

14320
July 1993

FISCAL DEFICITS AND MACROECONOMIC PERFORMANCE IN DEVELOPING COUNTRIES

William Easterly
Klaus Schmidt-Hebbel

FILE COPY

Although fiscal adjustment was urged on developing countries during the 1980s to lead them out of economic malaise, considerable uncertainty remains about the relations between fiscal policy and macroeconomic performance. To illustrate how financial markets, private spending, and the external sector react to fiscal policies, the behavior of holdings of money and public debt, private consumption and investment, the trade balance, and the real exchange rate is modeled for a sample of ten developing countries. The studies find strong evidence that over the medium term, money financing of the deficit leads to higher inflation, while debt financing leads to higher real interest rates or increased repression of financial markets, with the fiscal gains coming at increasingly unfavorable terms. Consumers respond differently to conventional taxes, unconventional taxes (through inflation or interest and credit controls), and debt financing, in ways that make fiscal adjustment the most effective means of increasing national saving. Private investment—but not private consumption—is sensitive to the real interest rate, which rises under domestic borrowing to finance the deficit. Contrary to the popular presumption, in some countries private investment increases when public investment decreases. There is strong evidence that fiscal deficits spill over into external deficits, leading to appreciation of the real exchange rate. Fiscal deficits and growth are self-reinforcing: good fiscal management preserves access to foreign lending and avoids the crowding out of private investment, while growth stabilizes the budget and improves the fiscal position. The virtuous circle of growth and good fiscal management is one of the strongest arguments for a policy of low and stable fiscal deficits.

Fiscal deficits received much of the blame for the assorted economic ills that beset developing countries in the 1980s: overindebtedness and the debt crisis, high inflation, and poor investment performance and growth. Attempts to regain macroeconomic stability through fiscal adjustment achieved

1284
eff v10.0

uneven success, raising questions about the macroeconomic consequences of public deficits and fiscal stabilization—or fiscal deterioration.

One recurring question is whether larger public deficits are always associated with higher inflation. Sargent and Wallace's (1985) "monetarist arithmetic" answered this question affirmatively. But the relationship is blurred because governments finance deficits by borrowing as well as by printing money. The relationship is further muddled by other influences such as unstable money demand, inflationary exchange rate depreciations, widespread indexation, and stubborn inflationary expectations (Kiguel and Liviatan 1988; Dornbusch and Fischer 1991). And if larger public deficits are associated with higher inflation, what are the tradeoffs in financing the deficit through money creation?

Interest rates are another ambiguous factor. Do deficits push up domestic real interest rates when governments rely heavily on domestic debt instruments, or is this relationship also blurred by such factors as interest rate or credit allocation controls (Easterly 1989; Giovannini and de Melo 1990) or the high degree of substitutability between public debt instruments and other assets held by the private sector?

Will consumers reduce their spending when taxes are raised and increase it when taxes are lowered? Or will they offset only changes in government consumption—without reacting to changes in government tax or debt financing—as posited by Ricardo and, more recently, by Barro (1974)? Although the issue is still not settled empirically for industrial countries (Hayashi 1985; Bernheim 1987; Leiderman and Blejer 1988), there is growing evidence that refutes Barro's Ricardian equivalence proposition for developing countries (Haque and Montiel 1989; Corbo and Schmidt-Hebbel 1991).

Another unresolved issue concerns the effects of government spending on investment. Does a higher level of public capital spending boost (crowd in) or lower (crowd out) private investment? Theory predicts, and the limited evidence available for developing countries confirms, that the effect depends on whether private and public investment complement or substitute for each other (Blejer and Khan 1984; Khan and Reinhart 1990; Easterly and Schmidt-Hebbel forthcoming).

If real interest rates do rise in response to higher domestic debt financing of deficits, how does that affect private consumption and investment? Although theory argues that the effect is ambiguous—because of potentially offsetting substitution, income, and wealth effects—it predicts unambiguously that private investment will decline with higher interest rates. A growing body of evidence for developing countries supports the notion that private consumption is insensitive to real interest rates (Giovannini 1983, 1985; Schmidt-Hebbel, Webb, and Corsetti 1992). Surprisingly, many studies of developing countries show that private investment also does not respond much to interest rates (Rama 1990; Servén and Solimano 1992).

Finally, how do fiscal deficits feed into external deficits? One expects a strong link between fiscal deficits and current account deficits in financially open econ-

omies when consumers are not Ricardian. The role that fiscal imbalances played in the overborrowing that led to the debt crisis of 1982 is widely recognized (Dornbusch 1985; Sachs 1989). But evidence linking public deficits with external deficits and appreciation of the real exchange rate is still incomplete.

This article examines these issues for a representative sample of ten developing countries. After reviewing alternative measures of the fiscal deficit and the broad outlines of fiscal adjustment in the ten countries, the article focuses on the relation of the domestic financing of deficits to inflation and real interest rates. It looks as well at the direct and indirect effects of public spending, taxation, and deficits on private consumption and investment, at the spillover into external imbalances and the real exchange rate, and finally at some of the policy implications.

Analytical Framework

Governments can finance deficits by printing money (seigniorage), borrowing at home, or borrowing abroad. This public deficit financing identity (written for the broad public sector comprising general government, public enterprises, and the central bank) is a useful starting point for tracing out and quantifying the macroeconomic effects of public deficits:¹

$$(1) \quad \text{Public deficit financing} = \text{Money financing} + \text{Domestic debt financing} + \text{External debt financing}.$$

The consequences of deficits depend on how they are financed. As a first approximation, it can be said that each major type of financing, if used excessively, results in a specific macroeconomic imbalance. Money creation leads to inflation. Domestic borrowing leads to a credit squeeze—through higher interest rates or, when interest rates are fixed, through credit allocation and ever more stringent financial repression—and the crowding out of private investment and consumption. External borrowing leads to a current account deficit and appreciation of the real exchange rate and sometimes to a balance of payments crisis (if foreign reserves are run down) or an external debt crisis (if debt is too high).

To quantify the effects of domestic deficit financing on inflation and real interest rates for the ten sample countries, we applied a portfolio-balance model for the demand for money and public debt instruments, linking it to the public deficit financing identity in equation 1. Econometric estimations of demand for money balances and domestic debt, which reflect substitution between these two assets and a third asset (typically foreign currency or foreign interest-bearing assets) in the portfolios of asset-holders, are the backbone for assessing the effects of domestic financing of the fiscal deficit on monetary and financial markets. Policy simulations are used to estimate the effects of larger deficits, financed through either money creation or the issuance of domestic debt instruments, on inflation and real interest rates.

Public deficits are financed by surpluses from other sectors. So the public deficit can be rewritten in terms of the economy's aggregate resource or saving-investment constraint:

$$(2) \quad \begin{aligned} \text{Public deficit} &= \text{Public investment} - \text{Public saving} \\ &= (\text{Private saving} - \text{Private investment}) + \text{Foreign saving}. \end{aligned}$$

Larger public deficits must lead to some combination of lower private consumption (at a given level of private income), lower private investment, and higher foreign saving. The question is what determines that combination: which of the three components on the right side of equation 2 bears the burden of higher public deficits? The answer depends broadly on five factors that influence the private domestic and foreign response to public deficits: the flexibility and sophistication of domestic financial markets, access to external financing, the source of domestic financing (money or bonds), the forward-looking behavior of consumers and investors, and the composition of the deficit.

The common framework for analyzing the sensitivity of private consumption and investment to fiscal policies is that of consumer and investor behavior constrained by imperfect access to financial markets. The specification of private consumption considers three alternative hypotheses: the Keynesian hypothesis that only current taxation affects consumption; the permanent (long-term) income hypothesis that only permanent taxation matters because consumers spend a proportion of the present value of their expected lifetime income; and the Ricardian hypothesis that only permanent government consumption affects private consumption because any increase or decrease in taxes is offset by an equivalent change in the opposite direction in private saving. The specification of private investment considers the direct and indirect (through higher interest rates) effects of the deficit as well as whether an increase in public investment causes private investment to rise or fall. Econometric estimations can quantify the impact of the deficit (and of the composition of the underlying spending and financing) on private consumption and investment, including the indirect effects through inflation and real interest rates.

Specification of the behavior and sensitivity of the trade deficit and the real exchange rate to public deficits and fiscal policy-related variables follows the framework of Rodríguez (1989). Through a two-step relation linking the deficit and the real exchange rate, the analysis shows how fiscal policies affect private spending and the accumulation of foreign assets. The fiscal deficit (among other determinants of private spending) affects the external deficit, which then determines the real exchange rate that is consistent with the clearing of the market for nontraded goods. Statistical estimation of these relations can quantify the impact of the deficit and its composition (public spending on traded and nontraded goods and services) on the trade balance and the real exchange rate.

Data for the ten sample countries were plugged into this common framework for money and financial markets, private consumption and investment,

and the trade deficit and real exchange rate. Except for some portfolio demand estimations, which were based on quarterly data, most of the estimations were performed using annual data, typically covering the 1960s through the 1980s. The quantitative results of the country analyses, complemented by additional cross-country evidence, are summarized for money and domestic debt financing. Qualitative results are presented for the effects of deficits and fiscal policies on private consumption and investment, the trade balance, and the real exchange rate. (The full set of quantitative estimation results is available in the case studies listed in the reference section.)

