
temas de coyuntura

Do private sectors deficits matter?

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Summary

During the 1990s, recurrent crises linked to abrupt changes in the direction of international financial flows have been observed. Both the Mexican crisis of 1994-1995 and the Asian crisis of 1997-1998 had important propagation effects and exhibited high levels of contagion that were underestimated. Observers have tried to identify the ex-ante sources of vulnerability and policy mismanagement. Once more, economists have increased the volume of knowledge arising from traumatic episodes. Among other implications, the profession is now concerned about the optimal exchange rate regime, the sustainability of large current account deficits, the vulnerability of malfunctioning financial systems, the propagation effects of highly leveraged hedge funds, and risks linked to currency mismatches and to the term structure of external liabilities. The purpose of this article is to emphasize the links between external vulnerability and excess domestic expenditure explained by private sector behaviour.

The motivation is based on the feature that at the eve of their respective crises, Mexico and most of the Southeast Asian economies in which the last crisis detonated exhibited significant current account deficits while their fiscal accounts were under control. This was also the case of Chile in 1996-1997, prior to its own recession. The mix of large current account deficits and fiscal balance or fiscal surplus implies that the origin of excess domestic expenditure –and of vulnerability– was non-fiscal.

What are the macroeconomic consequences of an excess of non-fiscal expenditure? What are the consequences of inconsistent policy targets? Which should be the consistent policy responses? These are the main questions tackled in this paper by means of a formal analytical model. In section A we develop the case of an open economy with no voluntary financial flows, and analyse the effects of inconsistent policy targets. Two relevant and intuitive conclusions are that fiscal policy crowds out private expenditure, and that inflation is the natural outcome of inconsistent policy targets. In section B we develop the case with an open capital account, where the conclusions are that inconsistent policy targets generate external vulnerability rather than inflation, and that private expenditure crowds out fiscal policy. Moreover, in the context of consistent targets, fiscal policy needs to accommodate any excess of private expenditure to avoid external vulnerability. That is to say, the larger the level of private expenditure funded by external financing, the larger the requirement of fiscal effort to adjust to a consistent equilibrium. In section C we argue that if fiscal policy cannot be crowded out beyond a politically feasible level of fiscal surplus, a consistent equilibrium needs additional policy instruments. We analyse the case of a Tobin tax and the case of a flexible tax as alternatives to an adaptive fiscal policy. Finally, we present a number of special cases in the Appendix which prove the robustness of our conclusions.

Introduction

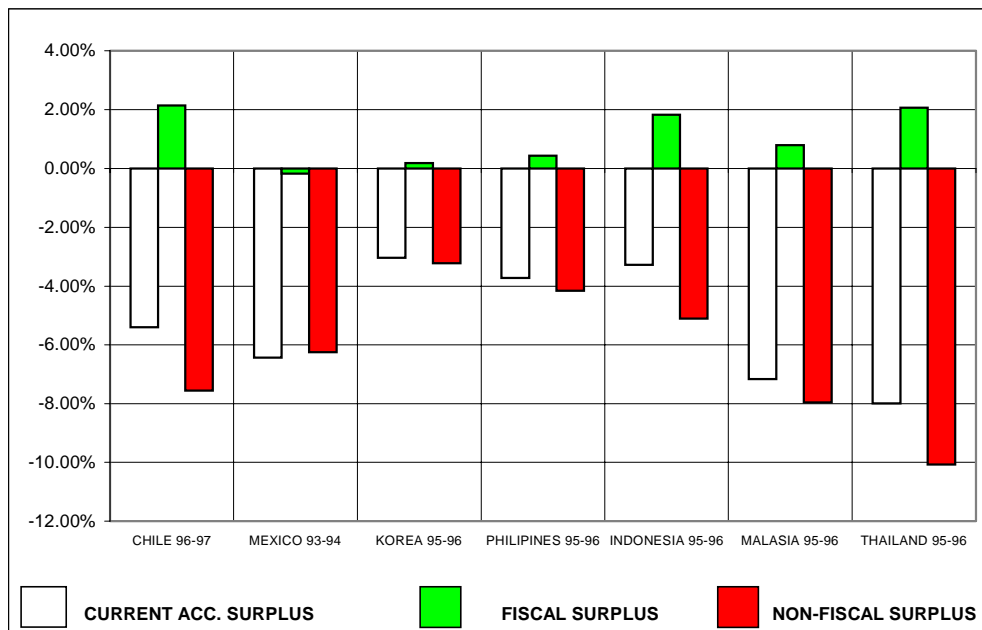
During the 1990s, recurrent crises linked to abrupt changes in the direction of international financial flows have been observed. Both the Mexican crisis of 1994-1995 and the Asian crisis of 1997-1998 had important propagation effects and exhibited high levels of contagion that were underestimated. Observers have tried to identify the ex-ante sources of vulnerability and policy mismanagement. Once more, economists have increased the volume of knowledge arising from traumatic episodes. Among other implications, the profession is now concerned about the optimal exchange rate regime, the sustainability of large current account deficits, the vulnerability of malfunctioning financial systems, the propagation effects of highly leveraged hedge funds, and risks linked to currency mismatches and to the term structure of external liabilities. The purpose of this article is to emphasize the links between external vulnerability and excess domestic expenditure explained by private sector behaviour.

