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ABSTRACT

Lending Booms: Latin America and the World*

Recent theories on the origins of crises put lending booms at the root of financial collapses. Yet lending booms may be a natural consequence of economic development and fluctuations. So, are lending booms dangerous? In this Paper, we investigate this question empirically using a broad sample of lending boom episodes over 40 years, with a special eye on Latin America. Our results indicate that: (1) lending booms are often associated with (i) a domestic investment boom, (ii) an increase in domestic interest rates, (iii) a worsening of the current account, (iv) a decline in reserves, (v) a real appreciation, and (vi) a decline in output growth; (2) lending booms typically do not substantially increase the vulnerability of the banking sector or the balance of payments. On comparing Latin America and the rest of the world, we find that Latin American lending booms make the economy considerably more volatile and vulnerable to financial and balance-of-payment crises than is the case in other regions.

JEL Classification: E44, E51, F32
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NON-TECHNICAL SUMMARY

Lending booms are the cornerstone of numerous recent theories on financial and banking crises. The precise origins of lending booms are diverse. They may arise following a possibly poorly regulated financial liberalization, a surge in capital inflow driven by external factors, supply shocks that boost domestic investment or consumption or both, or as a consequence of exchange rate-based stabilization programmes.

During a lending boom, the typical story goes, credit to the private sector rises quickly. Leverage increases, and financing is extended to projects with low net present value, as monitoring becomes more difficult and domestic borrowers' net worth increases. As lending expands, exposure increases, and the banking sector becomes more vulnerable. In addition, bail-out guarantees, whether explicit or implicit, in the event of a generalized bankruptcy, induce private borrowers and lenders to develop and carry over riskier projects than may be socially efficient. The story usually ends in tears: the private sector gets scared or the projects fail to deliver, the bail-out guarantees are called in, and the whole edifice comes tumbling down. Credit market imperfections play a crucial role. The mechanics are relatively straightforward: during a boom, asset prices increase, which increases borrowers' net worth, facilitates new lending, fuels higher asset demand and even higher asset prices and so on. During the bust, the opposite happens: some actors are not able to repay their loans, and banks call in the collateral at firesale prices. The banks become more vulnerable as the asset side of their balance sheet shrinks. New loans are curtailed and investment collapses together with asset prices. As a result of this increased vulnerability, a mild correction in asset prices may trigger a full blown banking crisis.

There is ample empirical evidence that credit overexpansion and banking crises are related. As scholars of the recent financial crises note, countries that rely on foreign capital inflows may experience a nastier variety of financial debacle that combines a banking crisis and a balance-of-payments collapse. Argentina in 1979, Chile in 1982, Mexico in 1994, and Thailand in 1997 are notorious examples of currency crises erupting into full blown banking crises. Conversely, a weak financial sector may prevent financial authorities from defending their currency, effectively hastening its demise.

In sum, whether lending booms are generated because financial markets are poorly regulated, because monitoring authorities are unable to cope with the rapidly increasing activity of financial intermediaries, because implicit or explicit bailout guarantees aggravate the tendency toward extending credit to high-risk projects, because credit market imperfections increase systemic risk, or because a country adopts a less than perfectly credible exchange rate–based stabilization programme, they are often seen as a sure recipe for

financial disaster. Left unchecked, they are ultimately harmful to the domestic economy.

Consequently, recent proposals in the debate about the new financial architecture call for the use of ‘speed limits’ on credit growth as a prudential tool. But a closer assessment of the consequences of lending booms is needed before we can adopt such proposals. A number of studies empirically establish the existence of a causal link from finance to growth and development. Financial development typically occurs in stages, with periods of intense financial deepening and increases in levels of intermediation. These lending phases may represent permanent take-offs rather than transitory booms. Thus, even if lending booms are an important determinant of banking and balance-of-payments crises, it is possible that a good proportion of them die a natural death, with a subsequent permanent deepening of the domestic financial markets and increased growth.

So are lending booms really that bad? Which theories best explain these episodes empirically? Are speed limits desirable? This Paper examines these questions by contrasting the experience of Latin America and the world for two reasons. First, Latin America experienced a relatively large number of lending booms, especially in the 1990s; second, a number of Latin American countries implemented exchange rate–based stabilization programmes throughout the sample period. It is therefore natural to ask whether Latin America’s lending booms are somehow different in nature from the rest of the world.
We proceed by empirically analysing a large sample of lending boom episodes from 1960 to 1996 in 91 countries, and documenting some stylized facts surrounding these events. We define lending booms as a significant deviation of the ratio of claims on the non-banking private sector from banking institutions to GDP from a country-specific and backward-looking trend. Our benchmark sample contains 80 lending booms over the sample period.
We first characterize the temporal and geographical pattern of booms. We find that booms are very symmetrical, with a build-up that lasts approximately 2.3 years and an ending phase that lasts about 2.8 years. We also find that the occurrence of episodes increased from the 1960s to the 1970s, but remained mostly stable afterwards, while the duration has mostly decreased to about 6.5 years. Geographically, our results indicate that Asia appeared very prone to lending booms, also we observe some time variation across regions of the globe.

We also analyse the performance of a set of macroeconomic indicators around specific episodes of lending booms and the relation between the occurrence of banking and balance-of-payments crises and external disequilibrium. Our results are as follows: we find that lending booms are often associated with (i) a domestic investment boom; (ii) an increase in domestic interest rates; (iii) a worsening of the current account; (iv) a decline in reserves; (v) a real appreciation; and (vi) a decline in output growth.

Using existing indicators of balance-of-payment and banking crises, we compare the vulnerability across different phases of the lending cycle. Interestingly, when using our entire sample, we do not find significant evidence of higher vulnerability during lending booms or during tranquil times. We interpret these results as evidence that lending booms do not systematically harm the economy.

Finally, we perform a similar analysis for Latin American countries only. Our results are significantly different. First, we find that the lending cycle is associated with much more pronounced movements in output, interest rates, and the real exchange rate. Second, we find significant evidence of a direct link between lending booms and banking or balance-of-payment crises.

