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THE SOCIAL COST OF FOREIGN EXCHANGE RESERVES

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ABSTRACT

There has been a very rapid rise since the early 1990s in foreign reserves held by developing countries. These reserves have climbed to almost 30 percent of developing countries' GDP and 8 months of imports. Assuming reasonable spreads between the yield on reserve assets and the cost of foreign borrowing, the income loss to these countries amounts to close to 1 percent of GDP. Conditional on existing levels of short-term foreign borrowing, this does not represent too steep a price as an insurance premium against financial crises. But why developing countries have not tried harder to reduce short-term foreign liabilities in order to achieve the same level of liquidity (thereby paying a smaller cost in terms of reserve accumulation) remains an important puzzle.

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I. Introduction

Financial globalization has been accompanied by frequent and painful financial crises. Since the debt crisis of 1982, which engulfed practically all countries of Latin America, a new financial upheaval has erupted in some part of the developing—and occasionally industrial—world with alarming regularity. Some of the better known blowups include Mexico in 1995, East Asia in 1997, Russia in 1998, Turkey in 1994 and 2001, Brazil in 1999, and Argentina in 2002. These crises have spawned a huge literature examining their causes. And they have forced policy makers to look for protective strategies.

As Martin Feldstein (1999) concluded in the aftermath of the Asian financial crisis, developing countries cannot rely on the International Monetary Fund or reforms in the "international financial architecture" to protect themselves from such crises. Nor, Feldstein reasoned, is it enough to rely on sound macroeconomic policies, since even well-managed countries can be hit by contagion from elsewhere. The key, according to Feldstein was self-protection through increased liquidity. Countries with higher (net) levels of liquid foreign assets are better able to withstand panics in financial markets and sudden reversals in capital flows. Therefore they may not only reduce the costs of financial crises, they may also make such crises less likely. Liquidity, in turn, could be achieved via three strategies: reducing short-term debt,

[1] Paper prepared for presentation at the American Economic Association meetings in Boston, January 2006. I am grateful to Jeffrey Frankel and Ricardo Hausmann for helpful conversations, to Ken Froot, Bob Hormats, Rick Mishkin, Helene Rey, and Federico Sturzenegger for comments, and to Joe Stiglitz for his insistence that I write this paper.

creating a collateralized credit facility, and increasing foreign exchange reserves of the Central Bank (Feldstein 1999).

Among the three strategies, raising foreign reserves is the one advice that developing countries have clearly taken to heart. Foreign exchange reserves held by developing nations are today at an all time high, and stand at levels that are a multiple of those held by advanced countries (in relation to their incomes or trade). But as Feldstein and others since have pointed out, accumulating reserves is also costly. Central banks hold their foreign exchange reserves mostly in the form of low-yielding short-term U.S. Treasury (and other) securities. Each dollar of reserves that a country invests in these assets comes at an opportunity cost that equals the cost of external borrowing for that economy (or alternatively, the social rate of return to investment in that economy). The spread between the yield on liquid reserve assets and the external cost of funds—a difference of several percentage points in normal times—represents the social cost of self-insurance.

In this short paper, I document the rapid rise in foreign reserves held by developing countries and present some calculations on the social costs of these reserves. I show that these costs now amount to around 1 percentage points of GDP annually for developing nations taken as a whole.

I also discuss the optimality of current reserve policies. There is convincing evidence that being liquid reduces the probability of suffering a financial crisis (and perhaps that it also reduces the cost of borrowing). Given the high output and social costs of such crises, a plausible case can be made that prevailing liquidity levels are rational, despite their high cost. Perhaps the insurance premium pays for itself.

However, this argument overlooks the point that liquidity can be achieved not just by building up foreign reserve assets, but also by reducing short-term debt liabilities. A truly optimal response to the crises of the last two decades would have been to simultaneously increase reserves *and* reduce short-term liabilities. As I will show, what is striking is that emerging nations have on the whole not reduced their exposure to short-term debt, even as they were amassing massive foreign reserves. This behavior is difficult to reconcile with rationality—unless one is willing to ascribe benefits to short-term borrowing that are nowhere to be seen in the data. Therefore, another way to think of the cost of reserves is that it constitutes the price tag—and a soaring one at that—for policy makers' reluctance to rein in short-term external borrowing.

One final comment by way of introduction. It can be argued that the rapid rise in reserves in recent years has little to do with the self-insurance motive, but is instead related to policy makers' desire to prevent the appreciation of their currencies and maintain the competitiveness of their tradable sectors. The latter has clearly played a significant role in China's reserve accumulation. But as we shall see, reserve accumulation has not been limited to a few countries where export competitiveness is a particularly important policy objective. The numbers look just as impressive with China excluded from the sample. Further, Aizenman and Woo (2005) provide some systematic evidence that suggests the self-insurance motive has been predominant as a driver of reserve accumulation. They contrast this view with the "mercantilist" argument that countries increase reserves in order to prevent the appreciation of their currencies. Their results suggest that the latter motive has been quantitatively much less significant in the recent build-up. Finally, it is worth pointing out that even when the underlying motive is one of competitiveness, reserve accumulation becomes the necessary consequence only when

governments are unable or unwilling to stem the tide of capital inflows. Otherwise, governments could restrain capital inflows and prevent the appreciation of the currency more directly. From this perspective too, there is a tradeoff between financial globalization and avoiding the cost of high levels of reserves. Holding high reserves is the price to be paid for not managing the capital account more actively.

II. The Rapid Rise in Reserves

Figure 1 shows the massive increase in developing countries' foreign exchange reserves in recent years. Reserves have risen from a range of 6-8 percent of GDP during the 1970s and 1980s to almost 30 percent of GDP by 2004. Reserves begin to trend sharply up just around 1990, the year that is commonly identified with the onset of the era of financial globalization. Note that there is no similar jump in the reserves held by industrial countries, which have remained roughly steady at below 5 percent of GDP since the 1950s. As the figure shows, the trend for developing countries looks identical regardless of whether China is included in the sample or not. In other words, the increase in recent years cannot be attributed to China's efforts to prevent the appreciation of the yuan.