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In Figure 1 we present a summarized view of this assertion. All cases exhibited excess of domestic expenditures –approximated by the current account deficits– in the range of 2.5% to 8% of GDP in the two years prior to their respective recessions. Also, they all displayed either a fiscal balance or a surplus ranging up to 2% of GDP. We also introduce a measure of the private surplus, which we proxy as the simple difference between the current account surplus and the fiscal surplus. From a strict accounting standpoint, the surplus of any agent should be the difference between its savings and its contribution to Gross Fixed Capital Formation. The relevant data for this purpose are not available, but the orders of magnitude of this proxy strongly suggest that the origin of excess domestic expenditure –and of vulnerability– was non-fiscal.

What are the macroeconomic consequences of an excess of non-fiscal expenditure? What are the consequences of inconsistent policy targets? Which should be the consistent policy responses? These are the main questions tackled in this paper. In section A we develop a formal model for an open economy with no voluntary financial flows, and analyse the effects of inconsistent policy targets. Among others, a relevant and intuitive conclusion is that fiscal policy crowds out private expenditure. In section B we develop the case with an open capital account, where a main conclusion is that private expenditure crowds out fiscal policy. That is to say, the larger the level of private expenditure funded by external financing, the larger the requirement of fiscal effort to adjust to a consistent equilibrium. In section C we argue that if fiscal policy cannot be crowded out beyond a politically feasible level of fiscal surplus, a consistent equilibrium needs additional policy instruments. We analyse the case of a Tobin tax and the case of a flexible tax as alternatives to an adaptive fiscal policy. Finally, we present a number of special cases in the Appendix which prove the robustness of our conclusions.

Figure 1
SELECTED VARIABLES PRIOR TO RECESSION
 (% OF GDP)



I. A simple version

The balance of payments current account can be defined according to three accounting identities. First, it is the sum of the balance of trade, the balance of financial and non-financial services and net current transfers. Second, it is the difference between GNP and domestic expenditure (the difference between investment and national savings). Third, it is the difference between the change in international reserves and the capital account surplus. Whatever the transmission mechanisms within an economy, these identities should prevail. The relation between the exchange rate and the current account surplus varies depending on which definition we take. In some cases, it is the actual level of the exchange rate and its actual rate of change what matter. In others, it is the expected level and its expected rate of change the relevant driving forces. An analytical framework that simultaneously considers the actual and expected exchange rate and their respective rates of change may be extremely complex. To avoid these complexities, we develop a model where all the identities are expressed either in terms of rate of change or in terms of their change relative to the level of GNP.

This first basic case assumes an exogenous capital account (no voluntary financial flows), an assumption that is removed in the following sections. The model assumes that there exists a GNP rate of growth that, all other things being equal, allows a sustainable path for the balance of payments current account. Let y_x be the external equilibrium rate of growth, which can be expanded by means of a real depreciation ($e - p$). The left-hand side of equation (1) represents a measurement of the current account surplus as the difference between such a consistent GNP rate of growth and actual growth (y). As long as

y exceeds $y_x + d(e - p)$, there would be a current account deficit beyond the threshold of vulnerability¹. The right-hand side of equation (1) also represents the current account. In this case, it does so as the difference between GNP growth (y) and domestic expenditure pressure which, in turn, is the sum of the pressure of fiscal policy (g) and of private expenditure ($q - a_0(r - p^*)$), where r is the nominal interest rate and p^* is expected inflation².

$$(1) \quad a_1(y_x + d(e - p) - y) = B = y - [g + q - a_0(r - p^*)] \quad \text{IS}$$

Equation (2) represents the equilibrium condition where the rate of growth of real money balances ($m - p$) is a function of output growth and the nominal interest rate.

$$(2) \quad m - p = b_0 y - b_1 r \quad \text{LM}$$

Equation (3) states that inflation (p) is a weighted average between nominal depreciation (e) and expected inflation (p^*), plus a function of the gap between actual GNP growth and potential GNP growth (y_d)³:

$$(3) \quad p = c_0 e + (1 - c_0) p^* + c_1 (y - y_d) \quad ; \quad 0 < c_0 < 1 \quad \text{Phillips Curve}^4$$

In this simple initial version we assume the absence of voluntary financial flows. Thus, there is a constraint on the current account deficit:

$$(4) \quad y \leq y_x + d(e - p) \quad \text{External constraint}^5$$

Finally, we assume that the authority sets its policy instruments in order to minimize the deviations with respect to a zero inflation target and a target rate of growth of y_{target} :

$$(5) \quad L = \text{Min} [p^2 + (y - y_{\text{target}})^2] \quad \text{Loss function}$$

The model assumes that the private sector sets its expectations rationally ($x^* = E[x]$ for all x), but does not react instantaneously to surprises. The authority, which minimizes L , may take advantage of this rigidity in a non-systematic way. The endogenous variables are y , p , and either r , m or e , depending on the policy regime (fixed or floating exchange rate; passive or active monetary policy).

Assuming a binding equation (4) –i.e., with equality in (4)–, the final outcome is independent of the policy regime. In the absence of surprises (i.e., when $x = x^* \forall x$), then⁶

$$(6) \quad y = [c_0 y_x + c_1 d y_d] / (c_0 + c_1 d) = \hat{y}$$

$$(7) \quad p = (1 - c_0) d (y_{\text{target}} - \hat{y}) / (c_0 + c_1 d)$$

$$(8) \quad e - p = c_1 (y_d - y_x) / (c_0 + c_1 d)$$

$$(9) \quad \hat{y} - g = q - a_0 (r - p^*)$$

- Growth is a weighted average of the two constraints for growth (y_x and y_d), and is independent of the growth target y_{target} (equation 6).