1 Introduction

Lending booms are the cornerstone of numerous recent theories of financial and banking crises.[1] The precise origins of lending booms are diverse. They may arise following a possibly poorly regulated financial liberalization, a surge in capital inflow driven by external factors, or a terms-of-trade shock (or other types of supply shocks) that boosts domestic investment or consumption or both. They may also come as a consequence of a macroeconomic stabilization program: it has long been noted that exchange rate based stabilization programs are often associated with ultimately unsustainable booms in consumption, output and credit.

During a lending boom, the typical story goes, credit to the private sector rises quickly. Leverage increases and financing is extended to projects with low -possibly even negative- net present value, either because monitoring becomes more difficult when the volume of lending increases rapidly, which increases the likelihood of fraud (including looting, self-lending or 'evergreening'), or because domestic borrowers' net worth increases. As lending expands, the quality of funded projects goes from bad to worse, exposure increases and the banking sector becomes more vulnerable.

Some scholars emphasize the aggravating effect of expected public bailouts in the event of a generalized bankrupcy. Bailout guaranties whether explicit or implicit, induce private borrowers and lenders to develop and carry over riskier projects than may be socially efficient. Entrepreneurs and lenders price new projects under the 'best possible scenario', taking into account the government intervention in the worst states of nature, and the quality of new loans worsen.[2] The story usually ends in tears: the private sector gets scared or the projects fail to deliver, the bailout guaranties are called in, and the whole edifice comes tumbling down.

Others focus on the importance of the 'credit channel' or 'financial accelerator'.[3] The mechanics are relatively straightforward: during a boom, asset prices increase, which increases borrowers' net worth, facilitates new lending, fuels higher asset demand and even higher asset prices, and so on. During the bust, the opposite happens: a proportion of actors are not able to repay their loans, and banks call in the collateral at firesale prices. The banks become more vulnerable as the asset side of their balance sheet shrinks. New loans are curtailed and investment collapses together with asset prices. As a result of this increased vulnerability, a mild correction in asset prices may erupt in a full blown banking crisis.[4]

Consumption booms serve as the basis for many other explanations of the boom-bust cycle. For instance, the cycle may stem from an unsustainable consumption boom rooted in a less-than-perfectly-credible exchange rate stabilization program. Calvo and Vegh (1999) provide an extensive review of these theories.

There is ample empirical evidence that credit overexpansion and banking crises are related. Demirgüç-Kunt and Detragiache (1997), for instance, show that after controlling

for the existence of deposit insurance, the ratio of private credit to gross domestic product (GDP) and the (lagged) real growth of private credit are significant determinants of banking crises. Honohan (1997) considers credit growth one of the leading variables for diagnosing and predicting banking crises.[5]

As scholars of the recent financial crises note, countries that rely on foreign capital inflows may experience a nastier variety of financial debacle that combines a banking crisis and a balance-of-payments collapse collapse. Chile in 1982, Argentina in 1979, Mexico in 1994 and Thailand in 1997, are notorious examples. Several studies examine how the fiscal burden of a banking crisis can generate a balance-of-payment crisis (Dias-Alejandro (1985), Velasco (1987) and Calvo (1995)). Conversely, a weak financial sector may prevent financial authorities from defending their currency, effectively hastening its demise. Goldfajn and RodrigoValdés (1997) and Goldstein (2001) study the direct link between an intermediation boom and the likelihood of banking and balance-of-payment crisis occurring as a result of capital flows. Kaminsky, Lizondo and Reinhart (1997) report that five out of seven studies analyzing credit growth as a determinant of currency crises find statistically significant results. In their own currency-crisis warning system these authors consider that the M2 multiplier and the credit-to-GDP ratio are among the 'particularly useful' leading-indicators.

In sum, lending booms are generated for a variety of reasons – because financial markets are poorly regulated, because monitoring authorities are unable to cope with the rapidly increasing activity of financial intermediaries, because of implicit or explicit bailout guarantees aggravate the tendency toward extending credit to high-risk projects, because credit market imperfections increase systemic risk, and because a country adopts a less-than-perfectly-credible exchange rate-based stabilization program. Uncontrolled growth in lending is thus the result of inadequately designed financial institutions or micro imperfections that distort investment incentives towards socially excessively risky projects. Regardless of the source , lending boom are often seen as a sure recipe for financial disaster. If left unchecked, they are ultimately harmful to the domestic economy.

Some proposals in the debate about the 'new financial architecture' concentrate on eliminating distortions and improving incentives through increased supervision and training and the establishment of safer, more transparent banking standards. Few doubt that this would be an appropriate response. As Rogoff puts it, 'like motherhood and apple pie, it is hard to assess these recommendations as anything but positive' Kaminski and Reinhart (1999, p36). These reforms are unlikely to be achieved any time soon, however, as is the case with most of the grand-schemes currently on the table. Other proposals therefore directly advocate the use of 'speed limits' on credit growth as a prudential tool. Honohan (1997, p21), for example, states 'Speed limits [are] (...) the most promising [regulation] so far as bank soundness is concerned'. Still others propose controls on capital inflows, as a way to limit exposure to reversals of short-term capital flows and currency mismatches. The message in all these proposals is clear: *until we know how to build safer roads, let's make slower cars.*

The argument has been most forceful in the context of capital flows. Even the International Monetary Fund (IMF) –the guardian of the doctrine– has shifted from an unconditional advocacy of full capital account liberalization to a more nuanced position that acknowledges the benefits of targeted capital controls.

This need not be. First, financial accelerator models (Bernanke and Gertler (1989), Bernanke, Gertler and Gilchrist (1998)) do not imply that fluctuations are 'inefficient'. Fluctuations are only a symptom, associated with contractual inefficiencies. Indeed, it is precisely because entrepreneurs face an external finance premium stemming from incentive problems that they have to rely on internal funds or collateral. As the value of the collateral increases, more valuable projects obtain financing. Speed limits on lending would curtail possibly valuable investment. Aghion, Bacchetta and Banerjee (1999a) and Aghion, Bacchetta and Banerjee (1999b) develop a model where lending booms are the 'normal state of affairs' and where the economy can exhibit cycles. Schneider and Tornell (1999a) develop a model with multiple equilibria in which the high lending equilibrium might ex-ante be better.