Prior to the era of financial globalization, countries held reserves mainly to manage foreign exchange demand and supply arising from current account transactions. The traditional rule of thumb for Central Banks was that they should hold a quantity of foreign exchange reserves equivalent to three months of imports. Therefore at least part of the increase in reserves may be due to the increased commercial openness of developing countries. But as Figure 2 shows, the increase in reserves is equally evident when looked at in relation to imports. Prior to 1990, developing country reserves fluctuated between 3 and 4 months of imports. They now

stand at a record high of 8 months of imports. Once again, there has been no corresponding increase in the industrial countries' reserves-imports ratio, which still stands at less than 3 months.

It is pretty clear that the increase in developing country's reserves is related to changes not in *real* quantities (such as imports or output) but in *financial* magnitudes. Financial liberalization has led to an explosion in financial assets and liabilities since the 1980s, with which reserves have barely kept pace. For example, Figure 3 shows the ratio of reserves to M2 in a sample of emerging market economies. The figure reveals that the increase in Central Bank reserves starting around 1990 has served simply to restore the reserves-M2 ratio to the levels that prevailed in the pre-liberalization period. Moreover, this ratio has remained more or less flat since the early 1990s, indicating that reserves are barely keeping pace with the expansion of bank liabilities in these countries. It seems clear therefore that developing countries began to accumulate reserves as a consequence of financial liberalization and globalization, and that they actually embarked on this path *before* it became part of the conventional policy wisdom.

The policy guidance that the IMF provides to emerging nations on reserves was summarized by Stanley Fischer in 2001 in the following manner:

> An IMF staff study discussed by our Executive Board last year agreed that holding reserves equal to short-term debt was an appropriate starting point for a country with significant but uncertain access to capital markets. But it is only a starting point. Countries may need to hold reserves well in excess of this level, depending on a variety of factors: macro-economic fundamentals; the exchange rate regime; the quality of private risk management and financial sector supervision; and the size and currency composition of the external debt.
>
> This analysis is now reflected in the way we treat reserve adequacy in our lending and surveillance activities. (Fischer 2001)

The rule that countries should hold liquid reserves equal to their foreign liabilities coming due within a year is also known as the Guidotti-Greenspan rule, after a principle enunciated by Pablo

Guidotti (then deputy finance minister of Argentina) and subsequently endorsed by Fed Chairman Alan Greenspan (see Greenspan 1999). As Figure 4 shows, most emerging market economies had short-term debt/reserves ratios that were significantly above unity in the early 1990s. Since then, practically all of them have built up enough reserves to abide by the Guidotti-Greenspan-IMF rule, most with some room to spare. The only exception in 2004 was Argentina, a country that was just coming out of a severe financial crash.

Finally, Figure 5 shows a geographical breakdown of reserve trends. The surprise here is that the increase in reserves has not been restricted to "emerging markets." In fact, the increase in Africa's reserves is as striking as that of Asia. By 2004, Africa held reserves worth around 8 months of imports, compared to 6 months in the Western hemisphere and close to 10 months in Asia. So the reserve buildup is a phenomenon that affects the world's poorest countries as well.

III. Calculating the Cost of Reserve Holdings

Consider a country that lives by the Guidotti-Greenspan-IMF rule. Suppose a domestic private firm or bank takes a short-term loan from abroad of $1 million. The Central Bank now has to increase its reserves by an equivalent amount. The usual strategy that the Central Bank will follow is (a) to purchase foreign currency in domestic financial markets to invest in U.S. government or other foreign short-term securities and (b) to sterilize the effects of its intervention on the money supply by selling domestic government bonds to the private sector. When all these transactions are completed, the domestic private sector ends up holding $1 million of domestic government bonds balancing its foreign liability of $1 million, while the Central Bank has $1 million more in foreign assets and $1 million less in domestic government bonds.

Three consequences are noteworthy. First, the application of the Guidotti-Greenspan-IMF rule implies that, even when the process is initiated by borrowing from abroad, the home economy ends up with no net resource transfer from abroad. The increase in the private sector's foreign liability matches the increase in the Central Bank's foreign assets. Second, short-term borrowing abroad does not enhance the private sector's overall capacity to invest. This is because the private sector ends up holding additional government securities equal in magnitude to its borrowing abroad. And third, aggregating the domestic private and public balance sheets, the net effect is that the economy has borrowed short term abroad (at the domestic private sector's cost of foreign borrowing) and has invested the proceeds in short-term foreign assets.

The last of these conclusions points directly to the appropriate way of thinking about the social cost of reserves. For every $1 of reserve assets a country accumulates to abide by the Guidotti-Greenspan-IMF rule, the home economy pays a cost (an insurance premium, if you will) equal to the spread between the private sector's cost of short-term borrowing abroad and the yield that the Central Bank earns on its liquid foreign assets. This is the measure I will use here to compute the cost of holding reserves.

Note that this measure is somewhat different from two other measures that often appear in the literature. Perhaps the most commonly used cost concept is that of the *fiscal* cost of holding reserves. Looked at it solely from the perspective of the public sector, the relevant spread is that between the interest on domestic government bonds and the yield on reserves (expressed in a common currency). But any difference between the interest costs of domestic government bonds and short-term foreign borrowing is tantamount to a transfer from the public to the private sector in the domestic economy (or vice versa), and needs to be netted out when calculating the cost from a *national* standpoint. Second, some studies presume that a dollar of

reserves could have been alternatively used to augment the public capital stock of the economy, and use the social opportunity cost of (public) capital as the relevant benchmark in lieu of the cost of foreign borrowing. But the social opportunity cost of capital is a slippery concept that is hard to implement empirically (see Hauner 2005). In any case, the process of accumulating reserves, as sketched above, makes clear that the relevant counterfactual in most instances is not one additional dollar of public investment, but one less dollar of short-term foreign debt.

In contrast to established practice in the literature, I also exclude the component of reserves that is held for traditional, current-account financing purposes. Assuming that the three-months of imports rule captures the traditional component, I will compute the cost of holding reserves in excess of the amount that is required to satisfy the three-months rule. As we saw previously, this is consistent with the actual practice of central banks. Prior to the 1990s, reserves hovered around the 3-4 months mark, and began their sharp climb thereafter. This will give us a more realistic estimate of the costs imposed by financial globalization per se.

We also need estimates of the spread between private foreign borrowing costs and yields on reserve assets. While one can approximate the yields on foreign reserves by looking at short-term U.S. Treasury securities and other short-term assets, there is no direct source of information on costs of short-term borrowing. Unlike sovereign bonds, which are traded and for which we have the EMBI and other benchmarks, most short-term private borrowing takes the form of commercial bank lending at rates which are not publicly available. Some indirect guidance can be obtained by looking at EMBI spreads, which have averaged around 700 basis points since the early 1990s, with lots of ups and occasional downs (see Kamin 2002). These spreads might overstate the spread we are interested in to the extent that some of the private short-term debt

takes the form of trade credit at relatively low interest rates. But they understate it to the extent that private entities in developing countries face a higher cost of borrowing than sovereigns.