Several policy implications are derived from this empirical evidence. Relying on a representative set of case studies rather than on pooled cross-country studies or individual case studies permits more reliable inferences to be drawn about the unsettled issues regarding deficits and their macroeconomic consequences. The countries selected for study—Argentina, Chile, Colombia, Côte d'Ivoire, Ghana, Morocco, Mexico, Pakistan, Thailand, and Zimbabwe—were chosen for the diversity of their fiscal and other macroeconomic policies and experiences and for how well they represent the developing world at large. The sample includes fiscal adjusters and nonadjusters, high- and low-deficit countries, large and small economies, low- and high-inflation cases, and countries with and without well-developed financial markets and with and without access to foreign financing.

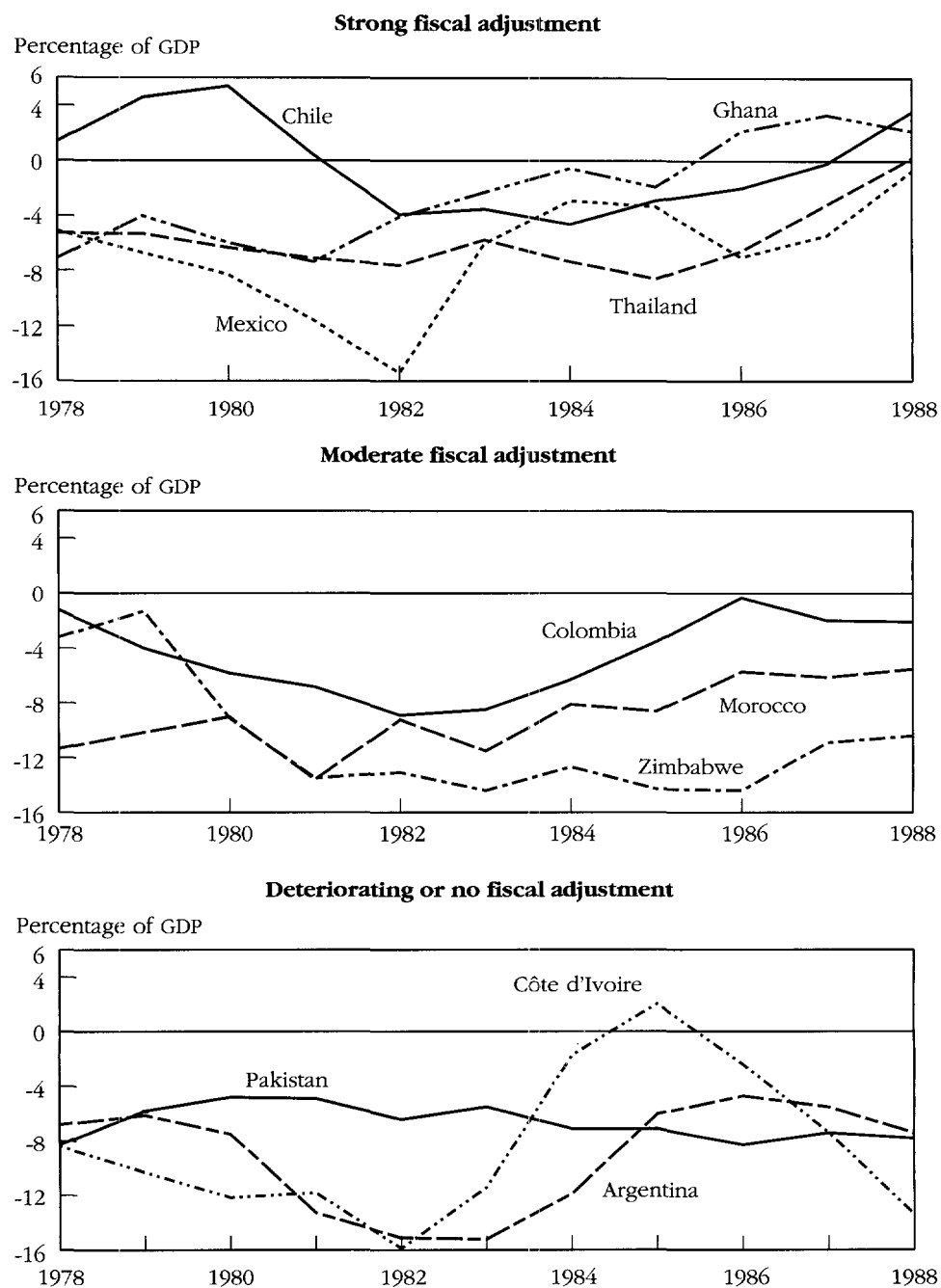
One final point on methodology. This article focuses on how public deficits influence the macroeconomy, but the case studies also examined influences in the other direction. They found that foreign and domestic macroeconomic shocks play only a minor role in cyclical variations or long-run changes in non-financial public sector deficits—fiscal policymakers get both the blame for fiscal crises and the credit for fiscal adjustment (see Easterly and Schmidt-Hebbel forthcoming for a summary). Ignoring the feedback effects thus seems to be a benign simplification.

Deficit Measurement and Fiscal Performance

How the fiscal deficit is measured has an important bearing on an analysis of the macroeconomic implications of deficits.² Two key dimensions are the composition of the public sector and the economic relevance—or quantifiability—of various types of deficit measures.

The composition of the public sector can be defined in three alternative ways: central government only; consolidated nonfinancial public sector, which adds local government, social security, and nonfinancial public enterprises; and consolidated total public sector, which adds the central bank and, sometimes, public commercial banks. Deficit measures based on the most inclusive definition of public sector are the most accurate measures of a country's fiscal position and public sector resource transfers, but they are not always readily

Figure 1. Patterns of Fiscal Adjustment in Ten Developing Countries, 1978–88



Note: Based on the consolidated nonfinancial public sector balance in each country.
Source: Country case studies listed in the references.

available and are frequently subject to arbitrary accounting conventions that sharply reduce their usefulness.

Nominal consolidated nonfinancial public deficits in the 1980s present one picture for each of the ten sample countries (figure 1). Chile, Ghana, Mexico, and Thailand show strong fiscal adjustment; Colombia and Morocco display more gradual but steady improvement; and Zimbabwe demonstrates partial adjustment in the late 1980s. Argentina, Côte d'Ivoire, and Pakistan show no adjustment or even a deterioration in fiscal accounts.

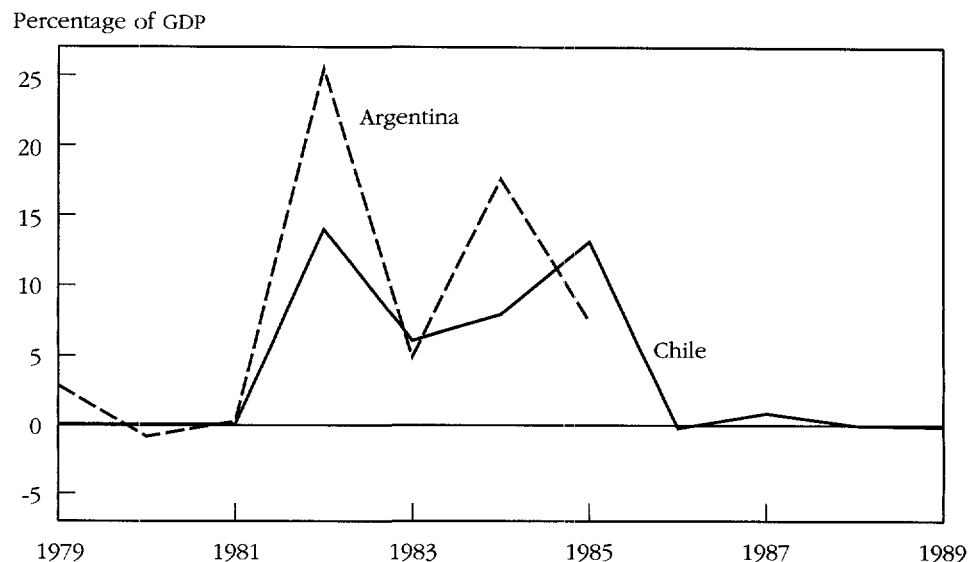
But consolidated nonfinancial public sector deficits do not always show the whole picture. They leave out an important fiscal element, the losses of the central bank or other public financial intermediaries from quasi-fiscal operations that subsidize activities in the private sector. Among the ten countries, deficits in quasi-fiscal operations are exclusively a Latin American phenomenon. The central banks in Argentina and Chile extended emergency loans to financial institutions and suffered losses from exchange rate guarantee programs. A comparison of quasi-fiscal deficits and conventional nonfinancial public sector deficits in the two countries illustrates how misleading nonfinancial public sector deficits are as indicators of overall fiscal policy when quasi-fiscal operations are large (figure 2). In Argentina quasi-fiscal deficits were roughly as large as conventional deficits during 1982–85; together they averaged 25 percent of gross domestic product (GDP) a year. In Chile quasi-fiscal deficits averaged more than 10 percent of GDP a year during the same period, more than double the size of conventionally measured deficits.

There are also several options for measuring the deficit in ways that are more or less economically relevant. The nominal cash approach permits broad comparability of deficits across countries. A variant, the operational deficit, deducts the inflationary component from nominal interest payments on public debt. This deduction, which reflects the compensation of debt holders for erosion of the real value of public debt caused by inflation, is an important correction for high-inflation, high-domestic-debt countries.