Second, a number of studies (Rajan and Zingales (1998), Levine and Zervos (1998)) empirically establish the existence of a causal link from finance to growth and development. Financial development typically occurs in stages, with periods of intense financial deepening and increases in levels of intermediation.[6] These lending phases may represent permanent takeoffs rather than transitory booms and they need not revert to lower levels of financial depths. Thus even if lending booms are an important determinant of banking and balance-of-payment crises, it is possible that a good proportion of them dies a 'natural death' with a subsequent permanent deepening of the domestic financial markets and increased growth.

So are lending booms really that bad? Which theories best explain these episodes empirically? Are 'speed limits' desirable? This paper examines these questions by contrasting the experience of Latin America and the World, for two reasons. First, Latin America experienced a relatively large number of lending booms especially in the 1990s; second, a number of Latin American countries experienced exchange rate-based stabilization programs throughout the sample period. It is therefore only natural whether Latin America's lending boom are somehow different in nature from the rest of the world.

we proceed by empirically analyzing a large sample of lending boom episodes and documenting some stylized facts surrounding these events. We are particularly interested in describing the covariation of domestic credit with other relevant macroeconomic variables. The set of stylized facts that we investigate includes the duration of booms, temporal patterns, and geographic agglomeration effects. We also analyze the performance of a set of macroeconomic indicators around specific episodes of lending lending booms and the the relation between the occurrence of banking and balance-of-payment crises and external disequilibrium.

The paper is organized as follows. The next section outlines our definition of a lending boom episode, describes the data we use, and presents a first set of stylized facts. We then

analyze the behavior of a set of macroeconomic indicators around episodes and, subsequently, evaluate how harmful booms are in terms of banking and balance-of-payment crises. The following section compares the characteristics of lending booms in Latin America with the rest of the world. The paper then revisits different explanations of booms. Finally, we present our concluding remarks.

2 Lending Booms

In this section we present our operational definition of a lending boom episode and describe the data we use to identify events. We also provide a first characterization of lending boom episodes, analyzing a number of cases, theiur duration, their temporal distribution, and their geographic agglomeration.

2.1 Definition and Data

In contrast to a currency crisis, a current account reversal, or other well-defined events occurring only in one period, lending boom episodes have a variable duration. Moreover, because economic growth brings about financial deepening, lending figures follow a natural trend. Any study of lending booms must therefore start by defining a complete event, differentiating between "normal" increments in the volume of lending and boom episodes. In this paper we define a lending boom episode as a deviation of the ratio between nominal private credit and nominal GDP from a rolling retrospective country-specific stochastic trend.[7] A rolling backward-looking trend uses only information available up to the time the lending boom is detected in the data. This is the correct approach as far as speed limits are concerned: some increases in lending may lead to permanent financial deepening while others lead to reversals. In the first case a trend defined on the entire sample period would incorporate this increase in the trend. In the other case, it would instead flag a lending boom. But of course, a policymaker observing a given increase in lending would not know whether it is to be ultimately to be reversed or not.

To become an episode, the deviation from the trend has to be larger than a given threshold. We consider two alternative threshold definitions: relative deviation and absolute deviation. The former is based on the relative difference between the actual and predicted credit-to-GDP ratio, implying that different countries may experience a lending boom independent of their financial deepening. The latter looks at the absolute discrepancy between the actual and predicted credit-to-GDP ratios, implying that countries with a more developed financial sector may be more prone to experiencing lending booms. The relative deviation compares the size of the additional lending to the size of the banking sector, while the absolute deviation compares it to the size of the economy. We maintain the distinction between these two types of booms throughout the paper since we do not know a priori

whether the economic impact of a boom depends on its relative or absolute magnitudes.[8]

[Figure 1 about here]

Figure 1 shows a typical boom episode, which begins when the credit-to-GDP ratio reaches a "boom threshold" (the upper dashed-line). We define three phases in each episode: a build-up phase, which starts when the ratio rises above a "limit threshold" (the bottom dashed-line) and ends and ends one year before the episode reaches its largest deviation from the trend; a peak year; and an ending phase which starts at the end of the peak year and ends when the ratio returns to the limit threshold. The boom threshold identifies episodes (and therefore, the number of cases),while the limit threshold determines their duration.

Our sample consists of ninety-one countries over the period 1960–1996. All the countries in the sample have more than 500,000 inhabitants, have more than twelve years of credit data available from the International Financial Statistics (IFS), and show a ratio of private credit to GDP ratio of 15 percent or more in one or more years. We measure private credit as claims on the nonbanking private sector from banking institutions (line 22d of the International Financial Statistics), while nominal GDP corresponds to line 99b.[9] Because credit corresponds to a stock variable measured at the end of the year, we consider the geometric average of GDP in year t and t+1 as the relevant measure of GDP in the ratio calculations. We estimate the trend of the credit-to-GDP ratio using a rolling Hodrick-Prescott filter for each country (with parameter set at 1000).[10]

[Figure 2 about here]

Figure 2 presents the credit to GDP ratio for Argentina, Chile and Mexico, three relatively well-known cases. The graphs show that Argentina experienced two lending booms, from 1979 to 1982, and then from 1992 to 1995. Chile featured a long lending boom from 1975 to 1984, and Mexico experienced one from 1988 to 1994. In Argentina, the credit-to-GDP ratio increased by 100 percentin the first episode and by 70 percent in the second, while in Chile and Mexico it increased by 1200 percent and 350 percent respectively. Understanding the underlying forces -and consequences- of such dramatic surges in financial depth is of paramount importance to policymakers.[11]

Appendix A presents a complete list of episodes under both the relative and absolute criteria.

2.2 Characterization of Episodes: A First Look

This section provides a first characterization of lending boom episodes, analyzing the number of cases, their duration, temporal distribution, and geographic agglomeration.