I present three sets of calculations, based on spread levels of 3 percent, 5 percent, and 7 percent. The results are shown in Table 6. Since "excess" reserves have risen very rapidly since 1990, the estimated social costs also show a very steep increase. Using the mid-point of our range of spreads (5 percentage points), the cost of excess reserves now stands at close to 1 percent of developing countries' GDP. This is a large number by any standard. It is a multiple of the budgetary cost of even the most aggressive anti-poverty programs implemented in developing countries.[2] And it is roughly the same order of magnitude as the projected gains for developing nations from a successful conclusion of the Doha round of trade negotiations (see for example Anderson and Martin, 2005). Developing nations are paying a very high price to play by the rules of financial globalization.

IV. The Optimality of Reserve Policies

Of course, the high cost of reserve holdings does not necessarily imply that developing nations are being irrational. The greater liquidity that reserves provide presumably reduces the likelihood of financial crises, and may also reduce the cost of foreign borrowing in normal times. In fact, conditional on short-term external debt levels being what they are, it is easy to make the case that developing country reserve levels are not excessive in general.

To see this, consider the following back-of-the envelope calculation. We know from a range of empirical studies that countries with higher reserves/short-term debt ratios are less prone to financial crashes. For example, in Rodrik and Velasco (2000) we estimated that a country that abides by the Guidotti-Greenspan-IMF rule of holding reserves equal to at least its

[2] Mexico's Progresa program, for example, cost around 0.2% of GDP.

short-term debt reduces the (annual) probability of experiencing a sharp reversal in capital flows by 10 percentage points on average. Further, suppose that the output cost of a financial crisis is of the order of 10 percentage points of GDP, which is not too far from what is estimated in, for example, Hutchison and Noy (2002). Hence, in expected value terms the benefits of the Guidotti-Greenspan-IMF rule amount to about 1 percentage points of GDP (0.10 x 0.10). Under these assumptions, a risk-averse government ought to be willing to invest more than 1 percentage points of GDP in order to meet the Guidotti-Greenspan-IMF requirement. In other words, prevailing patterns of reserve holdings are far from crazy in view of the significant costs of being less liquid. Similar results have been obtained using more detailed optimization frameworks in Garcia and Soto (2004) and Jeanne and Ranciere (2005).[3]

Such calculations overlook a significant point, however. They essentially assume that liquidity can be raised only by increasing reserve holdings. Obviously, liquidity is a relative concept that takes into account the level of liquid assets *in relation to* liquid liabilities. The Guidotti-Greenspan-IMF rule refers to the ratio of reserves to foreign liabilities falling due within a year, while the empirical literature typically employs the ratio of reserves to short-term external debt. Therefore, an optimal strategy of increasing liquidity would *combine* reserve accumulation with reduced short-term debt exposure--unless for some reason reducing short-term foreign liabilities is exceptionally costly (more so than building up reserves).

Yet the striking fact is that short-term debt exposure has continued to climb in many countries, even as these same countries were investing valuable resources in increasing reserve

[3] Put differently, conditional on short-term liabilities being what they are, the optimal precautionary level of reserves is probably not too different than what it is currently (at least in aggregate for developing countries as a whole). Prasad and Rajan (2005) have recently proposed the creation of a closed-end mutual fund that sells reserves to the domestic private sectors and invests the proceeds in foreign securities. As the authors make clear, however, this proposal applies only to reserves that exceed the desired precautionary levels. So it would not save nations any money as long as short-term liabilities keep desired precautionary reserve levels this high.

assets. As Figure 7 shows, half of the emerging market economies had higher short-term debt-GDP ratios in 2004 than they did in 1990. In contrast, none held lower reserves in relation to GDP. Looking at the group of emerging market economies in aggregate, the average short-term debt-GDP ratio has risen from 5.4 (6.5) percent to 6.1 (8.4) percent in weighted (unweighted) terms between 1990 and 2004, while the reserves-GDP and reserves-short-term debt ratios have increased by a multiple (Table 1). The minimum that can be said is that there has not been a clear downward trend in short-term debt exposure, a fact that looks all the more astonishing when we put it together with the massive boost in reserves.

Could it be that the reason for these trends is the large cost of reducing short-term debt levels? The experience of Chile in the 1990s (as well as many others with less transparent policies) shows that governments are able to influence the maturity of their debt profile when they put their mind to it. Perhaps short-term foreign debt has large benefits which dissuade governments from taking measures to restrain its buildup. But if this is the case, it is not at all clear what those benefits are. In principle, larger debt could provide for improved risk sharing, better financial intermediation, and greater domestic investment, but I am not aware of any empirical studies that have been able to document such effects in emerging market economies, least of all for short-term borrowing. True, short-term borrowing is usually cheaper in financial terms, but that is only because it transfers greater risk to the borrowers (see for example Broker et al. 2004, Velasco and Rodrik 2000). Certainly gross fixed capital formation has not been visibly affected by the vast pool of short-term flows moving into emerging market economies (Figure 8). In the apt words of Joshua Aizenman (2005, 959), “the 1990s’ experience with financial liberalization suggests that the gains from external financing are overrated.”

V. Concluding Remarks

An implication of this analysis is that developing countries have responded to financial globalization in a highly unbalanced and far from optimal manner. They have over-invested in the costly strategy of reserve accumulation and under-invested in capital-account management policies to reduce their short-term foreign liabilities. In reality, of course, the Guidotti-Greenspan-IMF rule is an admonishment that applies as much to short-term foreign borrowing as it does to reserves.

The reason for this suboptimal response is unclear. Perhaps it has to do with the fact that, unlike reserve accumulation, controls on short-term borrowing hurt powerful financial interests, both at home and abroad. International financial institutions have done very little work on capital-account management techniques and have not advocated them. Consequently, "market intervention" in the form of taxing short-term capital inflows has developed an unsavory reputation that "market intervention" in the form of buying reserves does not have.

