange rate and a countercyclical fiscal policy based on a fiscal surplus (which has been deteriorating). In summary, the trends in Brazil, Mexico, and Chile do not point to the existence of crowding out effects, while in Argentina, interest rates spiked somewhat after 2008, but consumption and investment rose.

V. Estimates: multipliers and policy impact

We estimated the multipliers independently for each country we studied, using the Generalized Method of Moments (GMM), which offers the advantage of not requiring in its specification a likelihood function, but rather providing a convenient computing method to estimate non-linear dynamic models. Consistency depends only on the correct specification of residuals and conditioning variables. Likewise, it permits estimates with correlated variables (Brufman and Urbisaia, 2009).

One tenet of GMM is that in random samples, a sample statistic will likely converge towards a constant, which is in turn a function of unknown parameters, $\theta(k \times 1)$, which characterizes the density function of the variable, so that the population moments of the distribution will be a function of the same, such that $E[y_t^i] = \mu_i(\theta)$. To estimate the k parameters, the corresponding sample moments are calculated and equalized with the population moments (Hansen, 1982; Chumacero, 1997; Greene, 1999; Brufman and Urbisaia, 2009).

The econometric methodology specifies certain conditions of orthogonality, that is, conditions of the moments and not of the density function as such. The existence of said conditions refers to the fact of the hope that the cross product between random disturbance and observable variables in an econometric model be equal to zero. Non-observable random disturbances can be replaced by an equivalent expression that is in the form of a function of the true parameter vector and the observed variables. Similarly, GMM offers consistent estimators under a general assumption of stationarity, continuity of functions, and the conditions established for moments (Hamilton, 1994; Chumacero, 1997; Brufman and Urbisaia, 2009).

In the estimation of the multipliers in the model for each country, an instrumental variables vector (vector Z_t) was added, which is composed of consumption, government spending, the inflation rate, investment levels, money supply in circulation, and GDP level. Moreover, other lagging variables were added in the time period. The variables are in logarithms in order to measure their growth rate, and they were obtained from the CEPALSTAT databases kept by the Economic Commission for Latin America and the Caribbean (ECLAC). The model that was estimated independently for each country is as follows:

$$PIB_t = \beta_1 g_t + \beta_2 m_t + u_t \quad (10)$$

Government spending (g_t) and money supply (m_t) are used as proxy variables for fiscal and monetary policy, respectively. Aiming to deduce that there is coordination between the aforementioned policies in each country, the statistical significance for each variable was expected to be positive with a positive term and greater than 1. Table 1 shows the results of the government purchases multipliers for Argentina, Brazil, Mexico, and Chile. For the case of Argentina, growth in government spending as a proxy variable for fiscal policy is statistically significant, with a fiscal multiplier of 1.13, while growth of the money supply, as a proxy variable of the monetary multiplier, was not statistically significant for GDP growth.

Source: Created by the authors based on CEPALSTAT data.

<i>Argentina</i>			
<i>Variable</i>	<i>Coefficient</i>	<i>t Statistic</i>	<i>Prob.</i>
Fiscal	1.1268	9.8706	0.0000
Monetary	-0.1785	-1.1457	0.2711
<i>Brazil</i>			
<i>Variable</i>	<i>Coefficient</i>	<i>t Statistic</i>	<i>Prob.</i>
Fiscal	0.5014	0.2411	0.0564
Monetary	0.3275	0.1157	0.0134
<i>Chile</i>			
<i>Variable</i>	<i>Coefficient</i>	<i>t Statistic</i>	<i>Prob.</i>
Fiscal	0.0089	0.0933	0.9254
Monetary	0.5859	0.0438	0.0000
<i>Mexico</i>			
<i>Variable</i>	<i>Coefficient</i>	<i>t Statistic</i>	<i>Prob.</i>
Fiscal	0.8052	0.0512	0.0000
Monetary	0.2177	0.0167	0.0000

Table 1. Parameters of the Multipliers and Their Statistical Significance

In the case of Brazil, the null hypothesis (H_0) that the fiscal multiplier is not significant is not rejected, but the H_0 for the monetary multiplier is rejected. The same is true of the case of Chile, where government spending is not significant, but the money supply is. In both cases, policies are isolated and do not exercise influence over growth of the aggregate output. The situation in Mexico reveals that both policies are statistically significant, demonstrating that the two work in coordination; however, the multiplier is less than 1.

The econometric tests suggest that isolated application of these policies does not exercise influence over GDP in the cases of Brazil, Argentina, and Chile, because their effects are not positively channeled as they would be if there were coordination, as the theory asserts. Table 2 displays the orthogonality tests for the instruments (C-Test or Eichenbaum test). The test behaves with Chi-squared probability, in other words, the instrumental variables used are orthogonal in their entirety for the countries under study.

Source: Created by the authors based on data from Table 1.