¹ A value of zero for the left-hand side of equation (1) does not necessarily mean that the current account is strictly balanced. All that it means is that the current account is sustainable.

² Strictly speaking, the right-hand side of equation (1) should consider the change in the real interest rate. In an end-of-period model, such a change is with respect to the beginning-of-period interest rate, which is a constant by definition. So, the change in the interest rate is a function of its end-of-period level.

³ Notice that y_d is a measure of domestic or internal factor markets equilibrium.

⁴ In the appendix we develop the model with a “supply-side” version for this equation. Although the main conclusions do not vary, we prefer to stick to this equation in the main text to allow for positive inflationary effects of a nominal depreciation.

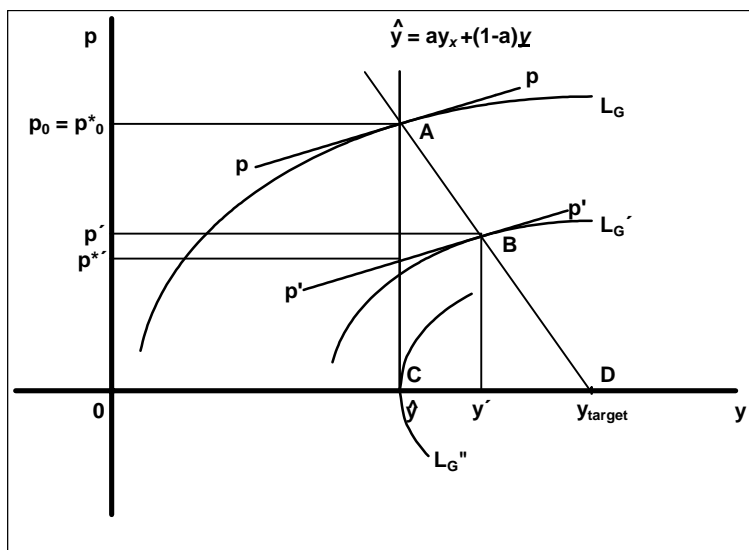
⁵ Notice that equation (4) is equivalent to $B \geq 0$.

⁶ See section A of the Appendix for the solution when unanticipated shocks occur.

- Inflation depends on the gap between the growth target y_{target} and actual growth \hat{y} (equation 7).
- Real currency depreciation depends on the gap between y_d and y_x (equation 8).
- Private expenditure is crowded out by fiscal policy, since the equilibrium interest rate must fulfill expression (9).

Real variables in this simplified version are determined by the exogenous components of the model, while inflation is the outcome of an inconsistent growth target. Figure 2 provides a graphic rationale for this outcome. Point D is the desired outcome for the authority, where inflation is zero and growth is y_{target} . With a quadratic loss function, the optimal policy mix will seek the smallest circle centered in D. p^*p' , in turn, represents the short-run Phillips curve, derived from equations (3) and (4), while the vertical line CA represents the “long-run” Phillips curve (i.e., the one where $p = p^*$), located at $y = \hat{y}$. The short-run and the long-run Phillips curves cut each other at p^* . Under this setting, the optimal point for the authority is B, with inflation p' and growth y' . This, however, is an equilibrium that cannot be systematically sustained since $p' \neq p^*$. The only sustainable equilibrium in Figure 2 is at point A, where there are no systematic biases on inflation expectations.

Figure 2
SIMPLE VERSION EQUILIBRIUM



In this version of the model, persistent inflation is the natural outcome of inconsistent policy targets. As authorities become less ambitious and set their targets with smaller degrees of voluntarism, inflation declines. Further, it is interesting to note that point C in Figure 2 is superior and feasible. Such an equilibrium would take place either (a) if the authority has a consistent growth target [$y_{target} = \hat{y}$], or (b) if the authority only takes care of inflation ($L' = p^2$). In the absence of shocks, both ways would display an equivalent outcome. With randomness (see section A of the Appendix), non-predicted shocks would cause equilibrium to deviate from point C with a split between inflation and output in case (a). In case (b), inflation would be zero, and the effect of surprises would be concentrated on growth and real depreciation

II. Opening the capital account

In the full version of the model we maintain the first three equations:

$$(1.B) \quad a_1 (y_x + d (e - p) - y) = y - [g + q - a_0 (r - p^*)] \quad \text{IS}$$

$$(2.B) \quad m - p = b_0 y - b_1 r \quad \text{LM}$$

$$(3.B) \quad p = c_0 e + (1 - c_0) p^* + c_1 (y - y_d); \quad 0 < c_0 < 1 \quad \text{Phillips Curve}$$

In the presence of perfect capital mobility, current account deficits may be financed by financial flows. Thus, equation (4) of the simple version is replaced by an interest rate arbitrage condition, where r_x represents the external interest rate, e^* is the expected nominal depreciation, and λ is a position parameter⁷:

$$(4.B) \quad r = r_x + e^* + \lambda, \quad \text{Arbitrage Condition}$$

We also split the authorities' targets, assuming a central bank and a fiscal authority (government) which display different policy targets. The central bank minimizes inflation:

$$(5.B) \quad L_B = \text{Min} [p^2] \quad \text{Loss Function (Central bank)}$$

The government, in turn, cares about growth, and sets g in order to minimize the expected rate of growth with respect to its target y_{target} :

⁷ To avoid algebraic complexities, we have not explicitly included interest payments in the current account (equation (1.B)). This could be the case when financial flows are linked to fixed rate assets, so that interest payments are independent of the spot interest rate and are implicitly included in y_x .

$$(6.B) \quad L_G = \text{Min} [(y^G - y_{\text{target}})^2] \quad \text{Loss Function (Government)}$$

As a general notation, x^* and x^G represent the respective expectations of the private sector and the government for any variable x .