An accrual, or payments-order, approach measures income and spending actions when they occur, even if they do not immediately involve cash flows. Deficits measured on an accrual basis would be larger than those measured on a cash basis when arrears have been allowed to accumulate on government payments of interest, wages, or purchases of goods. Accrual-based deficits open the door to a whole set of unconventional measures of the deficit based on considerations of public net worth or intertemporal budget constraints. Such measures would constitute the most meaningful gauge of a government's fiscal position, but they are not observable.

There are other economically meaningful measures. One is the sustainable public deficit of Buiter (1983, 1985, 1990) and van Wijnbergen (1989), a deficit that can be financed without raising debt levels (relative to GDP) under feasible rates of growth, real interest, and inflation. Another is the public sector solvency measure of Hamilton and Flavin (1986), Grilli (1989), Wilcox (1989), and

Figure 2. Consolidated Quasi-fiscal Deficits in Argentina and Chile, 1979–89



Source: Argentina, Rodriguez (1991); Chile, Marshall and Schmidt-Hebbel (1991).

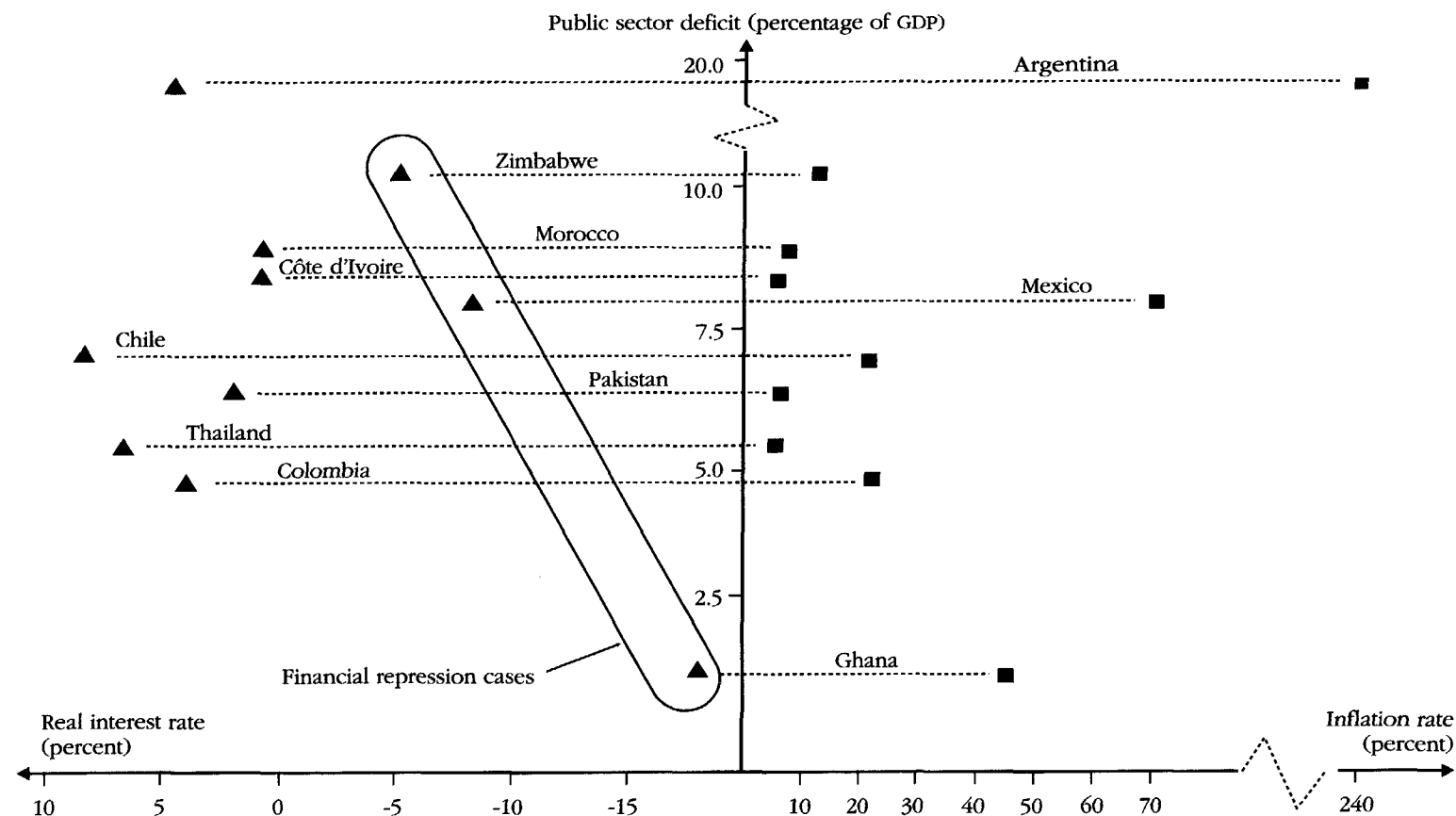
Buiter and Patel (1990), which checks for public sector solvency by comparing the rate of growth of the public debt (relative to GDP) to the real interest rate. If the debt ratio systematically grows faster than the real interest rate, the public sector is considered insolvent.

Despite the usefulness of these measures for assessing overall fiscal stance and issues of sustainability and solvency, the questions addressed in this analysis require the use of cash-based operational (or nominal) deficit measures with the widest available coverage of the public sector. The analysis of deficits, inflation, and interest rates uses consolidated total (nonfinancial plus quasi-fiscal) public sector deficits. The analyses of deficits and private sector response and of deficits and the real exchange rate use operational consolidated non-financial public deficits, because there are no long time-series data for quasi-fiscal deficits.

Inflation, Real Interest Rates, and Financial Repression

The relations between deficits and inflation and between deficits and real interest rates are far from simple (figure 3). With low to medium rates of inflation, there is no relation across countries between long-term inflation (1980–88)

Figure 3. Fiscal Deficits, Real Interest Rates, and Inflation in Ten Developing Countries, 1978–88 Averages



Note: Public sector deficits are for the total consolidated nonfinancial public sector in each of the ten countries, with quasi-fiscal deficits added for Argentina, Chile, and Mexico.

Source: For deficit data, see country case studies listed in the references; for inflation and nominal interest rates, see IMF (annual).

and public deficits. However, countries with the highest rates of inflation—Argentina and Mexico during the 1980s—had significantly higher deficits than countries with lower rates. Similarly, domestic real interest rates show no correlation with public deficits across countries except in the case of high-deficit, high-interest rate Argentina.

The lack of correlation across countries between deficits and inflation and deficits and interest rates is attributable primarily to the different ways that countries finance their public deficits. To account for the effects of these differences, a more detailed understanding is needed of the links between domestic deficit financing and inflation and interest rates.

Fiscal Deficits and Inflation

On average over the long term, developing countries have relied more on money creation (seigniorage) to finance deficits than have industrial countries (table 1). Various factors, including unstable demand for money, exchange rate depreciation, and widespread indexation, blur the relation between money financing and inflation over shorter periods. In the long run, however, an increasingly unfavorable tradeoff between inflation and money creation becomes evident, which explains why money creation is generally used only as a last resort. The last column of table 1 shows the amount of additional inflation required to achieve an additional percentage point in long-run seigniorage revenue relative to GDP, derived from estimates of how much money people are willing to hold at different inflation rates. The tradeoff is still favorable in countries with low inflation (5 percentage points of additional inflation in Thailand), worsens in countries with moderate inflation (15 to 20 percentage points in Colombia and Ghana), and becomes untenable in countries with high inflation (97 percentage points in Argentina), where money holders replace most of their local currency holdings with foreign currency and interest-bearing assets.

Except for Chile, these results are remarkably similar to those derived from more comprehensive models for the long-term effects on price levels of transitory deficits financed by money creation (reported in table 2). These models also consider feedback effects on inflation from asset substitution (and from output, in the cases of Colombia and Pakistan). The four countries with results show that financing a percentage point increase in the deficit (as a share of GDP) through money creation boosts inflation from 10 percent (Zimbabwe) to 18 percent (Pakistan).

Considering the unfavorable tradeoff in most cases and the general aversion to high inflation, it is hard to believe that revenue motivations alone explain chronic high inflation. More likely, the cause is the inability of governments to make credible commitments to fiscal and monetary targets, leading to a loss of confidence and increased substitution away from money (Blejer and Liviatan 1987; Kiguel and Liviatan 1988).

Table 1. Money Creation and the Inflation Tax in Ten Developing Countries, 1965–89

Country	Seigniorage ^a (percentage of GDP)	Inflation ^b (percent)	Percentage increase in inflation to achieve a 1 percentage point increase in seigniorage revenue
<i>Case study countries</i>			
Argentina	4.2	115.3	97
Chile	3.7	56.6	23
Colombia	2.1	17.7	15
Côte d'Ivoire	1.3	7.6	—
Ghana	3.1	31.6	20
Mexico	3.1	28.9	—
Morocco	1.7	6.1	8–26
Pakistan	2.0	8.0	—
Thailand	1.0	5.7	5
Zimbabwe	1.1	7.7	10
Average 10 countries	2.3	28.5	n.a.
<i>Other countries</i>			
Average of 35 developing countries	2.1	—	n.a.
Average of 15 industrial countries	1.0	—	n.a.

— Not available.

n.a. not applicable.