<i>Variable</i>	<i>Argentina</i>	<i>Brazil</i>	<i>Chile</i>	<i>Mexico</i>
	<i>Prob.</i>	<i>Prob.</i>	<i>Prob.</i>	<i>Prob.</i>
Consumption	0.7805	0.7526	0.7959	0.8887
Fiscal policy	0.9857	0.8927	0.4775	0.8268
Inflation	0.9985	0.8932	0.4013	0.9579
Investment	0.9307	0.8279	0.8742	0.8583
Monetary policy	0.9364	0.8807	0.6202	0.8987
GDP	0.8114	0.8104	0.819	0.8445
Consumption (-1)	0.9678	0.9288	0.3509	0.9647
Fiscal policy (-1)	0.9299	0.8331	0.845	0.858
Inflation (-1)	0.9182	0.7969	0.6845	0.9169
Investment (-1)	0.9972	0.9589	0.9321	0.9015
Monetary policy (-1)	0.8114	0.8114	0.5394	0.7356
GDP (-1)	0.9942	0.7941	0.4483	0.9194

Table 2. Orthogonality Tests

Table 3 displays the probability statistic of the Durbin-Wu-Hausman test of endogeneity for the variables used, which measure fiscal and monetary policy, which consists of looking for whether the variables are endogenous (explained by the instruments) or exogenous (not explained by the instruments). Based on this, it was derived that the variables used as proxies for the fiscal and monetary policies are explained by the instruments and are therefore endogenous.

Table 4 introduces the probabilities with respect to the structural breaks test (LR-type test from Andres and Fair and O-type test from Hall and Sen). The following periods were chosen: 1) 1999 and 2000, due to the crises registered in this period, including the effects of the Asian, Brazilian, and Argentine crises, as well as the dotcom crisis in the United States and 2) 2007 and 2008 to consider the effects of the subprime mortgage crisis in the United States. The tests behave with Chi-squared probability, while the results reveal that for the time periods chosen, there are no structural breaks in any of the specifications carried out. This points to the lack of any major break that would need a specification independent from the models established.

Source: Created by the authors based on data from Table 1.

<i>Argentina</i>	
<i>Variable</i>	<i>Probability</i>
	0.0000
<i>Brazil</i>	
<i>Variable</i>	<i>Probability</i>
	0.0000
<i>Chile</i>	
<i>Variable</i>	<i>Probability</i>

	0.0000
<i>Mexico</i>	
<i>Variable</i>	<i>Probability</i>
	0.0000

Table 3. Endogeneity Tests

Source: Created by the authors based on data from Table 1.

	<i>Argentina</i>		<i>Brazil</i>		<i>Chile</i>		<i>Mexico</i>	
	<i>Andrews and Fair</i>	<i>Hall and Sen</i>	<i>Andrews and Fair</i>	<i>Hall and Sen</i>	<i>Andrews and Fair</i>	<i>Hall and Sen</i>	<i>Andrews and Fair</i>	<i>Hall and Sen</i>
1999	-	0.9999	-	0.9999	-	0.9999	-	0.9999
2000	0.0000	0.9996	0.0000	0.9991	0.0000	0.9998	0.0001	0.9996
2007	0.0000	0.9997	0.0000	0.9997	0.0000	0.9997	0.0000	0.9997
2008	0.0000	0.9996	0.1176	0.9995	0.0000	0.9995	0.0000	0.9995

Table 4. Structural Breaks Tests

Conclusions

One of the topics at the forefront of the economic policy debate is precisely the role of fiscal policy and spending multipliers in times of crisis. There is some consensus among post-Keynesian and neo-Keynesian economists that coordination between fiscal and monetary policy will benefit economic performance in countries. They tend to agree on two points. The first is found in the overwhelming influence fiscal policy has on conditions of crisis and stagnation: the second entails considering the economic particularities in estimating the multipliers and evaluating spending policy. The effectiveness of coordination can be observed in the value of the multipliers. Under certain conditions, with greater coordination, the multipliers increase, especially at times when interest rates are close to zero and the economy is depressed.

Some economists maintain that in open, developing, or flexible exchange rate economies (such as Argentina, Brazil, Chile, and Mexico), spending multipliers tend not to be high. Even so, public spending holds an important weight in driving growth. In examining the stylized facts, our research found that raising public spending in these four countries coincides with investment, consumption, and GDP growth in times of expansion. No crowding out effects were found. Despite the weight of public spending, our econometric estimations suggest that some spending multipliers were less than one, specifically, in the cases of Brazil, Mexico, and Chile. The case of Argentina is the only country with a multiplier greater than 1. The econometric tests moreover show that isolated monetary and fiscal policies do not have an impact on GDP growth in three of the four countries. The inflation targeting regime has had an influence to some extent in reducing inflation in Chile, Brazil, and Mexico, but if this regime is evaluated by quantifying the spending multipliers, its results are poor. By contrast, the results are positive for Argentina. We accept our central hypothesis; therefore, we believe that economic policy in countries with inflation targeting regimes must radically pivot, because if currency appreciation continues to be the tool used to stabilize

prices, sooner or later, we will have to start all over again, and the sacrifices made by an entire society will have served for nothing. This research showed that in some countries, better coordination could bring with it an increase in the spending multiplier and thus output and employment, but future research will be needed to examine a coordination proposal in the framework of the institutional structure of each of the countries analyzed here.

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