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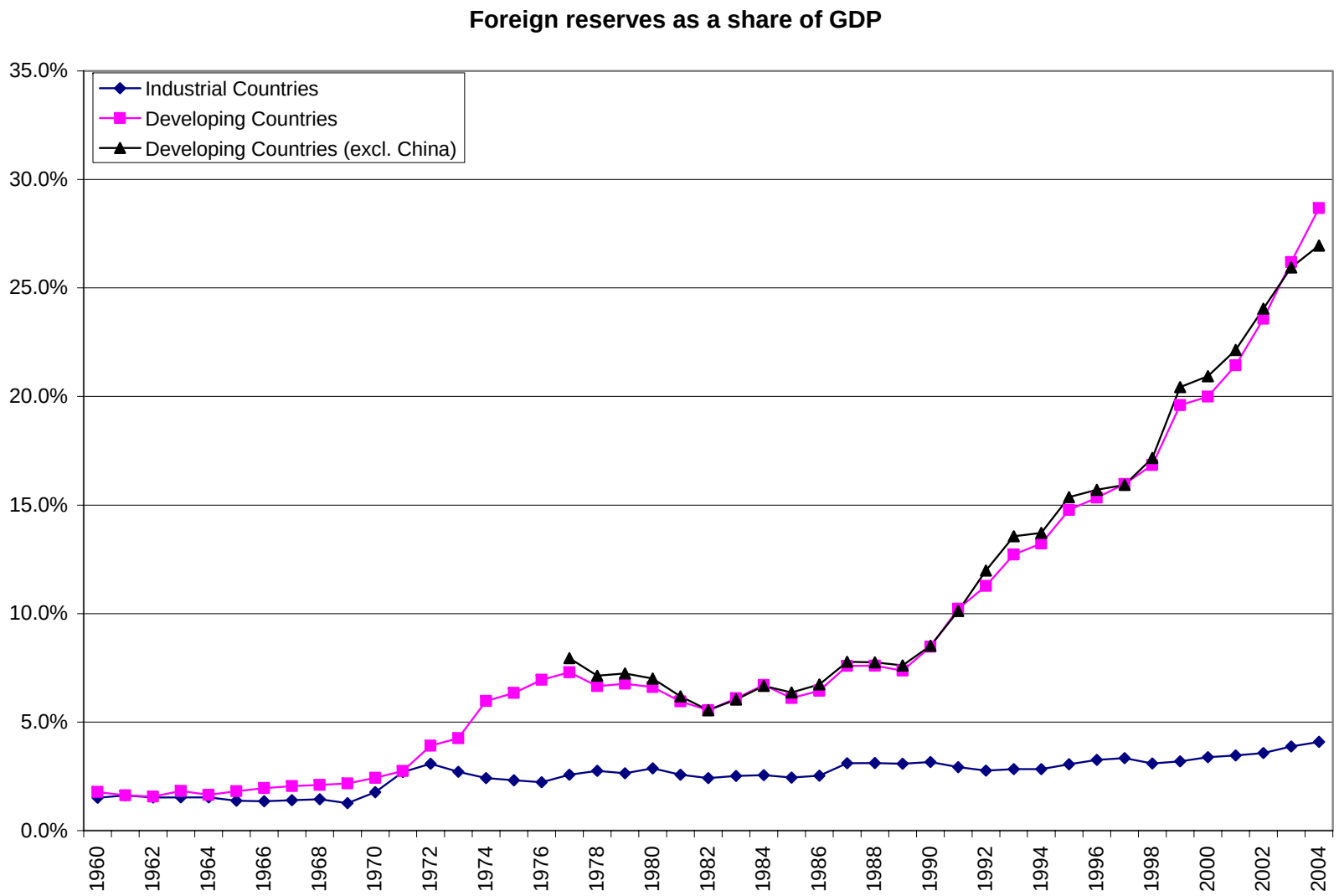
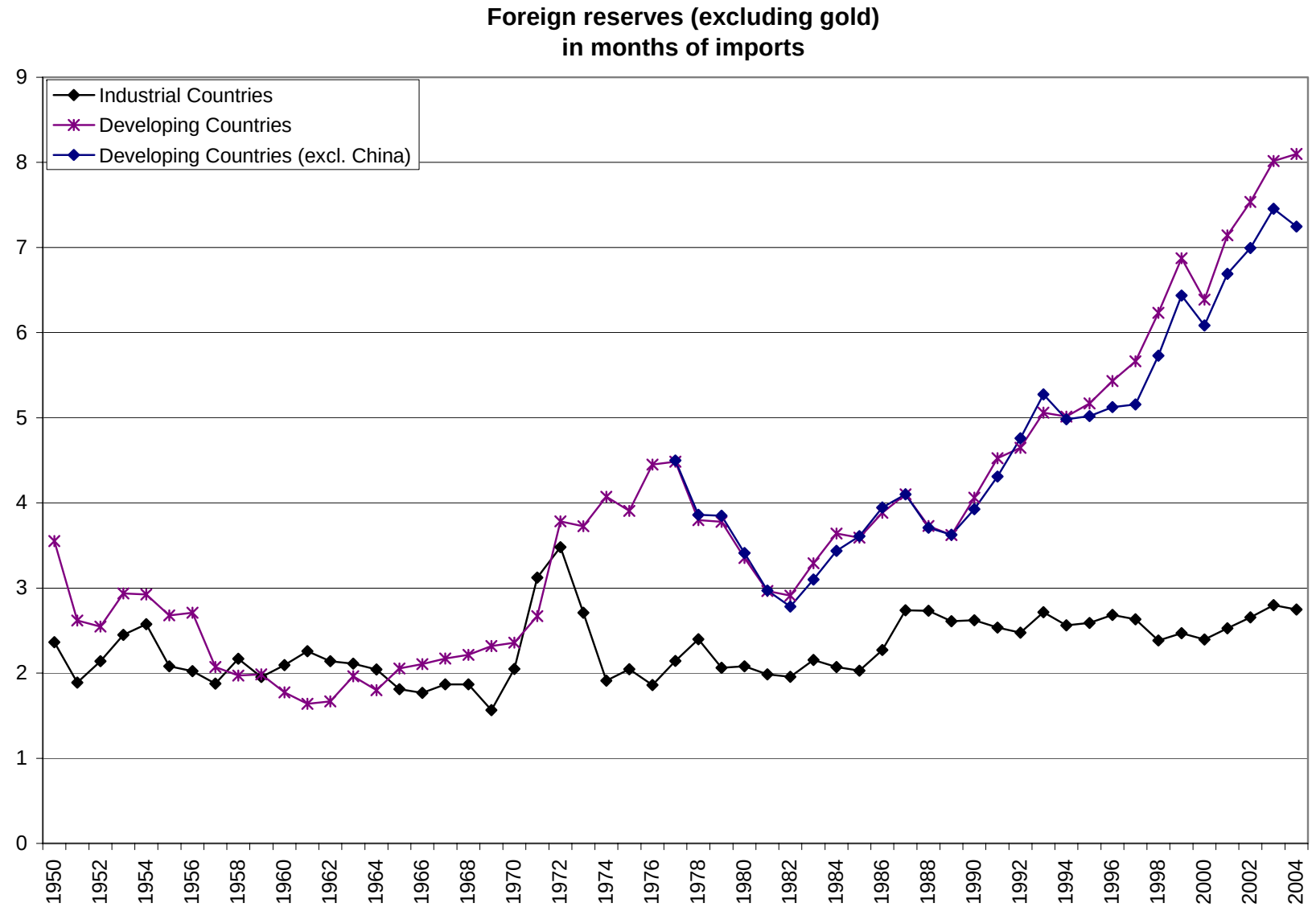
Figure 1