The central bank reacts instantaneously to surprises. The private sector continues to set its expectations rationally, but these are not adjusted instantaneously to surprises. The government also sets its expectations rationally, but it is the slowest of the participants in the model⁸. Fiscal policy is always in the information set of the private sector⁹.

The final outcome does not depend on whether the exchange rate floats or is fixed, although the transmission mechanisms vary from one version to the other.

In the absence of surprises (i.e., when $x = x^* = x^G, \forall x$)

$$(7.B) \quad p = 0$$

$$(8.B) \quad y = y_{\text{target}}$$

$$(9.B) \quad e = c_1 (y_d - y_{\text{target}}) / c_0$$

$$(10.B) \quad B = a_1 (c_0 + c_1 d) (\hat{y} - y_{\text{target}}) / c_0$$

$$(11.B) \quad g = y_{\text{target}} - [q - a_0 (r_x + \lambda + e)]$$

- The central bank achieves its inflation target (equation 7.B).
- The government also achieves its growth target (equation 8.B).
- Nominal (and real) exchange rate depreciation and the current account (B) are inversely correlated with the growth target (equations 9.B and 10.B).
- An inconsistent growth target implies a systematic bias towards currency appreciation and current account deterioration (equations 9.B and 10.B). In the simple version, such an inconsistent targeting caused inflation.
- Fiscal policy depends on the growth target y_{target} , and the expected value of private expenditure (equation 11.B). Notice that private expenditure crowds out fiscal policy instead of the other way around.

The intuition behind this outcome is simple. The central bank can achieve its target since it reacts instantaneously to surprises, and has only one policy target and one independent policy instrument (either e or m , depending on the exchange rate regime). The government can also achieve its growth target in the short run, since the inflationary pressures of an excess of growth can be avoided by means of a currency appreciation. This, in turn, is feasible as long as external financing is available. Currency appreciation and excess growth would both deteriorate the current account. Fiscal policy must accommodate to changes in private sector expenditures since equation (1) –or (1.B)– must prevail.

⁸ This means that fiscal policy is set in advance by a budget law. Once the law is in place, there are no degrees of freedom to introduce changes in fiscal policy. The private sector uses this information to set its own expectations and acts accordingly, but it cannot react to surprises. Implicitly, it is assumed that contracts cannot be changed instantaneously. The central bank can react to surprises. Moreover, it can be a source of surprises.

⁹ Algebraically, the model is solved in the following steps. First, the central bank optimizes its loss function for given (exogenous) values of expected variables and fiscal policy. Thus, a reaction function is derived for the central bank. Second, the private sector sets its expectations solving the model in expected values, given an exogenous fiscal policy, and given the central bank's reaction function. Private sector behavioural functions are derived. Third, the government sets g in order to optimize its loss function in expected values, given the behavioural functions of the private sector and given the central bank reaction function. Steps one and two are repeated with the value of g thus determined.

In section B of the Appendix we develop the case when there are surprises. In that case, the central bank still achieves its target ($p = 0$), and the effect of surprises would be concentrated on growth, the exchange rate and the current account.

A relevant special case arises when the government is concerned about vulnerability. In that case, the target for setting fiscal policy should consider the current account balance:

$$(6'.B) \quad L_G = \text{Min} [(y^G - d(e^G - p^G) - y_x^G)^2] \quad \text{Loss Function (Government)}$$

The outcome is equivalent to the one where $y_{\text{target}} = \hat{y}^G$, and, in the absence of surprises, almost replicates that of the simple version:

$$(7'.B) \quad p = 0$$

$$(8'.B) \quad y = \hat{y}$$

$$(9'.B) \quad e - p = e = c_1 (y_d - y_x) / (c_0 + c_1 d)$$

$$(10'.B) \quad B = 0$$

$$(11'.B) \quad g = \hat{y} - [q - a_0(r_x + \lambda + e)]$$

- Private expenditure crowds out fiscal policy, since g must fulfill equation (11'.B). That is to say, the public sector budget constraint would be given by an overall target for domestic expenditure.
- With shocks, volatility would concentrate on y , e and B , as in the previous case (see section B of the Appendix).

The main difference with respect to the simple case is that private expenditure crowds out fiscal policy instead of being the other way around. In fact, equations (11.B) and (11'.B) are significant to an understanding of recent events when dynamic economies faced external shocks. In effect, a consistent fiscal policy should provide enough slack to private spending.

That argument is unbounded in our setting, in the sense that it does not depend on whether the initial situation exhibits a fiscal surplus or a deficit. The fiscal constraint in this model is not the availability of public revenues –or the budget constraint–, but an overall (public plus private) expenditure constraint.