2.2.1 Selection of episodes.

Table 1 presents the number of cases that appear in our sample, considering both types of criteria. As expected, the number of cases decreases with the size of the boom threshold under both measures. With a relative deviation equal to 24 percent (relative to the credit-to-GDP ratio) there are 60 cases, while with an absolute deviation of 5 percent (relative to GDP) there are 65 cases. We observe that even with relatively high thresholds (42 percent under the relative criterion or 8 percent under the absolute one), we identify a significant number of episodes (23 and 33 respectively).

[Table 1 about here]

The following discussion focuses on three different thresholds that yield exactly one hundred, eighty, and sixty cases for each type of measure. This simplification facilitates a more exact comparison between the two definitions and generates a more straightforward concept of a lending boom: the N cases in our sample in which we observe the largest gap between the credit-to-GDP ratio and its trend.[12] Somewhat arbitrarily, we choose *limit* thresholds 5 percent and 2 percent for the relative and absolute deviations, respectively.

2.2.2 Duration

The second dimension we characterize is duration. In addition to average duration, we are interested in possible asymmetries between the build-up and ending phases since it is usually believed that credit-driven booms have a rather sudden unwinding (Honohan (1997)).[13]

Table 2 shows the results for our boom episodes.[14] The average duration of a complete episode is approximately 6.5 years for the relative cases, 5.5 years for the absolute case. While the standard deviations indicate substantial heterogeneity across episodes, the results also show a strong symmetry between the duration of the build-up and ending phases. Interestingly, most of the variation across the number of cases and criteria is in terms of the ending phase. The build-up takes roughly 2.5 years in all cases, whereas the unwinding varies from as little as 1.6 years to as much as 3.2 years. The longest boom in our sample occured for Syria and lasts twenty-seven years. In contrast, eight countries experienced one-year lending booms.

[Table 2 about here]

This symmetry implies that there is no evidence that lending booms end abruptly. Is it possible that our sample contains two types of very different episodes — quick reversals and slow unwindings? If so, the average across these two types of episodes could show a duration similar to the build-up phase. While this is certainly a possibility, the standard deviations are, in fact, extremely symmetrical: ending phases do not show markedly higher

cross-country volatility than build-up phases. On the contrary, the standard deviation during unwindings is lower than during build-ups. Countries with abrupt reversals should therefore also exhibit different upswings. We interpret this as evidence that lending booms (at least under our definition) are episodes that do not end abruptly.

Another potential explanation for the degree of symmetry arises from the construction of the ratio of private credit to GDP. Since the denominator of this indicator is nominal GDP, a possible bias could stem from sudden falls in this variable toward the end of the episode, for example as a result of the recessionary impact of a cut in domestic credit. This could keep our measure of private credit from falling as rapidly as it should. To evaluate this possibility we ran the same exercise as in table 2 using a Hodrick-Prescott filter to smooth the real component of nominal GDP prior to computing the credit-to-GDP ratio (see table 3). We used the same thresholds as before to maintain comparability. This exercises generates a slightly different number of cases for each threshold. Using trend GDP instead of actual GDP shortens the duration of the episodes by roughly one year. But both the build-up and the ending phases shorten, and the symmetry result still obtains.

[Table 3 about here]

2.2.3 Temporal distribution

The third characteristic we analyze is the temporal distribution of episodes. If lending booms are due to external or international factors that affect a number of countries simultaneously, we should observe some bunching of episodes. Of course, the same would occur if the episodes originate from internal factors that are correlated across countries (such as a wave of domestic financial liberalizations).

Figure 3 shows the number of countries experiencing a lending boom as a fraction of possible episodes (which takes into account the unbalanced nature of our panel).[15] Under the relative criterion (top panel), two peaks emerge: the early 1980s and the mid-1990s; under the absolute criterion, there is a natural upward trend in the number of episodes, due to financial deepening, with a peak between 1991 and 1993. Changes in the number of episodes are important from an economic perspective. While the peak number of episodes under the relative criterion in 1978-82 was between 20 and 36 percent of potential cases (depending upon the boom threshold), at the beginning of the sample, the number was between 1 and 4 percent.[16]

[Figure 3 about here]

We also look at changes in the duration pattern over time. Figure 4 shows the average duration of episodes during each year of our sample period. The data in the figure represent the average duration of of active episodes in each year, independently of the three phases.[17]

Under the relative criterion, the duration falls dramatically, from eleven years at the beginning of the sample to just under five years at the end. Temporal aggregation appears quite different under the absolute criterion: duration increases from roughly five years in 1968 to nine years in 1985, then falls back to about five years in 1996.[18] The typical lending boom episode of the 1990s may thus be significantly different from its 1960s cousin.

[Figure 4 about here]

2.2.4 Geographic Agglomeration

Finally, we examine the geographic agglomeration of episodes to determine whether some areas are more prone to lending booms than others. Table 4 presents the results.[19] As expected, the geographic distribution pattern is different under the two criteria. While industrialized regions are more likely to experience an absolute boom (because of their deeper financial sector), they are considerably less prone to experiencing a relative boom. Among developing regions, Asia –especially Far East Asia– exhibits a the greatest likelihood of having a boom under both types of deviation.[20] In the sample of 60 cases, for example, the Asian probabilities are 15.0 percent (relative) and 12.9 percent (absolute), while Latin America and Africa have relative probabilities 13.7 percent and 11.2 percent, respectively. Interestingly, by this measure, Latin America does not appear especially vulnerable to booms: the region experienced fewer lending booms, on average, than Asia under either criterion, and fewer lending booms than Africa, especially Sub-Saharan Africa, according to the absolute criterion.

[Table 4 about here]

Figure 5 presents the same decomposition by decade and continent for the relative criterion. It is apparent from this figure that the pattern differs quite markedly across continents and time. One clear message is that Latin America experienced far more lending booms in the 1990s than previous decades: the country/year probability exceeded 30 percent. By contrast, African economies were more prone to relative lending booms in the 1970s. As for Asia, the Middle East experienced a steady increase in lending booms over decades while Far East Asia was more prone to lending booms in the 1970s.[21] This figure highlights the strong geographical composition of the overall temporal distribution of lending booms in Figure 3.