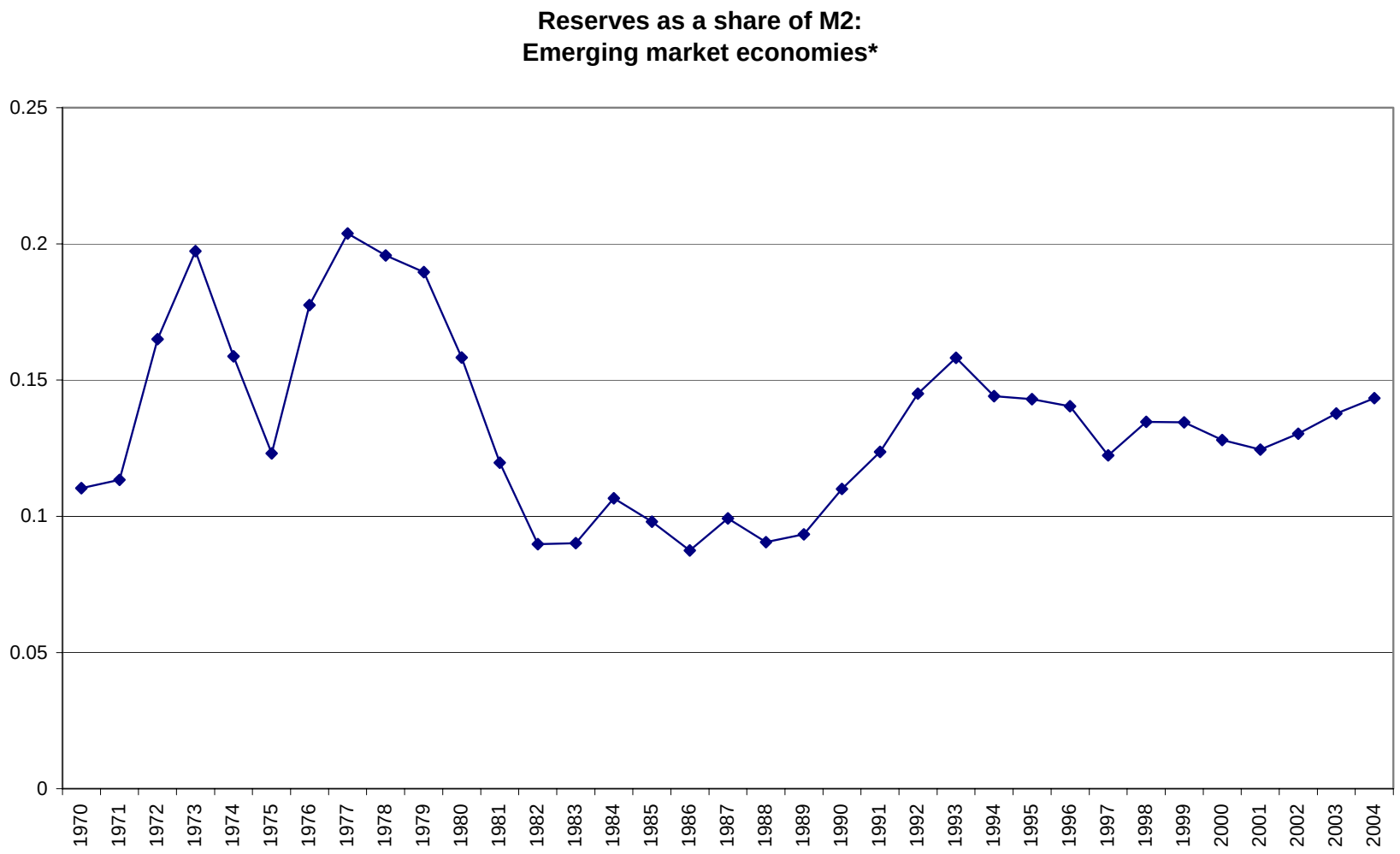
Source: IMF, International Financial Statistics (IFS).

Figure 2



Source: Calculated from IMF, IFS.

