

**Box 4.2. Is There a Relationship Between Fiscal Deficits and Inflation?**

Economists generally agree that fiscal deficits are one of the main causes of inflation, particularly high and hyper inflation. By creating excessive aggregate demand pressures recurrent fiscal deficits can both spark and sustain inflationary processes.<sup>1</sup> Typically, governments facing persistent fiscal imbalances are incapable (or unwilling) to create the political consensus needed to increase taxes and/or reduce expenditures and find borrowing increasingly difficult. As a result, these governments pressure the central bank to finance those deficits by printing money. Indeed, there is a large literature documenting the crucial role played by fiscal deficits during the hyperinflation episodes of the 1920s, 1970s, and 1980s and high and moderate inflation episodes of the 1970s, 1980s, and 1990s.<sup>2</sup>

Despite these case studies, more formal empirical analysis has had only limited success in establishing the existence of a relationship between the size of fiscal deficits and inflation.<sup>3</sup>

<sup>1</sup>Inflation, by affecting government revenues and expenditures, also changes the size of the fiscal deficits, albeit in an uncertain direction. There is some evidence, however, that fiscal deficits tend to increase with high inflation because of high nominal interest payments. To eliminate the effects of inflation on the deficit, alternative deficit definitions have been proposed, including that of the operational fiscal deficit; however, these definitions are not problem free. See Vito Tanzi, Mario Blejer, and Mario Teijeiro, "Effects of Inflation on Measurement of Fiscal Deficits: Conventional Versus Operational Measures" in *How to Measure the Fiscal Deficit*, ed. by Mario Blejer and Adrienne Cheasty (Washington: International Monetary Fund, 1993).

<sup>2</sup>See, for instance, Thomas Sargent, "The Ends of Four Big Inflation," in *Inflation, Causes, and Effects*, ed. by Robert Hall (Chicago: University of Chicago Press, 1982), pp. 41–97; and Rudiger Dornbusch and Stanley Fischer, "Stopping Hyperinflation Past and Present," *Weltwirtschaftliches Archiv*, Vol. 122, (1986) and "Moderate Inflation," *World Bank Economic Review*, Vol. 7 (January 1993).

<sup>3</sup>See for instance Robert King and Charles Plosser, "Money, Deficits, and Inflation," *Carnegie-Rochester Conference Series on Public Policy*, Vol. 22 (Spring 1985), pp. 147–96; and Stanley Fischer, Rama Sahay, and Carlos Végh, "Modern Hyper- and High Inflation" (unpublished; Washington: International Monetary Fund, 2000).

**Long-Run Relationship Between Inflation, Fiscal Deficits, and Changes in World Prices<sup>1</sup>**

Government deficit/narrow money	
Coefficient	0.32
t-ratio	(18.1)
Change in world oil prices	
Coefficient	0.08
t-ratio	(9.4)
World inflation	
Coefficient	0.29
t-ratio	(7.3)

<sup>1</sup>The sample covered Argentina, Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, South Africa, Thailand, Turkey, Uruguay, Venezuela, and Zimbabwe.

In general, this relationship is complex, and an important distinction needs to be made between the short and long run. In the short run, higher deficits do not necessarily lead to higher inflation, as they can be financed by additional borrowing. In the long run, however, high deficits will generally lead to higher inflation, as governments use seigniorage to finance them, although there will also be reverse causation through the impact of inflation on nominal interest rates. Because of this, it is useful to focus on the long-run relationship between fiscal deficits and inflation.

Some initial work by IMF staff indicates there is a positive long-run relationship between the size of fiscal deficits scaled by narrow money (as defined by the IMF's *International Finance Statistics*) and inflation for a sample of 23 emerging market economies during the period of 1970–99 (see the Table).<sup>4</sup> The econometric specification used in this study has been derived from a small open economy that predicts that in the long run the ratio of government deficits to narrow money should be directly related to inflation. In other words, inflation will be higher the larger are the fiscal imbalances (as

<sup>4</sup>See Luis Catão and Marco Terrones, "Government Deficits and Inflation: A New Look at the Emerging Markets Evidence," IMF Working Paper (Washington: International Monetary Fund, forthcoming).

measured by the ratio of government deficit over GDP) and/or the lower the size of the inflation tax base (proxied by the ratio of narrow money to GDP).<sup>5</sup> The existence of a long-run deficit-inflation relationship was tested using a dynamic panel regression.<sup>6</sup> Despite the wide variety of inflation experiences in emerging market economies, a statistically significant long-run relationship between the ratio of government deficits to narrow money and inflation was found and was superior to including only the deficit as a ratio for GDP or narrow money as a ratio to GDP. Moreover, the hypothesis of long-run coefficient homogeneity could not be rejected.

This relationship is quite stable to the inclusion of other variables, as well as to the exclusion of countries that experienced hyperinflation episodes in the late 1980s/early 1990s (Argentina, Brazil, and Peru). The stability of the long-run relationship between deficits and inflation was explored by introducing into the long-run econometric specification indicators of openness, political instability, exchange rate regime, changes in oil prices, changes in non-oil commodity prices, and world inflation—variables that have featured prominently in previous empirical

studies.<sup>7</sup> In addition to government deficits, changes in world oil prices and world inflation were found to be significant, suggesting that external factors matter, including overall global monetary stability. As in other studies, a negative long-run association between openness and inflation was found; however, once the fiscal deficit is introduced in the specification, openness changes sign and becomes statistically insignificant, suggesting that the effect of openness on inflation is indirect and in the long run works mainly through the fiscal channel. The analysis also found no evidence of a statistically significant relationship between pegged exchange rate regimes (as measured by a dummy variable created from the *de jure* exchange rate classification compiled by the IMF) and inflation, although other studies have found this link in the short run.

These results point to a significant long-run relationship between deficits and inflation. Based on the estimated parameters, the model predicts that a (permanent) reduction in the government deficit by 1 percentage point of GDP is associated with a drop in inflation by 2 to 6 percentage points depending on the level of private sector's holdings of narrow money. Likewise, a 10 percent reduction in oil prices changes would lead to a four-fifths of a percentage point reduction in the inflation rate, while a 10 percent change in world inflation translates into a reduction in domestic inflation of almost 3 percent.<sup>8</sup>

<sup>5</sup>A battery of tests confirmed that the specification derived from theory was statistically superior to other ones that included deficit over GDP and narrow money over GDP.

<sup>6</sup>A pooled mean group (PMG) estimator technique was used, as this is particularly good at dealing with dynamic processes and outliers, such as hyperinflation episodes. In addition, the PMG estimator is flexible enough to constrain the long-run parameters to be equal across countries while allowing other parameters (intercepts, short-run coefficients, and error variances) to vary freely from country to country. See M. Hashem Pesaran, Yongcheol Shin, and Ron Smith, "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels," *Journal of the American Statistical Association*, Vol. 94 (June 1999), pp. 621–34.

<sup>7</sup>See, for instance, Martha Campillo and Jeffrey Miron, "Why Does Inflation Differ Across Countries," in *Reducing Inflation: Motivation and Strategy*, ed. by Christina Romer and David Romer (Chicago: University of Chicago Press, 1997); and Chapter VI of the October 1996 *World Economic Outlook*.

<sup>8</sup>Short-run estimates are less informative, as they are country specific. The lag structure for each country was selected using the Schwarz Bayesian criterion, subject to a maximum lag of two (because of data considerations). In more than half of the countries at least one lag of inflation was included.