[Figure 5 about here]

3 Macroeconomic Indicators Around Lending Booms

To further our investigation of the origins of a lending boom and to evaluate its macroeconomic impact, we now present a set of macroeconomic indicators around episodes. Even

though lending is clearly an endogenous variable, closely studying macroeconomic performance around episodes is useful for confront different theories of lending booms.

We follow the methodology that Rose and Wyplosz (1995) use to study currency crises and that Razin and Milesi-Ferretti (1996) apply to the case of current account reversals. For each macroeconomic indicator we compute the difference between its sample average for each phase (including t-2, t-1, t+1, and t+2) and its average during tranquil periods (before t-2 and after t+2). We also report confidence bands.

The set of macroeconomic variables includes 14 indicators and can be grouped into four categories: (1) domestic macroeconomic variables (gap between actual and potential GDP, potential output growth, ratio of investment to GDP, ratio of private consumption to GDP, real interest rate, spread between lending and deposit interest rates, and inflation rate);[22] (2) domestic policy variables (government surplus as percentage of GDP, and months of imports covered by international reserves); (3) international variables (ratio of current account to GDP, real exchange rate, private capital inflows as percentage of GDP, and proportion of short term in total debt); and (4) external factors (terms of trade measured as deviation from long-run trend and international real interest rate). Appendix B presents details regarding source and data availability for each variable.

Because of potentially important cross-sectional variation in each of the indicators we measure each variable in deviation from a country-specific mean. This enhances the significance of the results. We construct potential output from the the Hodrick-Prescott filter of real output and estimate the output gap as deviation from this measure. We use deviations from trend (calculated with a Hodrick-Prescott filter) to estimate also the deviation of the real exchange rate from equilibrium, and the deviation of terms-of-trade from its long run value.

Figure 6 presents the results for the sample with 80 episodes using the relative deviation criterion. Each panel plots teh evolution of one of the variables, showing the deviation from its tranquil-period average plus or minus two standard deviations. We start with the evolution of private lending to provide a check that we are indeed capturing lending booms.[23] The following discussion is organized according to the four categories outlined above. These results are quite robust when we consider the relative boom thresholds that yield 60 and 100 cases, as well as under the absolute criterion.

[Figure 6 about here]

3.1 Domestic macroeconomic variables;

1. Private lending appears highly symmetrical, rising above the trend by almost 10 percent of GDP during a typical lending boom and slowly decreasing afterwards. This result is in line with the results on duration discussed in the previous section. The exercise

indicates that our methodology may 'flag' lending booms too early: during our build-up phase, on average, private credit is not significantly more above above trend than during tranquil times.

2. The output gap is higher between t-2 and the build-up phase than during tranquil periods by 1.5 percent; Since the output gap is essentially zero during tranquil periods, this implies that output rises significantly above potential during this period; during the peak year output is roughly equal to potential, and declines below trend, although not significantly. We estimate a cumulated output gain for the entire episode at 2.80 percent, although only marginally significant.

3. The growth of potential output falls significantly below the average for tranquil times during the unwinding phase. The effect is large (-0.6 percent to -1 percent), significant and long lasting.[24] While this decline in trend GDP is certainly consistent with existing theories arguing that excessive lending leads to an ultimate collapse of the economy, it is important, to emphasize that our results do not demonstrate this point: a positive comovement between credit and GDP is also consistent with the alternative interpretation that shocks to the economy (such as a terms of trade shock or a negative productivity shock) simultaneously alter aggregate output and domestic credit.

4. Investment rises significantly from 0.6 percent of GDP above teh average for tranquil periods in $t-2$ to 3.5 percent of GDP above the tranquil-period average during the build-up period and declines subsequently. The typical lending boom is associated with a strong investment boom.

5. The consumption-to-GDP ratio is significantly depressed before the lending boom (-3.0 percent). Although consumption increases gradually over the episode, it never exceeds its average during tranquil times. Taken together, these findings indicate a strong investment boom but no overwhelming evidence of a consumption boom.

6. The domestic real interest rates rises by a staggering 700 basis points during the build-up, compared to tranquil times. This increase is very significant.

7. The domestic interest rate spread does not vary significantly.

8. The domestic inflation rate falls by 9 percent, from 6 percent above average in $t-2$, to a significant -3 percent at the peak and subsequently rebounds. This pattern may be consistent with theories that emphasize the role of stabilization programs, especially exchange rate based stabilization.[25]

3.2 Domestic policy variables

1. International reserves decline from 1.2 months of import above the mean to 0.

2. The ratio of government surplus or deficit to GDP worsens significantly in the aftermath of the lending boom, going from 0.4 percent above the mean to −1.3 percent below.

3.3 International variables

1. The large current account improvement seen before the lending boom (3.2 percent of GDP, relative to tranquil times) turns into a large deficit around the peak of the episode (−2.8 percent of GDP). The overall turnaround represents 6 percent of domestic GDP.

2. The real exchange rate appreciates by roughly 7 percent relative to trend and to tranquil times during that same period. It reverts to trend after the lending boom.

3. Private capital inflows increase significantly, by 2.6 percent of GDP from the build-up to the peak year and ending phase. This surge is subsequently reversed.

4. The proportion of short term external debt increases significantly after the lending boom, by 3.8 percent.

3.4 External factors

1. The terms of trade appreciates significantly after the end of the episode.

2. The international real interest rate increases steadily, by roughly 86 basis points over the episode.

4 Are Lending Booms Dangerous?

Credit growth is considered one of the key determinants of banking crises but this does not mean that credit booms are always harmful for the economy. While the conditional probability of a lending boom occurring before a banking crisis may be quite high, it does not tell us much about the converse, namely, the conditional probability that a banking crisis will *follow* a lending boom. As we have argued before, credit booms may instead reflect fundamental improvements in investing opportunities that are beneficial in the long run.