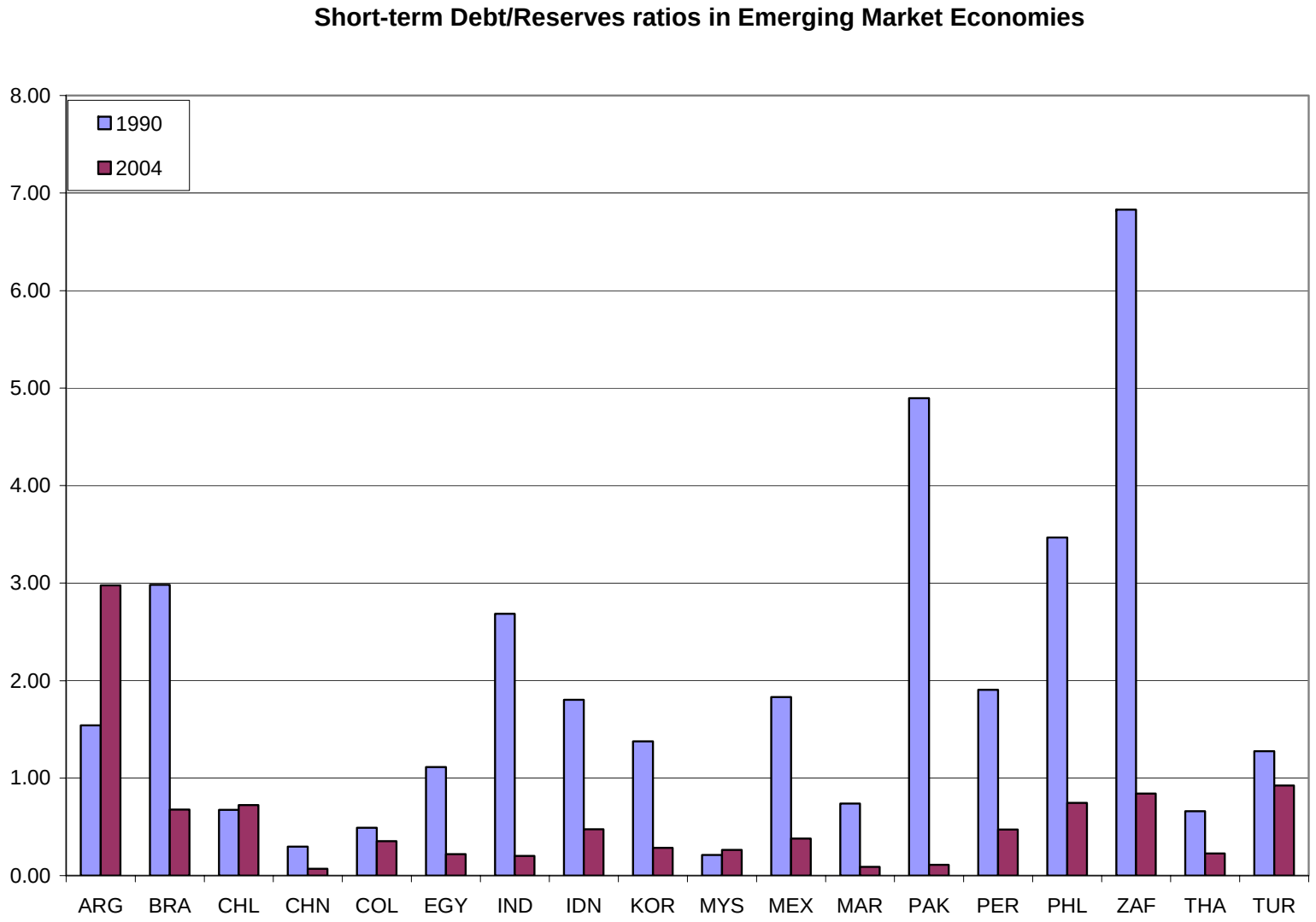
Figure 3



* Excluding former socialist economies, China, and Taiwan

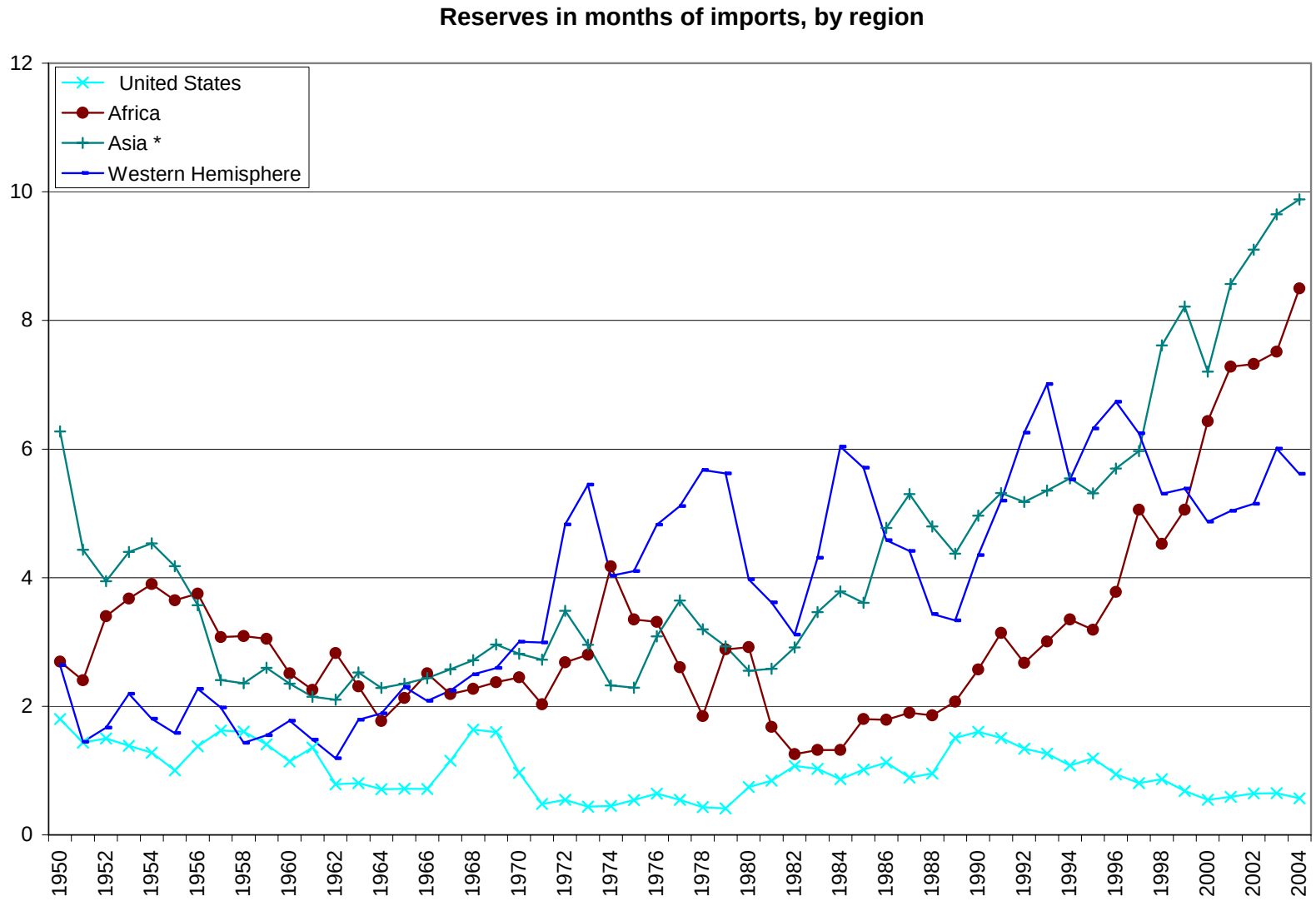
Source: World Bank, World Development Indicators (WDI).