In sections C and D of the Appendix we develop two special cases. In section C we replace the Phillips Curve (3.B) for a “supply-side” version. The one considered so far allows for inflationary effects of exchange rate movements, whether expected or not. In section C of the Appendix, we assume a Phillips Curve such that when all expectations are fulfilled, GNP growth cannot deviate from its domestic equilibrium ($y = y_d$). In this case, and in the absence of surprises, growth is always determined by its domestic constraint, while y_x is irrelevant for that purpose. However, fiscal policy continues to be decisive for a consistent exchange rate and a consistent current account, and private expenditure still crowds out fiscal policy.

In section D of the Appendix we develop the case of a dollarized economy, in which the overall balance of payments determines the changes in the money supply. In the absence of autonomous monetary and exchange rate policies, the sole policy instrument is fiscal policy (g). Under such a setting, inflation plays the role of the real exchange rate (with the opposite sign). An expansionary fiscal policy allows for larger GNP growth, but at the cost of raising inflation and deteriorating the current account. A consistent current account and GNP growth can be attained by means of an appropriate fiscal policy, but, since inflation plays the role of the exchange rate, inflation depends on the gap between y_d and y_x . The outcome of fiscal policy being crowded out by private expenditure is still valid under this setting.

We have followed an analysis of short-run equilibrium in a context of rational expectations and open capital account. Although we have concentrated mostly on the case in which GNP growth may be affected by demand, in section C of the Appendix we develop the case where short-run growth is driven by aggregate supply. We also analysed the case of a dollarized economy. Some results vary depending on the case, but there are two conclusions that are valid in all cases:

- Fiscal policy is the key decision variable for attaining a consistent current account.
- Private expenditure crowds out fiscal policy.

III. Policy options

In the simple case in which there are no voluntary financial flows, there were two disciplining factors operating. First, an autonomous and independent monetary policy could be implemented, which allowed the economic authority to keep overall private expenditure under control. Second, the outcome of fiscal policy voluntarism was an inflationary pressure, which could be prevented by re-stating consistent policy targets.

In the case of perfect capital mobility, these disciplining elements disappear. The outcome of inconsistent policy targets is external vulnerability, measured as the combination of an inconsistent current account and currency appreciation. Also, the authority has no ways to keep private expenditures within prudent boundaries, and no individual private agent has microeconomic incentives to cooperate in solving a macroeconomic problem. The most that the government can do is to implement a conservative fiscal policy. If such a conservative approach allowed a reduction in fiscal deficits, our arguments would end here. The policy dilemma arises when a fiscal balance or even a prudent fiscal surplus is not enough, as was the case of the countries considered in Figure 1 of the Introduction.

The political economy of a fiscal surplus is not simple where welfare effects are associated with fiscal policy. Once a structural fiscal surplus has been achieved, it is not clear that to continue limiting government expenditures (or expanding taxes) in the face of excess private expenditure is optimal.

To analyse policy options we develop a variant of the previous version.

Assume g_B is the fiscal policy such as (11'B), consistent with a loss function that optimizes the current account surplus (such as 6'.B). Also, assume g_m is the maximum fiscal effort that the government is willing and able to perform in a democratic environment. For the sake of the argument, assume that such a g_m already implies a fiscal surplus to avoid the case of a weak government and to concentrate in the case where the main driving force for a vulnerable current account behavior is excess private spending. Then,

$$g_m > g_B \quad \Rightarrow \quad B < 0$$

The setting in this case implies a source of vulnerability, given that a deteriorating current account and an appreciating currency would coexist.

Consider, now, the case where the central bank cares not only about inflation, but where the current account is also part of its concern.

$$(5.C) \quad L''_B = \text{Min} [p^2 + \{a_1 (y_x + d (e - p) - y)\}^2] \quad \text{Loss Function (Central bank)}$$

From the previous arguments, the government's loss function would be:

$$(6.C) \quad L''_G = \text{Max} [g_m; g_B] \quad \text{Loss Function (Government)}$$

Finally, assume that the central bank gains a policy instrument by introducing a Tobin tax (λ , of equation (4.B), becomes a policy instrument).

In this event a consistent outcome is re-attained (case of no surprises):

$$(7.C) \quad p = 0$$

$$(8.C) \quad B = 0$$

$$(9.C) \quad y = \hat{y}$$

$$(10.C) \quad e - p = e = c_1 (y_d - y_x) / (c_0 + c_1 d)$$

$$(11.C) \quad \hat{y} - g_m = q - a_0 (r_x + e^* + \lambda)$$

- The central bank achieves its goals on inflation and B (equations 7.C and 8.C).
- Growth and real depreciation are consistent (equations 9.C and 10.C).
- Fiscal policy crowds out private expenditure (from expression 11.C, which must be fulfilled by λ).

The intuition behind this version is straightforward. The central bank can achieve two independent goals from the moment that it has access to two independent policy instruments (either e or m , depending on the exchange rate regime, and λ). In particular, λ controls the cost of credit to the private sector and, thus, excess private expenditure can be contained. The government re-gains degrees of freedom to perform an independent fiscal policy.

The same outcome may be achieved with the introduction of any policy instrument that allows the monitoring of private expenditures. For instance, we may think of introducing a flexible tax τ instead of the Tobin tax, such that private expenditures are represented by $[q - \tau - a_0 (r_x + e^* + \lambda)]$. Such a tax should not have inflationary effects, in order to avoid complexities. All that is needed is that it should affect private expenditure and be flexible enough to be handled along the cycle.