The results from the previous section provide only mixed support for this interpretation: while the output gap is positive and -mildly- significant, potential output growth deteriorates significantly. This section addresses the possibility that lending booms lead to an increase in *volatility*, that is, in a country's vulnerability to economy-wide crises.[26]

We address this question in this section by investigating whether the incidence of banking and currency crises around lending booms episodes.

4.1 Incidence of Banking Crises during Booms

To analyze whether boom episodes are related to financial crises, and particularly whether they signal future banking troubles, we compare the probability of having a banking crisis before and after a boom episode with the probability of experiencing such a crisis during tranquil periods.[27] The period before an episode starts in $t-2$ and continues through the peak year. The period after an episode encompass the ending phase through $t+2$.[28]

The basic information that we use to define the existence of a banking crisis is drawn from Caprio and Klinguebiel (1997) and from Lindgren, Garcia and Saal (1996). We consider two alternative indicators of banking crisis (dummy variables for a country/year observation) based on the cases identified in each study.

Caprio and Klinguebiel (1997) construct a large database on banking crisis episodes. According to their definition, a banking crisis occurs when the net worth of the banking sector has been almost entirely eliminated.[29] Their identifies sixty episodes in fifty-one of our ninety-one countries (fourty-three countries have one case, seven countries have two cases, and one country has three cases). Lindgren et al. (1996) categorize banking problems as either "crisis" or "significant" problems. For the present exercise, we only consider those episodes classified as significant problems. Their data base uncovers twenty-nine episodes in twenty-four of our ninety-one countries (twenty countries have one case, three countries have two cases and one country has three). Both data bases were constructed on the basis of interviews with IMF and World Bank desk economists and accounts of banking crises in the international literature. The two major limitations of the these data sets are their imperfect comparability across countries —what is defined as a crisis in one country may not be enough for a crisis in another— and their vague criteria to define the duration of a crisis. For example, the average duration for a crisis in the Caprio Klingebiel data set is 3.8 years, while in the Lindgren et al. data set it is 4.6 years. The list of banking episodes under both criteria is presented in Appendix Appendix A..

[Table 5 about here]

Table 5 presents the results for both banking crisis indicators. First, we observe that the probability of a banking crisis after a lending boom is relatively low, around 9.5 percent to 13.9 percent using the Lingreen, Garcia and Saal data and 12.7 percent to 21 percent using the Caprio and Klinguebiel data. Overall, a banking crisis is far from an definite outcome for the episodes in our sample.

Second, the likelihood of having a banking crisis up to two years after a lending boom is somewhat higher than during tranquil periods, although the increase is often not statistically significant. Using the Lindgreen, Garcia and Saal index, the probability of having a banking crisis after a relative deviation boom is about 53 percent higher than during tranquil times (10.6 percent versus 6.8 percent). After an absolute deviation boom the average probability

is about 75 percent higher than tranquil times (11.7 percent versus 6.7 percent).[30] The incidence of banking crisis is slightly lower before the lending boom than during tranquil times.

These results indicate that the presumption that lending booms generically lead to banking crisis is largely erroneous: while most banking crisis may be preceded by a lending boom, most lending booms are not followed by a banking crisis.[31]

It is also interesting to contrast these results with those that emerge if we define our episode using a trend defined over the entire sample period.[32] In that case a banking crisis is subtantially more likely after lending booms than during tranquil times. One possible explanation is that the latter criterion flags booms that are ultimately reversed, and not those that lead to a permanent financial deepending. Probably part of this reversal occurs through a collapse of the domestic financial system. From the point of view of the policymaker, however, it is the deviation from trend based on purely historical data that matters. Our definition will flag rapid but permanent changes in the credit to GDP ratio as booms. For instance, under our present criterion Australia credit to GDP soared from 30 percent to 60 percent between 1985 and 1993. An analysis of its credit-to-GDP ratio (see the graph at the end of the paper) reveals that Australia experienced a rapid and apparently permanent financial deepening over this period.[33] While the definition of episodes used in this paper may appear too conservative, flagging perfectly healthy developments in the financial sector, it can only be extended on the basis of supplementary information. This paper will not present attempts to define lending booms on the basis of multivariate systems, this is clearly an avenue for future work.[34]

Despite the limitations of our criteria (which we view as empirically palatable), the previous section indicates a clear pattern of co-movement across a series of key macroeconomic variables and our lending booms. This may make it difficult to sort out healthy booms from dangerous ones on the basis of covariates, which is not really surprising considering the theoretical literature on liquidity and financial crisis. A number of existing models emphasize that the economy may be prone to multiple equilibria and thus, may or may not experience a collapse at given fundamentals.

4.2 Probability of Currency Crisis during Booms

This subsection evaluates whether lending booms are related to the existence of balance-of-payments or currency crises. We follow the same methodology used above, namely, we compute the probability of a currency crisis occurring before and after a lending boom and compare it to the same probability during tranquil periods. To determine the occurrence of a currency crisis in each country/year observation we construct a set of dummy variables using the definition of a currency crash outlined by Frankel and Rose (1996) and by Meese and Rose (1996). These authors consider that a currency crisis occurs when the nominal

devaluation (on a year-to-year basis) exceeds 25 prcent, with at least a 10 percent increase from the devaluation rate of the previous year, using the US dollar bilateral exchange rate. They also require crises to be 2 years apart.[35] Appendix Appendix A. reports our list of currency crises.

[Table 6 about here]

Table 6 presents the probability of having a currency crisis before and after a boom and during tranquil periods using both relative and absolute deviation criteria and our three samples. The results show that, the likelihood of a currency crisis is only slightly higher after a boom than during tranquil periods. In fact, using the relative criterion, currency crisis are sometimes more likely before a lending boom than after. Under the absolute criterion, the probability of a currency collapse is highest after a lending boom. However, once again, the results are somewhat imprecisely estimated, so that we cannot reject the hypothesis that the probabilities are indeed the same. Across samples, the average incidence after a boom is between 28 percent (relative deviation) and 32 percent (absolute deviation) higher than during tranquil periods.