Figure 4



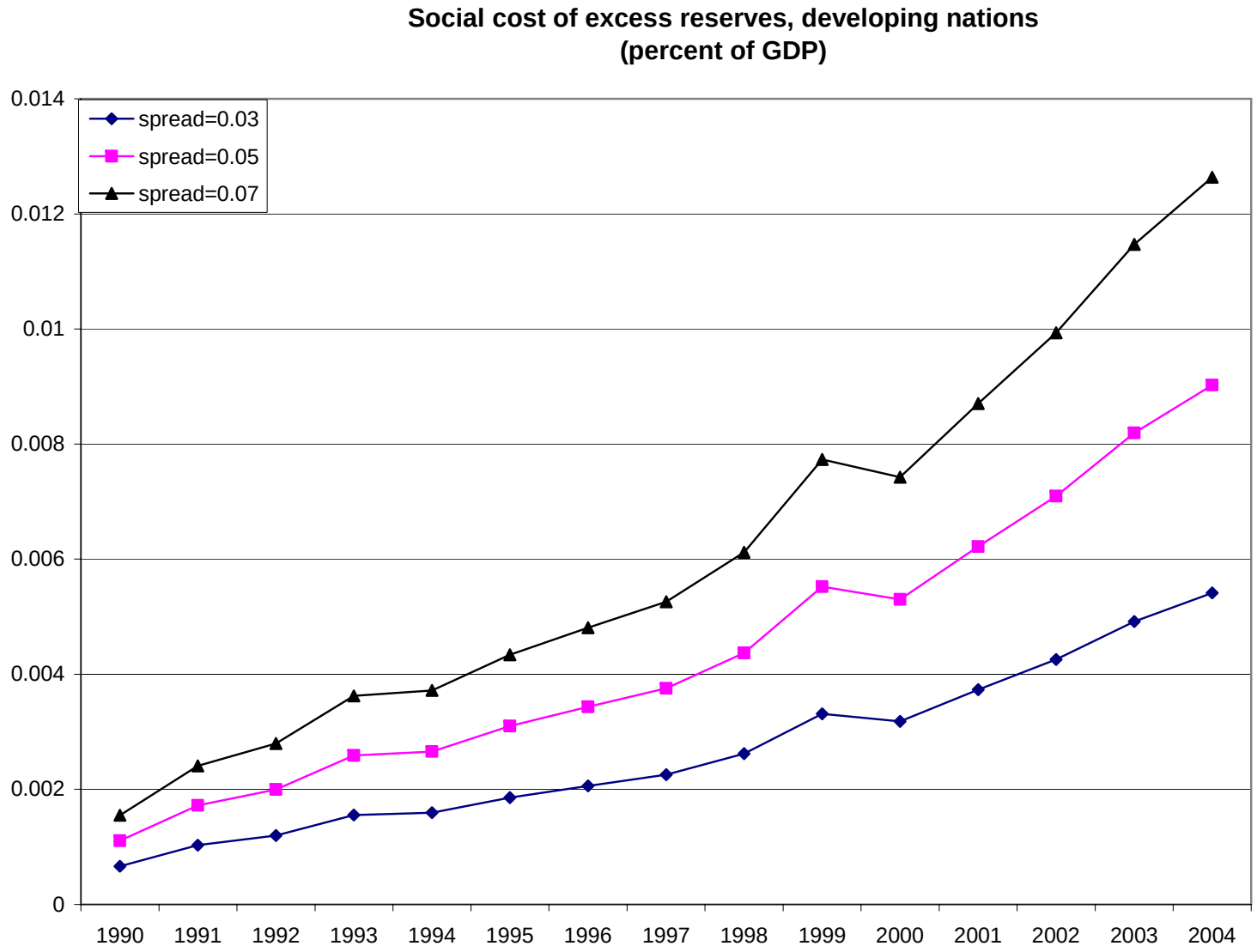
Sources: Short-term debt statistics are from the Joint BIS-IMF-OECD-World Bank Statistics on External Debt Online Database.

Figure 5



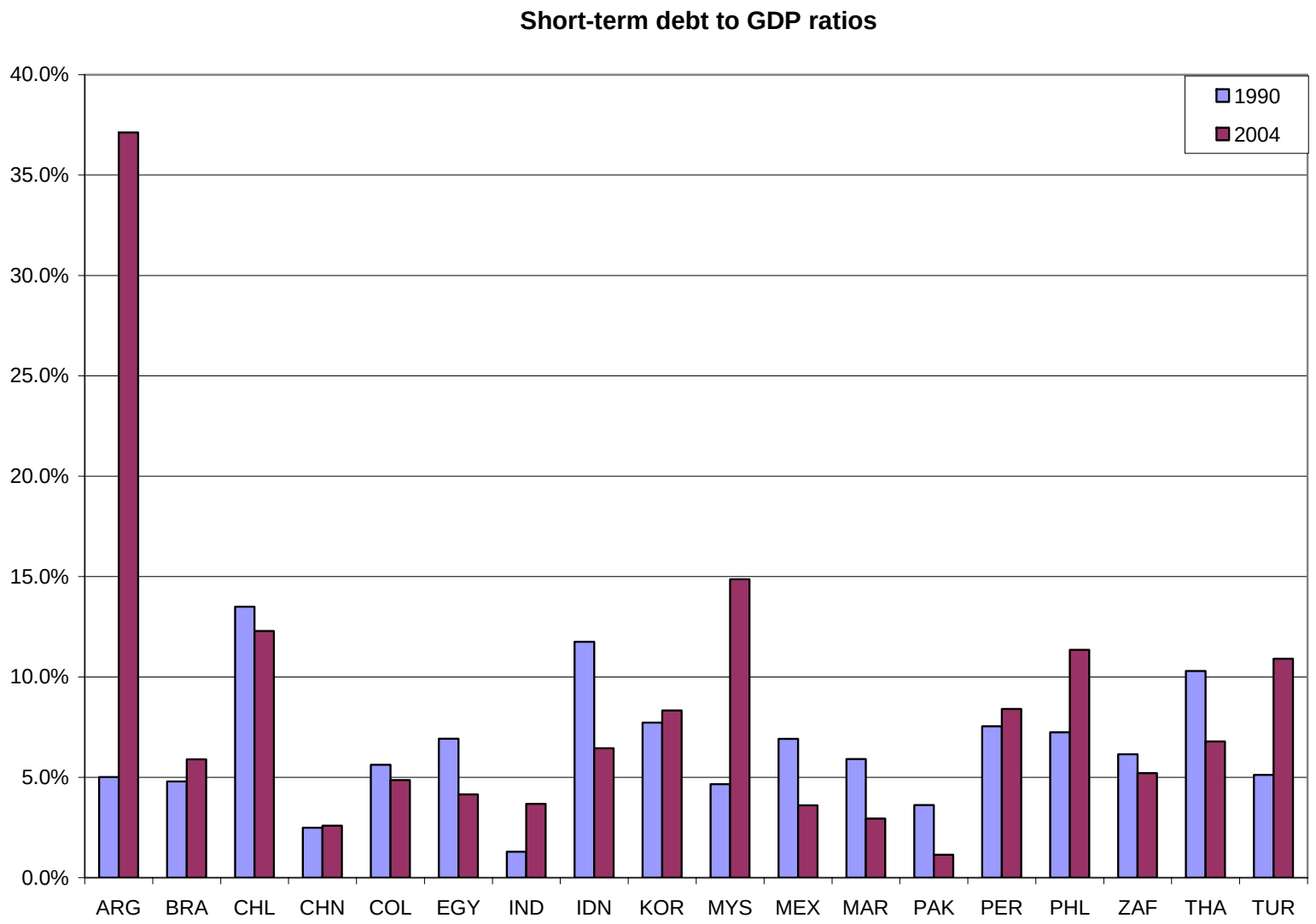
Source: IMF, IFS.