Note: The period covered is generally 1965–89, but coverage varies according to data availability.

a. Defined as the nominal change in the money base each month divided by the consumer price index for that month. The typical method of calculating the ratio of the nominal change in the money base over the entire year to the annual nominal GDP can seriously overstate seigniorage in high-inflation countries.

Although interest paid on reserves should also be subtracted to get a true estimate of seigniorage, the data are generally lacking, and, in any case, few developing countries pay interest on reserves. An important exception is Argentina, where the combination of high inflation and interest paid on reserves makes this adjustment important.

b. Average annual rates of change in the consumer price index between 1964 and 1988.

Source: For Argentina, Colombia, Ghana, and Morocco, country studies listed in the references; for Chile, Thailand, and Zimbabwe, calculated from seigniorage and inflation rates in columns 1 and 2 and long-run money demand inflation semi-elasticities of country studies listed in references; for other countries, Easterly and Schmidt-Hebbel (1991). Inflation data are from IMF (annual).

Fiscal Deficits and Interest Rates or Financial Repression

Real interest rates have risen in many developing countries following financial reform, often becoming positive for the first time in years. Argentina, Chile, Colombia, Morocco, Pakistan, and Thailand introduced financial reforms in the 1970s, and their real interest rates reached positive levels in the 1980s (table 3). Ghana, Mexico, and Zimbabwe maintained interest rate controls during most of the 1980s (Mexico liberalized its rates in 1988) and reaped substantial revenue from this implicit tax on financial assets, particularly during the international credit crunch following the debt crisis of 1982. Average annual revenue for the three countries from financial repression of deposit interest rates during

Table 2. Simulation Results for Long-term Effects of Fiscal Deficits on Inflation and Real Interest Rates
(percent)

Country	Effect of a 1 percentage point increase in the deficit to GDP ratio	
	On the price level with money financing	On the interest rate, with domestic debt financing
Chile	14	0.1
Colombia	14	3.0
Morocco	—	0.2
Pakistan	18	1.1
Zimbabwe	10	2.7

— Not available.

Note: This table presents the long-term effects of a transitory (one year) increase in the public deficit, financed by issuing either domestic noninterest-bearing monetary liabilities or domestic interest-paying debt. The results for Chile and Zimbabwe are based on portfolio models combined with the public sector budget equation, while those for Colombia, Morocco, and Pakistan are based on macroeconomic-portfolio general equilibrium specifications.

Source: Country case studies listed in the references.

Table 3. Evolution of Real Interest Rates following Financial Reform or Repression in the 1980s

Country	Real interest rate on deposits ^a (percent)		Tax revenue on deposits ^b due to financial repression (percentage of GDP)
	1970–79	1980–88	1980–88
Argentina	-17.2	4.8	n.a.
Chile	-15.9	8.1	n.a.
Colombia	-6.3	0.7	n.a.
Ghana	-18.8	-18.3	0.5
Mexico	-4.6	-8.4	1.6
Morocco	-3.1	1.8	n.a.
Pakistan	-3.4	2.1	n.a.
Thailand	-0.5	6.5	n.a.
Zimbabwe	-3.7	-4.3	0.8

n.a. Not applicable.

a. Average annual real interest rates on time deposits, calculated using the consumer price index.

b. Average annual revenue calculated as the difference between domestic real interest rates and average real interest rate of OECD countries.

Source: Country case studies listed in the references.

1980–88 ranged from 0.5 percent of GDP for Ghana to 1.6 percent for Mexico. Holding down nominal interest rates under high inflation was a quick and easy way to compensate for the loss of external financing after 1982.

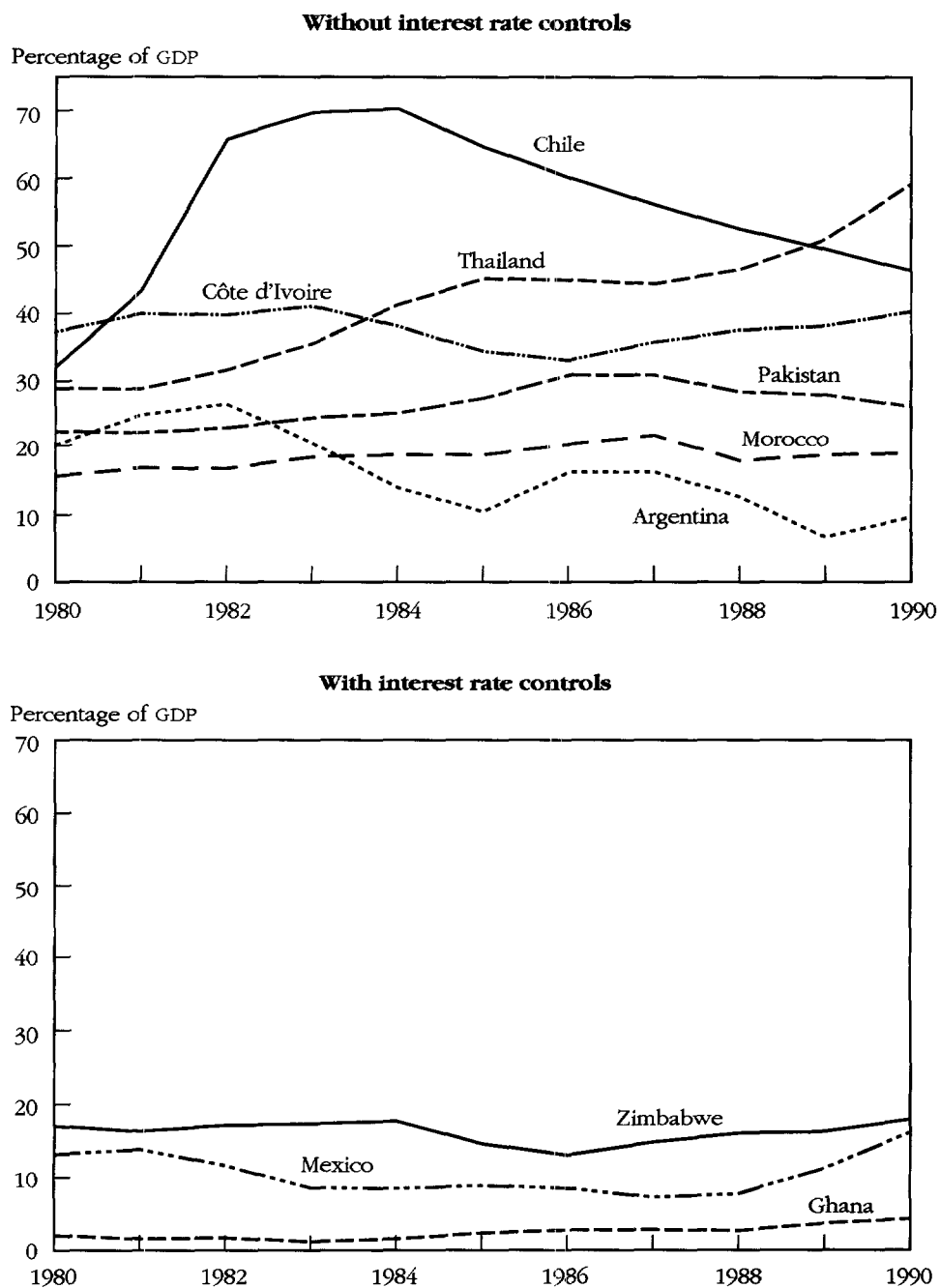
There is a cost, however, in repressed private credit and investment, as other studies have argued (Chamley and Honohan 1990; Easterly 1989; Giovannini and de Melo 1990). There are large differences in domestic private credit between countries with deregulated financial markets and those with stringent financial controls—for the sample countries, an average 30 percent of GDP in the first group compared with 10 percent in the second during 1980–90 (figure 4). Mexico's experience well illustrates the effects of financial repression under rising inflation. Financial controls intensified after 1981 as inflation soared, and the ratio of private credit to GDP dropped below already low levels. Following financial liberalization, the ratio doubled in two years. In Ghana, private credit was at a dismally low level in the late 1980s, reflecting years of financial repression, including two episodes of outright expropriation of financial assets. Countries that abstained from repressive interest rate controls, such as Chile and Thailand, had very high levels of private credit, which may partially explain their superior investment and growth performance in the late 1980s.

The massive decline in private credit in Argentina reflects a more unusual kind of financial behavior. The government oscillated between paying high interest rates and depressing the value of domestic liabilities through surprise devaluations and other undesirable methods, including the forced conversion of time deposits into near-worthless government bonds in 1990. This tactic was necessary because the high interest rates fueled the accumulation of more debt. In a classic example of a debt spiral, the government borrowed more to meet rising interest payments on the debt, which pushed interest rates and borrowing up even higher in the next period, and so on. The following data from Rodríguez (1991) chronicle the inevitable rise in interest rates at the outset of successive economic plans, each of which opened with a devaluation.