Each of these policy options has its benefits and shortcomings, which we briefly analyse in the following paragraphs:

- a. Adaptive fiscal policy: This is the case in which we concentrated in section B above. In the absence of other policy instruments to handle domestic expenditure, a

consistent fiscal policy would need to recognize that private expenditure is the dominant force, and that the true fiscal constraint is aggregate expenditures, as we observed in section B. To the extent that there is a fiscal deficit, such a response of public expenditures would be advisable, and the responsibility of government authorities should be to reduce its deficit until the overall excess expenditure in the economy is eliminated. But, as we mentioned before, once a structural fiscal surplus has been attained, it is not necessarily optimal that further increases in private expenditures should continue to crowd out fiscal policy. This is especially the case when government expenditures are disciplined within legislated public revenues that define the politically accepted size of the public sector, and when those expenditures have other social and welfare improvement effects that go beyond macroeconomic stability. The political economy of increasing an already existing fiscal surplus on the grounds that the role of fiscal policy is to provide macroeconomic room for unbounded private expenditures is almost impossible to handle in a democratic context.

- b. Tobin tax¹⁰: We analysed this policy option to solve the problem of managing private expenditures within the boundaries of a macroeconomic rationale. The main idea is that in the presence of an excess of expenditure, to increase the cost of credit seems advisable. In the presence of perfect international capital mobility, such an increase should act simultaneously on the cost of foreign and domestic credit. A rise in the cost of domestic funding only would simply encourage the substitution of domestic by foreign credit, increasing macroeconomic vulnerability. A simultaneous rise in the cost of domestic and external credit has the advantage of a nice political economy, in the sense that if the problem is excess expenditure, the Tobin tax would be levied precisely on the financing of such an excess expenditure¹¹.

But there are important shortcomings in this policy option. First and most obvious, the design of a fair, enforceable and manageable Tobin tax is not trivial. Second, with the presence of such a tax, fiscal policy crowds out private spending and, thus, we cannot preclude that it may be used to avoid the adjustment of fiscal deficits. Third, a Tobin tax, to the extent that it is levied on external financing, may be used for different purposes than macroeconomic fine-tuning. For instance, it may be manipulated in a protectionist way, in favor of the domestic financial sector. These last two shortcomings may be overcome by an acceptable surveillance performed by the international community, in order to ensure that this option is taken in favor of macroeconomic resiliency, and not against the rest of the world.

- c. Flexible tax: This policy alternative shares with the previous one the advantage of regaining degrees of freedom to handle domestic expenditure. It is superior to the Tobin tax in that it may not be used as a protectionist device for the domestic financial sector. But it has shortcomings of other sorts. First, to the extent that it is not levied on excess expenditure (the true problem), it has a political economy that is difficult to justify. Second, it has design problems as difficult as a Tobin tax. Third, since it is a temporary tax and, in its best version, should have income but not substitution effects, it is likely to display effectiveness problems linked to “Ricardian

¹⁰ The Tobin tax has also been discussed in the context of affecting the term structure of the external debt, which is an argument not tackled here.

¹¹ In this respect, the Chilean “reserve requirement safeguard” seems interesting to consider, in the sense that it is simple, with no exceptions (except for equity), has a welcomed bias against hot capital, and is known in advance by financial investors in order to avoid “time-inconsistency” problems.

equivalence” effects. Finally, like the previous option, it may be used to postpone a necessary elimination of a fiscal deficit.

- d.* Increasing national savings: A different line of thought is to introduce reforms to increase national savings. Of course, this is a more structural means of solving the problem of excess expenditure. But this is also a field where neither theoretical nor empirical analysis are conclusive on how to encourage national savings. To increase compulsory savings is more of the type of option *c*, above. Increasing government savings is more of the type of *a*. And policy options to increase voluntary private savings usually reduce public sector savings, with an unpredictable effect on national savings. Institutional reforms that may promote re-investment of profits and/or changes in private sector confidence, economic predictability and saving habits are welcome and superior to any of the previous options, but their likely effects might not be of the magnitude and timeliness needed.

Appendix

A. A simple version

With surprises, the outcome would be:

$$(6') \quad y^* = \hat{y}^* = [c_0 y_x^* + c_1 d y_d^*] / (c_0 + c_1 d)$$

$$(7') \quad p^* = (1-c_0) d (y_{\text{target}} - \hat{y}^*) / (c_0 + c_1 d)$$

$$(8') \quad e^* - p^* = c_1 (y_d^* - y_x^*) / (c_0 + c_1 d)$$

$$(9') \quad \hat{y}^* - g = q^* - a_0 (r^* - p^*)$$

Note that equations (6') through (9') are analogous to equations (6) – (9) of the text. The expected value of the endogenous variables is equivalent to their actual equilibrium values in the absence of surprises. Notice also that equation (9') implies that for any particular fiscal policy g , there is an expected interest rate that should crowd out expected private expenditure. The deviations of the actual equilibrium outcome from the expected values are presented below:

$$(10') \quad s (y - y^*) = (c_0 + c_1 d) [c_0 (y_x - y_x^*) + c_1 d (y_d - y_d^*)]$$

$$\text{where } s = (c_0 + c_1 d)^2 + ((1-c_0)d)^2 > 0$$

$$(11') \quad s (p - p^*) = -(1-c_0)d [c_0 (y_x - y_x^*) + c_1 d (y_d - y_d^*)]$$

$$(12') \quad s [(e-p) - (e^* - p^*)] = c_1 (c_0 + c_1 d) [(y_d - y_d^*) - (y_x - y_x^*)] - (1-c_0)^2 d (y_x - y_x^*)$$

$$(13') \quad s a_0 (r - r^*) = (c_0 + c_1 d) [c_0 (y_x - y_x^*) + c_1 d (y_d - y_d^*)] - s (q - q^*)$$