5 Is Latin America Different?

Latin America's recent history features prominent experiences of lending booms and busts.[36] These episodes usually contain three main ingredients: financial deregulation; large capital inflows and capital account liberalization; and a failed exchange rate-based stabilization policy. To examine whether these experiences have a special nature we now revisit the stylized facts listed in the previous two sections, comparing Latin America and the rest of the world.

5.1 Macroeconomic Indicators

Latin America comprises nineteen countries, which accounts for twenty-two of the lending booms in our sample of eighty.[37] Figure 7 shows the behavior of macroeconomic variables during booms in Latin America whereas figure 8 report what happens in all countries excluding Latin America.

[Figure 7 about here]
[Figure 8 about here]

First, positive capital inflows are more relevant before the lending booms in Latin America than for the rest of the world (Figure 7.13 and 8.13). This is consistent with the fact that a number of Latin American countries experienced capital account liberalization during our

sample period. Second, positive output gap deviations are stronger, with a cumulated output gain of 6.3 percent, although insignificant. The gains are strong and positive during the peak and the ending phase (2.05 percent and 3.12 percent respectively). On the other hand, potential GDP growth is very significantly smaller than average. This decline in potential GDP growth is much more pronounced for Latin America at about 1.4 percent than for the entire sample (panel 7.3). In fact, once Latin America countries are exluded the decline in output growth is not significant until $t + 2$ (panel 8.3), except at the very end of the episode. Latin American countries thus exhibit a pattern of strong temporary output gains and significant decline in potential output growth.

Third, there is much less evidence that the increase in output is driven by an investment or a consumption boom. Although the investment-to-GDP ratio increases from 0 to 2.5 percent after the boom, the rise is not statistically significant.[38] Clearly, it is hard to conceive of a lending boom that would not be associated with either an increase in investment or in consumption. However, recall that we are measuring investment and consumption in ratio to GDP. The temporary increase in GDP thus translates into an increase in investment and consumption, but investment increases substantially less than in the rest of the world. Taken together, these facts indicate consumption mmay play a more important role in Latin America than in the rest of the world.

Fourth, domestic interest rates are significantly higher in Latin America (approximately 10 percent or 1000 basis points in comparison to 4-5 percent in the rest of the world), while the world real interest rate tends to be significantly lower in the early phase. These results indicate that international factors may play a more important role in Latin America than in the rest of the world.

Lastly, the real exchange rate overvaluation is much more sustained. It reaches about 8 percent, in Latin America and only 2 percent in the rest of the world (and solely during the ending period) (Figure 7.12 and 8.12). Despite this stronger appreciation, the current account does worsen significantly more in Latin America than the rest of the world (Figure 7.11 and 8.11).

5.2 Crisis

Table 7 indicates that the probability that a banking crisis will follow a lending boom is much higher in Latin America than in the rest of the world. Under the relative criterion with 80 cases worldwide, only 9 percent of the country/year experience a banking crisis during tranquil times, this probability jumps up to 25 percent after a lending boom. By contrast, the rest of the world was less likely to experience a banking crisis during lending booms, with a probability between 7 percent and 10 percent. The result is even stronger if we look at the absolute criterion: with a 139 percent probability increase. A similar pattern is also present for the rest of the world, although to a lesser extent.

[Table 7 about here]
[Table 8 about here]

Balance of payment crisis follow a similar pattern (see table 8). The frequency of crisis is higher in Latin America than in the rest of the world, reflecting the disproportionate occurrence of currency crisis in the region. The increase in probability is also larger, although not significantly so.

These results indicate that the lending booms identified in this paper are of a distinctive nature in Latin America: post-boom banking and currency crisis are almost twice as likely in the region than in the rest of the world.

6 Stories about the Origin of Booms

What triggers a lending boom? This section briefly reviews leading theories and examines whether our findings support their predictions. While our results clearly do not a one-size fits-all theory, some theories seem better equipped to explain the facts. We want to emphasize that this is only a very impressionistic attempt to gauge the empirical relevance of various theories. More sophisticated work is needed.

6.1 Real Business Cycles

A lending boom is a by-product of a large real business cycle in which the output-elasticity of the demand for credit is highly procyclical. The ultimate origin of a boom under this story is a technological or terms of trade shock.[39] Technological shocks could certainly explain booms in the sample that excludes Latin America. A key feature of this story appear in the data: GDP growth is higher than normal in $t-1$ (that is, one year before the lending boom). Furthermore, the investment boom that arises with the lending boom is a typical outcome in this type of models. The story is also well suited to explain why the incidence of banking and balance-of-payments crises after a lending boom is not larger than during tranquil times. It is harder to argue, however, that terms-of-trade shocks are at the root of lending booms. According to figure 8.15, terms of trade shocks do not vary over the episode, until the very end when they fall significantly.

Real business cycles provide a less satisfactory explanation of the Latin American sample. Potential output growth in these episodes is below tranquil period average before, during, and after the lending boom. Output is above potential only when the boom is fully developed. Although terms of trade increase during the build-up (from a negative value relative to trend), they are never above their tranquil period average. Lastly, it is not obvious how this theory would explain the strong vulnerability that booms produce in Latin America.

Overall while this may be an appropriate story for a large fraction of cases, but is far

from being the only one, and according to our results, it provides a poor fit of the Latin American experience.

6.2 Financial Development and Liberalization

This theory holds that a lending boom is the natural outcome of a significant liberalization of an initally repressed financial system. If a country has interest rate caps, lending that is centrally allocated, and/or an over-regulated banking industry, then the credit-to-GDP ratio is considerably lower than in a country without any of these regulations. The lending boom following a financial liberalization might become large and troublesome if prudential regulation is not adequate. The evidence shows that after a liberalization the domestic real interest rates rise very significantly (Galbis (1993)) and there is a higher probability of both banking and balance-of-paymentd crisis (Kaminski and Reinhart (1999)).