<i>Plan</i>	<i>Initial devaluation (percent)</i>	<i>Nominal interest rate (monthly) (percent)</i>
Austral, June 1985	40	7
Primavera, August 1988	24	10
Bunge Born I, July 1989	200	17
Bunge Born II, December 1989	54	60
Erman Plan, January 1990	220	100

Simulation results for the long-term effects on real interest rates of a transitory percentage point increase in the deficit (relative to GDP) financed through domestic borrowing show wide variation, reflecting differences in the willingness of asset holders to shift from alternative forms of savings (table 2). In Chile and Morocco a 1 percentage point increase in the deficit could be absorbed with only a modest 0.1 to 0.2 percentage point increase in real inter-

Figure 4. Private Credit under Financial Liberalization and Repression in Nine Developing Countries, 1980-90



Source: Country case studies listed in the references.

est rates. Larger increases of 1.1 to 2.7 percentage points were required in Colombia, Pakistan, and Zimbabwe (after interest decontrol) to convince markets to absorb the increase in domestic debt. With such a high tradeoff, these countries would have only two choices when domestic borrowing triggers a domestic debt spiral: to clamp down hard on interest rates, as Zimbabwe did up to 1991; or to follow the more desirable course of fiscal adjustment, as Morocco and Colombia did.

These results for domestic debt financing and real interest rates (or financial repression) and those for money financing and inflation indicate strong correlation in both cases in developing countries. Increasingly unfavorable tradeoffs between these financing sources and the rates of return on government liabilities—leading in extreme cases to hyperinflation, debt repudiation, or the virtual disappearance of domestic capital markets—imply that there is no alternative to fiscal adjustment for ensuring monetary and financial stability.

Private Response to Public Deficits

The macroeconomic effects of deficits are determined to a large extent by the direct response of private spending—consumption and investment—to changes in the deficit and its composition. The way governments adjusted their fiscal imbalances during the 1980s—frequently by cutting public investment—was often costly for private investment. In the ten sample countries, private investment declined sharply from an average of 13 percent of GDP in 1981 to 9 percent in 1986. Meanwhile, consumption, both public and private, was relatively insulated. Not even the sharp increases in public consumption of the 1970s—increases that had much to do with the subsequent fiscal crises—were moderated during the adjustments of the 1980s. To provide some insight into how the private sector responds to fiscal policies, we first identify the channels of transmission between fiscal policies and private spending and then assess their empirical relevance.

Private Consumption and Fiscal Policies

Fiscal policies affect private consumption and saving through two major channels: disposable income and rate of return (real interest rate). An increase in the deficit resulting from a cut in current taxes boosts private consumption by increasing *disposable income*, according to the standard Keynesian hypothesis that consumers increase spending when their current income rises. If the tax cut is temporary, the effect will be minimal according to the permanent income hypothesis, which states that only permanent (long-run) tax cuts significantly affect consumer spending.

Both these hypotheses are wrong according to Barro's Ricardian equivalence hypothesis, which claims that consumers react the same whether the govern-

Table 4. *Qualitative Effects of Fiscal Policy-Related Variables on Private Consumption and Investment*

Country	Period	Sensitivity of private consumption to						Real interest rate	Sensitivity of private investment to					Cost of capital	
		Disposable income		Public saving		Public surplus			Public capital		Public deficit	Public consumption	Public revenue	Real user cost	Interest rate
		Current	Permanent	Current	Permanent	Current	Permanent		Stock	Flow					
Argentina	1915-84;1961-84		+	..	..		+	..	..	0	..	-	+	..	..
Chile	1960-88	+	+	..	0	..	..	0	..	..	..	..	..	..	..
	1961-88	..	..	..	..	..	..	..	..	-/0	..	..	..	-/0	..
Colombia	1971-86	+	+	0	..	..	..	+	..	..	..	..	..	..	..
	1925-88	..	..	..	..	..	..	..	-	..	..	..	..	0	..
Côte d'Ivoire	1972-87	+	..	..	..	0	..	..	..	..	-	..	..	..	..
Ghana	1969/70-88	+	+	..	..	0	..	0	..	..	..	..	..	..	..
	1967-88	..	..	..	..	..	..	..	..	-	..	..	..	..	0
Mexico	1981.I-1989.IV	+	0	..	0	..	..	-	..	..	..	..	..	..	..
	1970-89	..	..	..	..	..	..	..	..	-/0	..	..	..	-	..
Morocco	1972-88	..	+	..	..	..	+	0	..	+	..	..	..	-	..
Pakistan	1963-87	..	+	..	0	0	..	..	..	..	..	..	..	..	..
	1972/73-87/88	..	..	..	..	..	..	..	+	..	..	..	..	-	..
Thailand	1971-87	+	..	..	..	..	..	+	..	+	-	..	..	..	..
Zimbabwe	1965-88	+	+	..	+	..	..	0	..	+	..	..	..	-	..

+ and - correspond to statistically significant coefficients; 0 denotes a coefficient not significantly different from zero; .. denotes not available.

Note: Specifications and estimation techniques vary by country. The dependent variable "private consumption" enters in levels for Argentina, Ghana, and Pakistan; log levels for Morocco and Thailand; both levels and log levels for Colombia; ratio to national income for Côte d'Ivoire; and ratio to private disposable income for Chile, Mexico, and Zimbabwe. The dependent variable "private investment" enters in levels for Argentina; log levels for Thailand; ratio to GDP for Chile, Ghana, Mexico, and Zimbabwe; log ratio to GDP for Morocco; and either level, log level, or ratio to GDP for Colombia. For Pakistan, the dependent variable is the private capital stock to GDP ratio. Because of data limitations, the dependent variable is the domestic investment to national income ratio for Côte d'Ivoire.

Source: Country case studies listed in the references.

ment finances its spending through debt or taxes because consumers foresee that a tax cut today, paid for by a deficit and borrowing, will lead to a tax increase in the future. In anticipation of that future tax increase, consumers save rather than spend the income from the tax cut. So a tax cut that simply substitutes debt finance for tax finance of unchanged government spending would leave consumer spending unchanged—and would lower it as a share of now higher disposable income. In short, according to this argument, higher government deficits from tax cuts cause an offsetting increase in private saving. The argument, first skeptically postulated by Ricardo and affirmed in the recent literature by Barro (1974), rests on two main and rather stringent assumptions: that consumers are concerned with their own future welfare and that of their descendants and that consumers can shift consumption over time by borrowing or lending whenever they wish.

There is another reason—unrelated to the Ricardian hypothesis—why a deficit increase resulting from a tax cut could cause private saving to rise. Under conditions of strict credit and interest rate controls, with government having the first claim on credit, an increase in the deficit (a fall in government saving) reduces the credit available to the private sector, forcing consumption to contract and causing saving to rise. This effect, which may be hard to distinguish from the Ricardian hypothesis, may be termed the direct crowding-out hypothesis.

The *real interest rate* determines how consumers schedule their consumption over time, assuming they have access to credit. The effect of the interest rate on today's consumption is ambiguous according to the offsetting substitution, income, and wealth effects. An increase in interest rates causes consumers to substitute consumption tomorrow for consumption today, but it also induces consumers to feel richer and thus to spend more both today and tomorrow—unless this wealth stems significantly from future income streams inflated by the interest rise. Credit controls would block the effect of the real interest rate on consumption.

Econometric estimates for the ten sample countries provide a sense of the qualitative effects of these fiscal policy-related variables on private consumption (table 4). For most of the countries both current (or transitory) and long-run (or permanent) disposable income levels are found to be important determinants of private consumption—and often by magnitudes halfway between those implied by the Keynesian hypothesis and those by the permanent income hypothesis.

Does public saving or the public surplus affect private consumption directly, as implied by the Ricardian and direct crowding-out hypotheses? For most countries it does not: permanent public saving does not significantly offset private consumption in Chile, Mexico, or Pakistan; current public saving or surpluses do not affect consumption in Colombia, Côte d'Ivoire, Ghana, or Pakistan. In three cases, however, changes in public saving (or surplus) cause consumption (or the saving rate) to move in the same direction, which is consistent with both the Ricardian and the direct crowding-out hypotheses. Private

consumption rose with permanent public surpluses in Argentina and Morocco and with permanent public saving in Zimbabwe. Although the coefficients were significant and positive, they were much lower than those for permanent income, implying—contrary to the Ricardian hypothesis—that tax cuts would affect consumption and that public saving would have a positive net effect on total saving.

These three cases could have supported the Ricardian explanation only if these countries had freely operating financial markets, so that consumers could shift their consumption over time in anticipation of future tax increases. In fact, however, Argentina did not liberalize its financial markets until 1977, late in the sample period, while Morocco and Zimbabwe had institutional arrangements giving the public sector preferential access to domestic credit. These facts suggest that direct crowding out of private consumption by public deficits is the more likely explanation for the direct link between public deficits and private consumption in these three countries. Corbo and Schmidt-Hebbel (1991) achieved similar results for a different sample of developing countries.

The ten case studies provide little evidence that real interest rates favorably affect private saving, a result consistent with findings for other developing countries. The real interest rate showed significant effects in three countries. Rising real interest rates depressed private consumption and boosted saving in Mexico (signaling the dominance of the intertemporal substitution effect) but increased consumption and reduced private saving in Colombia and Thailand. The absence of significant results in five other cases suggests either that the substitution, income, and wealth effects cancel each other out or that financial market constraints prevent consumers from responding to interest rate swings by shifting consumption across time. Borrowing constraints are also behind Haque and Montiel's (1989) rejection of Ricardian equivalence for a set of developing countries.