- The deviations of the equilibrium levels for GNP growth, inflation and real currency depreciation from their expected values depend solely on surprises on the external equilibrium rate of growth (y_x) and potential GNP growth (y_d) (equations 10', 11', and 12').
- The deviation between the equilibrium and the expected interest rate also depends on surprises in private expenditure (q) (equation 13').

In the text we noted that inflation could be avoided with no costs in terms of growth either by having an authority which only cares about inflation, or by having a consistent growth target. In the absence of surprises, either option led to the same optimal equilibrium. With surprises, however, differences appear. We analyse these two special cases:

(a) The authority has a consistent growth target ($y_{\text{target}} = \hat{y}$). In this case the solution is the same as above, except for (7'), which would change to:

$$(7'.a) \quad p^* = 0$$

Inflation may deviate from 0 and growth from \hat{y} as long as there are surprises in the two constraints of growth (y_x and y_d).

(b) The authority only cares about inflation. That is to say, the loss function is:

$$(5'.b) \quad L = \text{Min } [p^2] \quad \text{Loss function}$$

In this case, most of the solution remains unchanged, except for:

$$(7'.b) \quad p^* = 0$$

$$(10'.b) \quad (y - y^*) = (\hat{y} - \hat{y}^*)$$

$$(11'.b) \quad (p - p^*) = 0$$

$$(12'.b) \quad [(e-p) - (e^*-p^*)] = c_1 [(y_d - y_d^*) - (\hat{y} - \hat{y}^*)] / c_0$$

The expected values of all variables are the same in both cases. But surprises in case (b) do not affect inflation, as they do in case (a), while growth and real depreciation are more affected by surprises in case (b) than in case (a). If the loss function (5) represents the true value for the authority, the outcome of case (a) would be superior to one of case (a). That is to say, consistent targets would lead to a better outcome than forgetting about growth.

B. Opening the capital account

With surprises, the solution would be:

$$(7''.B) \quad p^* = 0$$

$$(8''.B) \quad y^* = y_{\text{target}}$$

$$(9''.B) \quad e^* = c_1 (y_d^* - y_{\text{target}}) / c_0$$

$$(10''.B) \quad B^* = a_1 (c_0 + c_1 d) (\hat{y}^* - y_{\text{target}}) / c_0$$

$$(11''.B) \quad g = y_{\text{target}} - [q^G - a_0 (r_x^G + \lambda^G + e^G)]$$

Again, the expected values have analogous expressions to the case with no surprises analysed in the text. Also, this outcome replicates the conclusion of the text that, for a given growth target, fiscal policy is crowded out by (expected) private expenditure rather than the other way around.

The deviations of the actual outcome with respect to their expected values are:

$$(12''.B) \quad p - p^* = 0$$

$$(13''.B) \quad h(h - a_0 c_1)(y - y_{\text{target}}) = c_0 [h (q - q^G) - a_0 c_1 (q - q^*)] \\ - a_0 c_0 [h (r_x - r_x^G) - a_0 c_1 (r_x - r_x^*)] \\ + a_1 c_0 [h (y_x - y_x^G) - a_0 c_1 (y_x - y_x^*)] \\ + c_1 [h (a_1 d - a_0) (y_d - y_d^G) + a_0 (1 + a_1) (y_d - y_d^*)]$$

$$\text{where } h = c_0 (1 + a_1) + a_1 c_1 d > 0$$

$$(14''.B) \quad e - e^* = c_1 [(y_d - y_d^*) - (y - y_{\text{target}})] / c_0$$

$$(15''.B) \quad B - B^* = a_1 (c_0 + c_1 d) [(\hat{y} - \hat{y}^*) - (y - y_{\text{target}})] / c_0$$

Notice that even with surprises the central bank always achieves its inflationary target (equation 12''.B). Notice also that the right-hand side of equation (13''.B) is the sum of deviations of the actual values of exogenous variables (q , r_x , y_x and y_d) and their values expected either by the government or by the private sector. When all expectations are fulfilled, $y = y_{\text{target}}$.