Figure 6



Sources: Author's calculations.

Figure 7



Sources: Short-term debt statistics are from the Joint BIS-IMF-OECD-World Bank Statistics on External Debt Online Database.

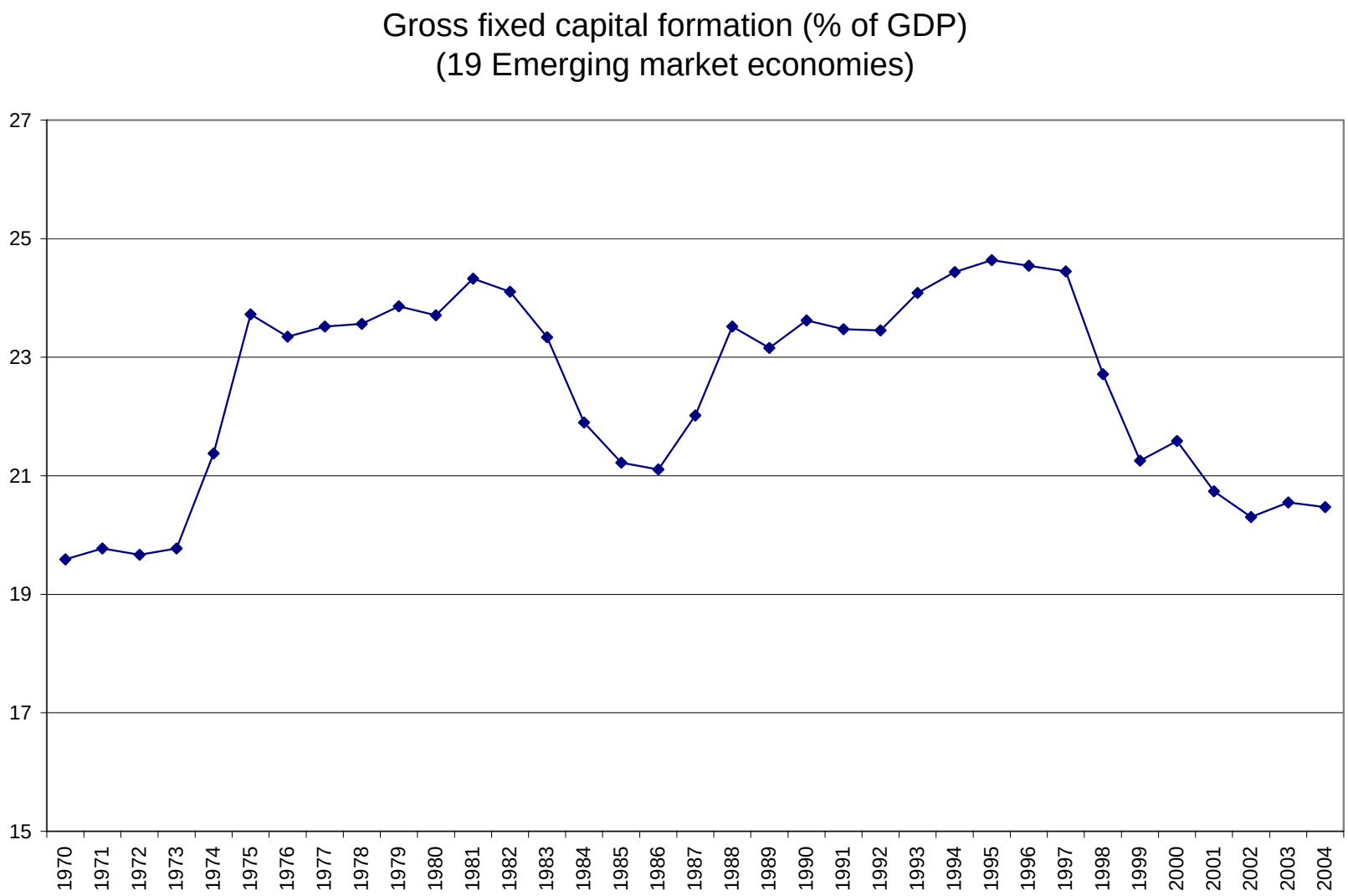
Table 1

Short-term debt and reserves ratios, all EMs

	1990	2004
STD-Reserves		
weighted avg	1.11	0.27
unweighted avg	1.93	0.56
STD-GDP		
weighted avg	5.4%	6.1%
unweighted avg	6.5%	8.4%
Reserves-GDP		
weighted avg	4.8%	22.5%
unweighted avg	3.4%	15.0%

Note: EMs included are those in Fig. 7

Figure 8



Sources: World Bank, WDI.