Private Investment and Fiscal Policies

Fiscal policies affect private investment through three major channels: public investment, public deficits, and the user cost of capital. Public capital could be a close substitute for private capital, driving down the rate of return on private investment. Public investment in steel plants is an obvious example. But governments also invest in activities that do not attract private investment, but that raise the return of other private projects, such as infrastructure projects. Thus, the higher the complementarity of public and private capital, the more likely that public investment will have a net positive effect on private investment. If there is domestic financial repression of interest rates and the public sector is given preferential access to domestic credit, the public deficit could crowd out private investment. When interest rates are not regulated, deficit financing through domestic borrowing tends to push up real interest rates, diminishing the profitability of investment by raising the user cost of capital.

(The user cost of capital is determined by the real interest rate, the price of investment goods, and investment incentives.)

Consistent with the theoretical ambiguity of the relation between public capital and private investment, the case studies found sharply different results for the qualitative effects of fiscal policy variables on private investment (see table 4). (For brevity, other investment determinants included in the estimations, such as the marginal product value of capital, foreign saving, firm profits, or banking credit to firms, are not discussed here.) For Pakistan each percentage point increase in the ratio of public capital stock to output results in a 2.1 percentage point increase in the ratio of private capital stock to output. A similar relation is found for Zimbabwe, but the effect is smaller than in Pakistan. By contrast, an increase in public capital stock in Chile and Colombia tends to lower private investment.

Some of the country studies used public investment rather than public capital stock, again finding opposite effects in different countries. For Ghana and Mexico increasing public investment reduces private investment (although the effect was weak for Mexico), while for Thailand private investment rises with public investment. For Argentina no significant relation was found. The Morocco study found that public investment contributes to growth, from which it is plausible to infer that private capital formation rises with public investment because growth boosts private investment.

Thus, only three countries provide direct evidence for the widespread presumption that public sector investment is good for private investment. Aschauer's study (1989) for the United States found that increases in public capital were associated with a large increase in private investment. It seems reasonable to infer, then, that for countries with a negative relation between public and private investment (Chile, Colombia, Ghana, and Mexico) or none at all (Argentina), public investment is concentrated in activities that substitute directly for private investment.

Public deficits have a negative effect on private investment in Côte d'Ivoire, where the effect is weak, and in Thailand, where the effect is strong. For Argentina, the analysis decomposed the deficit into its three major components, finding that public investment does not affect private capital formation, but that public consumption and public revenue do, in directions consistent with the crowding-out hypothesis. The inference, then, is that deficits tend to crowd out private investment through domestic financial markets in Argentina, Côte d'Ivoire, and Thailand.

Although many studies have found that private investment is insensitive to interest rates, the results for the sample countries show a surprisingly strong relation in five of them, with only two—Colombia and Ghana—showing no relation. The effect of interest rates on private investment is strongest in Morocco and Pakistan, moderately strong in Zimbabwe, and weakest in Chile and Mexico.

Table 5. *Qualitative Effects of Fiscal Policy Variables on the Trade Surplus and the Real Exchange Rate*

Country	Period	Sensitivity of the trade surplus to ^a					Sensitivity of the real exchange rate to ^b		
		Public surplus			Public expenditure		Trade surplus	Public expenditure	Public deficit
		Total	Primary	Operational	Consumption	Investment			
Argentina	1963–88	..	+	..	..	..	..	..	..
	1964–87	..	..	..	..	..	–	+	..
Chile	1960–88	..	..	+	..	..	–	–	..
Colombia	1970–88	..	+	..	..	..	..	..	..
	1967–87	..	..	..	..	..	–	–	..
Côte d'Ivoire	1971–81	..	0	..	..	..	..	..	..
	1979–89	..	+	..	..	..	..	..	..
	1972–87	..	..	..	..	..	..	+	..
	1972–89	..	..	..	..^c	..	–	0	..
Ghana	1970–88	..	..	..	–	..	..	..	+
Mexico	1970–89	..	..	+	..	..	–	–	..
Morocco	1974–88	..	..	..	–	..	–	+	..
Pakistan	1983/84–87/88	..	..	..	..	–	+	..	..
Thailand	1972–89	+	..	..	..	..	–	..	..
Zimbabwe	1965–88	..	..	+	..	..	–	+	..

+ and – correspond to statistically significant coefficients; 0 denotes a coefficient not significantly different from zero; and .. denotes not available.

Note: Specifications and estimation techniques vary by country. The dependent variable “current account or trade balance” enters as a ratio to GDP for Argentina, Chile, Colombia, Côte d'Ivoire, Mexico, and Thailand; in levels for Ghana, Morocco, and Pakistan; and as a log ratio to GDP for Zimbabwe. The dependent variable “real exchange rate” enters as levels for Côte d'Ivoire, Ghana, and Thailand; as levels distinguishing between the relative export price and the relative price for Chile, Mexico, and Zimbabwe; as natural logs of the import price for Argentina; and as natural logs of the real exchange rate for Colombia.

a. The effects for Morocco and Pakistan are not the coefficients for one structural equation but represent the general equilibrium effect of a change in the exogenous variable on the current account surplus (in Morocco) or the trade surplus (in Pakistan). For Morocco, the sign reflects the current account deterioration as a result of a foreign-financed increase in government consumption. For Pakistan, the sign reflects the trade surplus improvement based on the impact of a deficit reduction through lower public investment.

b. The effects for Morocco, Pakistan, and Thailand are not the coefficients for one structural equation but represent the general equilibrium effect of a change in the exogenous variable on the corresponding endogenous variable. For Morocco, the reported effects combine the simulation results of a domestic debt-financed increase in public expenditure and a foreign-financed increase in public expenditure. For Pakistan, the effect of an appreciation of the real exchange rate is brought about by a 10 percent reduction of the public deficit through lower public investment, which causes domestic prices to rise with a fixed nominal exchange rate. For Thailand, the reported effect summarizes the simulation results of domestically financed deficits, which cause a trade deficit and a real exchange rate depreciation.

c. The coefficient for Ghana is for aggregate private expenditure.

Source: Country case studies listed in the references.

Public Deficits, Trade Deficits, and Real Exchange Rates

For the 1980s real exchange rates are closely correlated with the behavior of fiscal deficits in many developing countries, supporting Edwards' finding (1989) that the real effects of nominal devaluations last only if the devaluations are accompanied by fiscal adjustment. To provide more systematic evidence on the links among the fiscal deficit, the trade deficit, and the real exchange rate, behavioral relations for these variables were tested for the sample countries using Rodríguez's model (1989). Econometric estimates were derived for the sensitivity of the trade balance and the real exchange rate to various fiscal variables (table 5).

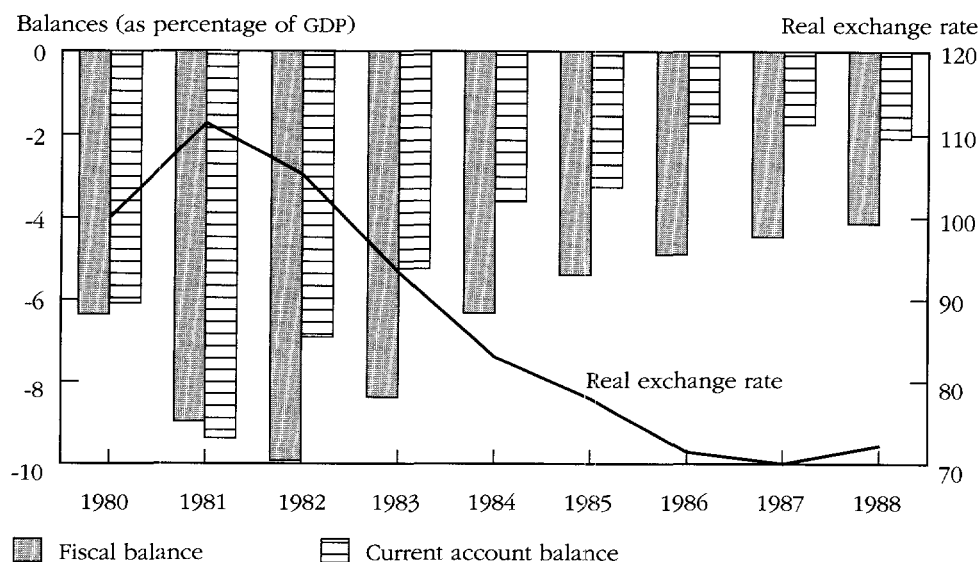
Model estimates for eight countries—Argentina, Chile, Colombia, Côte d'Ivoire, Ghana, Mexico, Thailand, and Zimbabwe—found significant evidence that rising public surpluses are accompanied by rising trade surpluses. A similar relation was found for Pakistan—reducing the fiscal deficit by reducing public investment improves the trade balance—based on a comprehensive macroeconomic model. That fiscal adjustment is a major determinant of external adjustment is also implied by the hypothesis that fiscal policy is an effective instrument for increasing national saving, as the substantial evidence presented in the preceding section shows.

The sample countries overwhelmingly demonstrate the sensitivity of the aggregate real exchange rate to the trade surplus and to fiscal variables (see table 5). For eight countries—Argentina, Chile, Colombia, Côte d'Ivoire, Mexico, Morocco, Thailand, and Zimbabwe—rising trade surpluses lead to depreciation of the real exchange rate. For Ghana a rising public deficit leads directly to appreciation of the real *official* exchange rate. The only contrary result was for Pakistan, where deficit reduction through reduced public investment leads to appreciation of the real exchange rate because of the depressing effect of lower public investment on domestic output. These findings, together with those on the positive relation between trade deficits and fiscal deficits, strongly support the hypothesis that real exchange rates move closely with fiscal deficits.