C. A “supply-side” version

Equation (3) of the model assumes the presence of a trade-off between inflation and output. The idea was to give room to inflationary effects of nominal currency depreciation. However, the main outcome does not critically depend on this assumption. In this version, we assume the following Phillips Curve equation:

$$(3.C) \quad p = p^* + c_0 (e - e^*) + c_1 (y - y_d) \quad \text{Phillips Curve}$$

Note that in this version, whenever expectations are fulfilled ($p = p^*$ and $e = e^*$), growth is determined by the internal constraint only ($y = y_d$). An important difference with respect to

previous versions is that authorities cannot systematically attain a growth target different than y_d . The current account and the exchange rate, however, do not have an obvious consistent behavior, unless the fiscal authority has a consistent target for the current account. To present this argument, we assume the following setting for the loss functions:

$$(5.C) \quad L_B = \text{Min} [p^2] \quad \text{Loss Function (Central bank)}$$

$$(6.C) \quad L''_G = \text{Max} [g_m; g_B] \quad \text{Loss Function (Government)}$$

a. In the absence of surprises ($x = x^* = x^G, \forall x$), and with $g = g_B$, the solution is:

$$(7.C) \quad p = 0$$

$$(8.C) \quad y = y_d$$

$$(9.C) \quad B = 0$$

$$(10.C) \quad e - p = e_B = (y_d - y_x) / d$$

$$(11.C) \quad g_B = y_d - (q - a_0 (r_x + e + \lambda))$$

- The central bank achieves its goal (equations 7.C).
- Growth is determined by its internal equilibrium (equations 8.C).
- B and real depreciation are consistent (equations 9.C and 10.C).
- Private expenditure crowds out fiscal policy (from expression (11.C)).

b. In the absence of surprises ($x = x^* = x^G, \forall x$), and with $g = g_m = g_B + \theta$

$$(7'.C) \quad p = 0$$

$$(8'.C) \quad y = y_d$$

$$(9'.C) \quad B = -d\theta / (a_1d - a_0)$$

$$(10'.C) \quad e - e_B = -\theta / (a_1d - a_0)$$

- The central bank achieves its goal (equation 7'.C).
- Growth is determined by internal equilibrium (equation 8'.C).
- B and currency depreciation would accommodate the excess of expenditure in an inconsistent way (equations 9'.C and 10'.C)¹².

In this supply-side version, the introduction of a current account balance as a target for the central bank and λ as a policy instrument allows for the correction of inconsistencies. Also, fiscal policy would crowd out private expenditure, as in the case developed in the text.

D. A dollarized economy version

In a dollarized economy (or in a currency-board regime) there is no exchange rate policy and money supply is endogenous and changes proportionally to the overall balance of payments. This introduces an analytical complication in the model, which is tackled by the following procedure:

¹² The denominator in expressions (8'.C) and (10'.C) has an uncertain sign. The ambiguity arises since, when expectations are fulfilled, depreciation has a mixed effect on total expenditure: a positive effect since depreciation improves the current account (a_1d), and a negative effect since expected depreciation increases the cost of credit (a_0) and, therefore, reduces private expenditure. When a depreciation is expansionary (i.e., when $a_1d - a_0 > 0$), there would be a trend toward an increasing current account deficit ($B < 0$) and an appreciating currency ($e > 0$).

First, we accommodate equations (1.B) and (3.B) of the text such that $e = e^* = 0$, we initially remove the assumption of perfect capital mobility, and we define a balance of payments equation in (4.D):

$$(1.D) \quad y = g + q - a_0 (r - p^*) + a_1 (y_x - d p - y) \quad \text{IS}$$

$$(2.D) \quad m - p = b_0 y - b_1 r \quad \text{LM}$$

$$(3.D) \quad p = (1 - c_0) p^* + c_1 (y - y_d) \quad \text{Phillips Curve}$$

$$(4.D) \quad m = f_0 (y_x - d p - y) + f_1 (r - r_x - \lambda) \quad \text{Balance of Payments}$$

Second, we derive the equations, and look for the outcome in limits, when $f_1 \rightarrow \infty$. Since the only policy instrument is fiscal policy, the model is solved in its expected version, and the solution depends on the government's loss function. First, we try with the two initial targets:

$$(5.D) \quad L = \text{Min} [p^{G^2} + (y^G - y_{\text{target}})^2] \quad \text{Loss function (Government)}$$

In the absence of surprises, the final outcome of this version is:

$$(6.D) \quad p = c_0 c_1 (y_{\text{target}} - y_d) / (c_0^2 + c_1^2)$$

$$(7.D) \quad y = (c_0^2 y_{\text{target}} + c_1^2 y_d) / (c_0^2 + c_1^2)$$

$$(8.D) \quad B = y_x - d p - y = y_x - y_d - c_0 (c_0 + d c_1) (y_{\text{target}} - y_d) / (c_0^2 + c_1^2)$$

$$(9.D) \quad g + q - a_0 (r_x - \lambda - p) = y - a_1 (y_x - d p - y)$$

- With two targets and one policy instrument, neither of the targets is achieved (equations 6.D and 7.D).
- A voluntarist target for growth is inflationary and deteriorates the current account (equation 6.D).
- Private expenditure crowds out fiscal policy, since g must fulfill equation (9.D).

For a consistent outcome, we alternatively try:

$$(5'.D) \quad L = \text{Min} [(y_x - d p - y^G)^2] \quad \text{Loss function (Government)}$$

In the absence of surprises, the final outcome in this version is:

$$(6'.D) \quad p = c_1 (y_x - y_d) / (c_0 + d c_1)$$

$$(7'.D) \quad y = (c_0 y_x + d c_1 y_d) / (c_0 + d c_1) = \hat{y}$$

$$(8'.D) \quad B = y_x - d p - y = 0$$

$$(9'.D) \quad g + q - a_0 (r_x - \lambda - p) = \hat{y}$$

- Inflation plays the role of the exchange rate (equation 6'.D).
- Growth and the current account are consistent (equations 7'.D and 8'.D).
- Fiscal policy is crowded out by private expenditure, since g must fulfill equation (9'.D).



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