The studies also examined Rodríguez's hypothesis (1989) that, for a given trade deficit, an increase in public spending affects the real exchange rate because such an increase implies a corresponding decline in private spending. If the public sector has a higher propensity than the private sector to spend on imports rather than domestic goods, a shift to more public and less private spending implies increased demand for imports and a corresponding depreciation of the real exchange rate. Tests of this hypothesis show split results for the sample countries: higher government spending leads to an appreciation of the real exchange rate for Argentina, Côte d'Ivoire, Morocco, and Zimbabwe and to a depreciation for Chile, Colombia, and Mexico.

These empirical results support the notion that the real exchange rate is sensitive to both policy and external variables, with the fiscal deficit prominent among them. The strong contribution of fiscal adjustment to external adjust-

Figure 5. *Fiscal and External Balances and Changes in the Real Exchange Rate, 1980–88 Averages for Ten Developing Countries*



Note: Depreciation of exchange rate is shown as a decrease.
Source: Country case studies listed in references.

ment and, correspondingly, to depreciation of the real exchange rate is shown in figure 5, which presents average values for these three variables in the 1980s for the sample of ten countries. This average trend of steady fiscal improvement from 1982 to 1988 was not confined to the sample countries. Other developing countries showed similar, though less pronounced, deficit reduction, and industrial countries also cut their deficits in half during that period. Accompanying these fiscal adjustments were sharp reductions in current account deficits, supported by massive depreciations of real exchange rates.

Conclusions and Policy Implications

Although correlations across countries between deficits and inflation and deficits and real interest rates were found to be weak at best, the sample countries offer strong evidence that, in the medium term, money financing leads to higher inflation and debt financing to higher real interest rates or increased financial repression. As deficit financing mounts, the terms become increasingly unfavorable to the extraction of these unconventional taxes from the private sector.

The evidence soundly refutes the Barro-Ricardian proposition that consumers react the same to conventional taxes, unconventional taxes (inflation or financial repression), and debt financing. The notion that private saving can be

mobilized through higher real interest rates (resulting from increased debt financing of deficits or from financial liberalization) was also rejected. Both findings are in line with the recent empirical evidence on private saving behavior in developing countries, which was noted in the introduction to this article. Higher interest rates have a negative effect on private investment, however. This finding is consistent with investment theory, but it contradicts some of the empirical evidence showing that investment is insensitive to interest rates in developing countries. Increasing public investment was found to reduce private investment in some countries and to increase it in others. This result confirms previous studies showing that the net effect of public investment on private investment depends on its composition—whether it is a complement to or a substitute for private investment.

Strong evidence was also found in favor of the hypothesis that fiscal deficits spill over into external account deficits, leading, in turn, to depreciation of the real exchange rate.

Several policy implications can be derived from these findings:

- *Fiscal deficits and inflation.* For fiscal deficits financed by money creation, the relation between deficits and inflation is indisputable. Considering the unfavorable tradeoff between additional inflation and revenue, however, a fiscal motivation hardly explains chronic high inflation in countries such as Argentina, where revenue from the inflation tax is slight and comes at the high cost of macroeconomic instability and high variability in relative prices. The inflation tax (or seigniorage) is, at best, only a temporary means of generating revenue. And because the inflation tax *is* a tax, there is no reason to expect adjustment through inflation to be any less contractionary than conventional fiscal adjustment (see Dornbusch, Sturzenegger, and Wolf 1990 for similar arguments).
- *Fiscal deficits and real interest rates or financial repression.* Financing deficits through domestic borrowing pushes up real interest rates, which can easily start a debt spiral leading to debt repudiation. If domestic interest rates are controlled, however, the result is fiscal crisis: high fiscal deficits are correlated with strongly negative real interest rates, and the loss of access to external borrowing for financing fiscal deficits often leads to high taxes on domestic financial intermediation. But the poor economic performance that follows from strong financial repression, as depressed private credit brings about the collapse of private investment, hardly recommends this solution to fiscal crisis.
- *Budget deficits and private consumption.* The policy implication of rejecting the notion that consumers react the same to taxes or debt financing is that increasing public saving—reducing public deficits—is the most effective contribution fiscal policy can make to increasing national saving. However, increasing real interest rates through domestic debt financing or financial liberalization will not increase private saving.

- *Budget structure, deficits, and private investment.* Real interest rates and private sector credit do significantly affect private investment, so whether there is financial repression or not, increasing public deficits reduces private investment. The composition of public spending matters as well, since increasing public investment depresses private investment in some cases—typically when large public enterprises compete with private firms and have preferential access to domestic financial resources. The policy implication is that the prospects for higher private investment and growth are improved by privatizing or reforming public firms and marketing boards, concentrating public investment on public and social infrastructure, and deregulating domestic financial markets by removing credit ceilings and interest controls, compulsory credit allocation, and preferential access of the government to credit.
- *Fiscal deficits, trade deficits, and real exchange rates.* The evidence of a strong relation between fiscal and external deficits complements the policy implication derived from the finding that private saving does not offset changes in public saving: fiscal adjustment is effective in boosting national saving and, therefore, in increasing the trade surplus as well. Exchange rates are driven by fundamentals and not the other way around, which should serve as a reminder to policymakers that nominal devaluation alone cannot restore macroeconomic balance. As Khan and Lizondo (1987) have hypothesized, real exchange rates are also affected by whether government spends more on tradables than on nontradables. Policymakers should pay attention to the composition of government spending when deciding on an accommodating exchange rate policy.
- *Fiscal deficits and growth.* The conventional notion that public investment is good for private investment and growth received mixed support. Countries that were forced to shift from external to internal financing of deficits—often because of a debt crisis induced by fiscal mismanagement—had particularly poor growth in the 1980s. Growth makes deficits less harmful: countries such as Pakistan and Thailand could sustain larger deficits because of strong growth, while economic collapse exacerbated the macroeconomic effects of deficits in Argentina, Côte d'Ivoire, and Mexico. The virtuous circle between growth and good fiscal management is one of the strongest arguments for a policy of low and stable fiscal deficits.

Notes

William Easterly and Klaus Schmidt-Hebbel are on the staff of the Transition and Macro-adjustment Division of the World Bank's Policy Research Department. The article is based on work done for the World Bank research project 675-31. The authors thank Jorge Baldrich, Mario Blejer, Vittorio Corbo, Shantayanan Devarajan, Ricardo Ffrench-Davis, Nicolás Eyzaguirre, Stanley Fischer, Ravi Kanbur, Johannes Linn, Paolo Mauro, Carlos Rodríguez, Vito Tanzi, Martin Werner, two anonymous referees, and participants in the World Bank Conference on Macroeconomics of Public Sector Deficits (Washington, D.C.), the tenth Latin American Meeting of the Econometric Society (Uruguay), and seminars at CEMA-Universidad de San Andrés (Buenos

Aires), Central Bank of Chile (Santiago), Ministry of Finance of China (Beijing), and Ministry of Finance of Costa Rica (San José) for useful discussions and comments. The authors are also grateful for research assistance from Maria-Cristina Almero, Piyabha Kongsamut, and Raimundo Soto and for interaction with the participants in the research project.

1. The fully specified behavior-based models used in the analysis reported in this article can be found in Easterly, Rodríguez, and Schmidt-Hebbel (1989); Rodríguez (1989); and Fischer and Easterly (1990).

2. The most complete study to date on measurements of the fiscal deficit is Blejer and Cheasty (1991). Alternative measures are discussed in Blejer and Chu (1988), Buiter (1987), Eisner (1986), Fischer and Easterly (1990), Kotlikoff (1988); and Tanzi (1985). IMF (1986) and United Nations (1968) discuss cash and accrual deficits in more detail. Robinson and Stella (1988) and Teijeiro (1989) survey issues concerning quasi-fiscal deficits.

References

The word "processed" describes informally reproduced works that may not be commonly available through library systems.

Country Case Studies

Alberro-Semerena, José. 1991. "The Macroeconomics of the Public Sector Deficit in Mexico during the 1980s." World Bank, Country Economics Department, Washington, D.C. Processed.

Chamley, Christophe, and Hadez Ghanem. 1991. "Fiscal Policy with Fixed Nominal Exchange Rates: Côte d'Ivoire." WPS 658. World Bank, Country Economics Department, Washington, D.C. Processed.

Easterly, William. 1991. "The Macroeconomics of the Public Sector Deficit: The Case of Colombia." WPS 626. World Bank, Country Economics Department, Washington, D.C. Processed.

Faini, Riccardo. 1991. "The Macroeconomics of the Public Sector Deficit: The Case of Morocco." WPS 631. World Bank, Country Economics Department, Washington, D.C. Processed.

Haque, Nadeem U., and Peter Montiel. 1991. "The Macroeconomics of Public Sector Deficits: The Case of Pakistan." WPS 673. World Bank, Country Economics Department, Washington, D.C. Processed.

Islam, Roumeen, and Deborah Wetzel. 1991. "The Macroeconomics of Public Sector Deficits: The Case of Ghana." WPS 672. World Bank, Country Economics Department, Washington, D.C. Processed.

Marshall, Jorge, and Klaus Schmidt-Hebbel. 1991. "Macroeconomics of Public Sector Deficits: The Case of Chile." WPS 696. World Bank, Country Economics Department, Washington, D.C. Processed.

Morandé, Felipe, and Klaus Schmidt-Hebbel. 1991. "Macroeconomics of Public Sector Deficits: The Case of Zimbabwe." WPS 688. World Bank, Country Economics Department, Washington, D.C. Processed.

Ramangkura, Virabongsa, and Bhanupongse Nidhiprabha. 1991. "The Macroeconomics of the Public Sector Deficit: The Case of Thailand." WPS 633. World Bank, Country Economics Department, Washington, D.C. Processed.

Rodríguez, Carlos A. 1991. "The Macroeconomics of the Public Sector Deficit: The Case of Argentina." WPS 632. World Bank, Country Economics Department, Washington, D.C. Processed.

General References

Aschauer, David. 1989. "Is Public Expenditure Productive?" *Journal of Monetary Economics* 23 (March): 177–200.

- Barro, Robert J. 1974. "Are Government Bonds Net Wealth?" *Journal of Political Economy* 81 (December): 1095–117.
- Bernheim, Douglas B. 1987. "Ricardian Equivalence: An Evaluation of Theory and Evidence." In *NBER Macroeconomics Annual 1987*. Cambridge, Mass.: MIT Press for the National Bureau of Economic Research.
- Blejer, Mario I., and Adrienne Cheasty. 1991. "The Measurement of Fiscal Deficits: Analytical and Methodological Issues." *Journal of Economic Literature* 29 (4): 1644–78.
- Blejer, Mario I., and Ke-Young Chu, eds., 1988. *Measurement of Fiscal Impact: Methodological Issues*. IMF Occasional Paper 59. Washington, D.C.
- Blejer, Mario I., and Mohsin S. Khan. 1984. "Government Policy and Private Investment in Developing Countries." *IMF Staff Papers* 31 (2): 379–403.
- Blejer, Mario I., and Nissan Liviatan. 1987. "Fighting Hyperinflation: Stabilization Strategies in Argentina and Israel, 1985–86." *IMF Staff Papers* 34 (3): 409–38.
- Buiter, Willem. 1983. "Measurement of the Public Sector Deficit and Its Implications for Policy Evaluation and Design." *IMF Staff Papers* 30 (2): 307–49.
- . 1985. "A Guide to Public Sector Debt and Deficits." *Economic Policy* (November): 13–79.
- . 1990. "The Arithmetic of Solvency." In Willem Buiter, ed., *Principles of Budgetary and Financial Policy*. Cambridge, Mass.: MIT Press.
- Buiter, Willem, and U. Patel. 1990. "Debt, Deficits, and Inflation: An Application to the Public Finances of India." NBER Working Paper 3287. National Bureau of Economic Research, Cambridge, Mass. Processed.
- Chamley, Christophe, and Patrick Honohan. 1990. "Taxation of Financial Intermediation." wps 421. World Bank, Country Economics Department, Washington, D.C. Processed.
- Corbo, Vittorio, and Klaus Schmidt-Hebbel. 1991. "Public Policies and Saving in Developing Countries." *Journal of Development Economics* 36 (1): 89–116.
- Dornbusch, Rudiger. 1985. "Overborrowing: Three Case Studies." In Gordon W. Smith and John T. Cuddington, eds., *International Debt and the Developing Countries*. Washington, D.C.: World Bank.
- Dornbusch, Rudiger, and Stanley Fischer. 1991. "Moderate Inflation." wps 807. World Bank, Office of the Vice President, Development Economics, Washington, D.C. Processed.
- Dornbusch, Rudiger, Federico Sturzenegger, and Holger Wolf. 1990. "Extreme Inflation: Dynamics and Stabilization." *Brookings Papers on Economic Activity* 2: 1–84.
- Easterly, William. 1989. "Fiscal Adjustment and Deficit Financing during the Debt Crisis." In Ishrat Husain and Ishac Diwan, eds., *Dealing with the Debt Crisis*. Washington, D.C.: World Bank.
- Easterly, William, Carlos A. Rodríguez, and Klaus Schmidt-Hebbel. 1989. "Research Proposal: The Macroeconomics of the Public Sector Deficit." World Bank, Country Economics Department, Washington, D.C. Processed.
- Easterly, William, and Klaus Schmidt-Hebbel. Forthcoming. "The Macroeconomics of Public Sector Deficits: A Synthesis." In William Easterly, Carlos Rodríguez, and Klaus Schmidt-Hebbel, eds., *Public Sector Deficits and Macroeconomic Performance*. New York: Oxford University Press.
- Edwards, Sebastian. 1989. *Real Exchange Rates, Devaluation, and Adjustment*. Cambridge, Mass.: MIT Press.
- Eisner, Robert. 1986. *How Real Is the Federal Deficit?* New York: Free Press.
- Fischer, Stanley, and William Easterly. 1990. "The Economics of the Government Budget Constraint." *The World Bank Research Observer* 5 (2): 127–42.
- Giovannini, Alberto. 1983. "The Interest-Elasticity of Savings in Developing Countries." *World Development* 11 (7): 601–7.
- . 1985. "Saving and the Real Interest Rate in LDCs." *Journal of Development Economics* 18 (2–3): 197–217.

- Giovannini, Alberto, and Martha de Melo. 1990. "Government Revenue from Financial Repression." WPS 533. World Bank, Country Economics Department, Washington, D.C. Processed.
- Grilli, Vittorio. 1989. "Seigniorage in Europe." In M. de Cecco and Alberto Giovannini, eds., *A European Central Bank?* Cambridge, Eng.: Cambridge University Press.
- Hamilton, J., and Marjorie Flavin. 1986. "On the Limitations of Government Borrowing: A Framework for Empirical Testing." *American Economic Review* 76 (September): 808–19.
- Haque, Nadeem U., and Peter Montiel. 1989. "Consumption in Developing Countries: Tests for Liquidity Constraints and Finite Horizons." *Review of Economics and Statistics* 71 (3): 408–15.
- Hayashi, Fumio. 1985. "Tests for Liquidity Constraints: A Critical Survey." NBER Working Paper 1720. National Bureau of Economic Research, Cambridge, Mass. Processed.
- IMF (International Monetary Fund). 1986. *A Manual on Government Finance Statistics*. Washington, D.C.
- . Annual. *International Financial Statistics*. Washington, D.C.
- Khan, Mohsin S., and J. Saúl Lizondo. 1987. "Devaluation, Fiscal Deficits, and the Exchange Rate." *The World Bank Economic Review* 1 (2): 357–74.
- Khan, Mohsin S., and Carmen M. Reinhart. 1990. "Private Investment and Economic Growth in Developing Countries." *World Development* 18 (January): 19–27.
- Kiguel, Miguel A., and Nissan Liviatan. 1988. "Inflationary Rigidities and Orthodox Stabilization Policies: Lessons from Latin America." *The World Bank Economic Review* 2 (3): 273–98.
- Kotlikoff, Lawrence. 1988. "The Deficit Is Not a Well-Defined Measure of Fiscal Policy." *Science* 241 (August): 791–95.
- Leiderman, Leonardo, and Mario I. Blejer. 1988. "Modeling and Testing Ricardian Equivalence: A Survey." *IMF Staff Papers* 35 (1): 1–35.
- Rama, Martín. 1990. "Empirical Investment Equations in Developing Countries." WPS 563. World Bank, Country Economics Department, Washington, D.C. Processed.
- Robinson, David J., and Peter Stella. 1988. "Amalgamating Central Bank and Fiscal Deficits." In Mario I. Blejer and Ke-Young Chu, eds., *Measurement of Fiscal Impact: Methodological Issues*. IMF Occasional Paper 59. Washington, D.C.
- Rodríguez, Carlos A. 1989. "External Effects of Public Sector Deficits." WPS 299. World Bank, Country Economics Department, Washington, D.C. Processed.
- Sargent, Thomas J., and Neil Wallace. 1985. "Some Unpleasant Monetarist Arithmetic." *Federal Reserve Bank of Minneapolis Quarterly Review* 9: 15–31.
- Sachs, Jeffrey D., ed. 1989. *Developing Country Debt and the World Economy*. Chicago: University of Chicago Press for the National Bureau of Economic Research.
- Schmidt-Hebbel, Klaus, Steven B. Webb, and Giancarlo Corsetti. 1992. "Household Saving in Developing Countries: First Cross-Country Evidence." *The World Bank Economic Review* 6 (3): 529–47.
- Serven, Luis, and Andrés Solimano. 1992. "Private Investment and Macroeconomic Adjustment: A Survey." *The World Bank Research Observer* 7 (1): 95–114.
- Tanzi, Vito. 1985. "Fiscal Management and External Debt Problems." In Hassanali Mehran, ed., *External Debt Management*. Washington, D.C.: IMF.
- Teijeiro, Mario O. 1989. "Central Bank Losses: Origins, Conceptual Issues, and Measurement Problems." WPS 293. World Bank, Country Economics Department, Washington, D.C. Processed.
- United Nations. 1968. *A System of National Accounts*. New York.
- van Wijnbergen, Sweder. 1989. "External Debt, Inflation, and the Public Sector: Toward Fiscal Policy for Sustainable Growth." *The World Bank Economic Review* 3 (3): 297–320.
- Wilcox, David. 1989. "The Sustainability of the Government Deficits: Implications of the Present Value Borrowing Constraint." *Journal of Money, Credit, and Banking* 21 (August): 291–306.