Various stylized facts support the predictions of this theory, particularly in the Latin America sample. Both the domestic real interest rate and the probability of banking and currency crises increase with a lending boom. Moreover, the liberalization may trigger an investment (and consumption) boom which, in turn, causes external disequilibrium such as real exchange rate overvaluation and a large current account deficit. Larger capital inflows and debt concentration in short maturities may also follow a liberalization, especially when this involves opening the capital account. This theory may even explain the bunching of cases we observed, since financial liberalization tended to occur in waves. On the other hand, this theory would have a difficult time explaining the output gains *before* the lending boom. Nonetheless, it may be a good candidate to explain a good portion of episodes in Latin America.[40]

An alternative theory (Aghion et al. (1999a)), argues that lending booms and subsequent macroeconomic instability may be the consequence of *partial* financial liberalization, in economies that exhibit mild financial constraints. Financial liberalization increases capital inflows. Initially, this increases output and the wealth of investors. Since personal wealth can be pledged as collateral on domestic investment projects, this increases further the demand for credit. In these models, increases in wealth and output, lead to a surge in the demand for nontraded inputs into production (such as real estate or services). The result is a real appreciation of the real exchange rate and a surge in the price of domestic assets. This eventually chokes off the initial expansion and lead to a decline in output. As the economy contracts, demand for nontradable inputs falls precipitously leading to a real depreciation and a collapse in asset prices. Aghion et al. (1999a) show that the resulting volatility occurs for intermediate levels of financial development, as measured by the severity of the financing constraint. In their theory, incomplete financial liberalization may leave a country exposed to financial and macroeconomic instability. This theory makes a number of predictions about the chain of events leading to a crisis. Large capital inflows and current account deficit, real

exchange rate appreciation and output expansion coincide with the increase in investment and lending. The episodes in Latin America feature many of these characteristics.

It is interesting to combine the story of financial development/liberalization with exchange-rate-based stabilization. The massive real exchange rate overvaluation coupled with the consumption turnaround observed in these episodes also characterizes stabilizations attempts that lack full credibility. The southern-cone experiences during the early eighties and the Mexican episode of 1994 could be compared with the experience of Peru of 1991-1994: all feature broad structural reforms, including price liberalization, privatization, trade reform, and opening up the capital account. One key differences between the Peruvian (successful) experience and others is that Peru pursued a monetary-based stabilization.

6.3 Capital Inflows

A lending boom is the domestic counterpart of a large capital inflow surge triggered by so-called external factors (Calvo, Leiderman and Reinhart (1993)). Episodes ocur in waves because of common external fundamentals. International real interest rates are rather low during the lending upswing. There is bunching of episodes because of common external fundamentals. The banking system intermediates the funds by increasing credit to the private sector which raises both consumption and investment.

Some of the stylized facts that we identify agree with this theory. In particular, we do observe time-agglomeration and a surge of capital inflows during the boom. Other key pieces are not present, however. In particular, the international real interest rate does not show the pattern one would expect, and the average size of the capital inflows is only around one-fifth the size of the boom (in percent of GDP). Thus, the story seems valid only for a limited number of cases.

6.4 Wealth Shocks

A lending boom occurs when a large investment or consumption expansion needs financing. New discoveries of natural resources, a large exogenous change in relative prices, or relevant structural reforms may trigger this expansion. This theory predicts higher growth and macroeconomic stability. This story does not conform with any of our three samples. In all cases potential output growth shrinks after the boom and vulnerability increases after lending episodes.

In sum, the two theories that are most consistent with the stylized facts presented in this paper are that lending booms follow a (sometimes poorly regulated) financial liberalization and/or a natural business cycle. In the latter case boom episodes should not be a problem. The former story fits much better the stylized facts we identify for Latin American countries.

7 Concluding Remarks

This paper has identified a set of stylized facts surrounding lending boom episodes. The build-up and ending phases appear highly symmetric, independent of whether we define lending booms as a relative or an absolute deviation of the credit-to-GDP ratio from its trend. This fact goes against the idea that lending booms end abruptly. We also do not find significant evidence of changes in boom duration in our sample. Lending episodes show some time-agglomeration. We speculate that this is due to waves of financial liberalization rather than a result from exogenous capital inflow surges. In comparison to other geographical areas, Latin America does not seem specially prone to have lending booms.

We analyze the behavior of several macroeconomic variables during lending booms. The most salient results are the following: (1) lending booms are associated with (i) an investment and—to a lesser extent—a consumption boom; (ii) trend output growth declines over the episode by over 1 percent; (iii) a large increase in domestic real interest rates; (iv) a large increase in the current account deficit and a counterpart in the form of capital inflows; (v) a real appreciation of the domestic currency; (vi) some worsening of the fiscal situation; (vii) a decline in foreign reserves and a shortening of the maturity of the external debt; (2) no significant increase in banking and balance of payment vulnerability.

When restraining our sample to Latin American countries, we find that lending booms are often followed or accompanied by a banking and/or a currency crisis. Macroeconomic variables in the region display an overall pattern during booms that is similar to the rest of the world's. However, there are relevant differences in the behavior of some key variables across the two samples both regarding timing and intensity. These differences allow us to associate booms in Latin America primarily to financial liberalization and development.

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Notes

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[1]See Corsetti, Pesenti and Roubini (1999), Krugman (1998), Sachs, Tornell and Velasco (1996) and Tornell (1999).

[2]See Merton (1977) and Schneider and Tornell (1999a).

[3]Kiyotaki and Moore (1997), Schneider and Tornell (1999a), Schneider and Tornell (1999b) and Aghion et al. (1999a), Aghion et al. (1999b).

[4]Gavin and Hausmann (1996), stress this type of vulnerability.

[5]Caprio and Klinguebiel (1997) conclude that other factors explain crises, although too much credit may increase vulnerability.

[6]Financial intermediation may later subside as firms and households gain direct access to financial markets.

[7]Another possibility is to focus on relative velocity of real credit growth (for example, vis-a-vis GDP). We prefer our definition because velocities focus only on time derivatives, and thus do not consider a reference to the lending level. Velocities could identify a boom after a credit crunch just because lending volumes are getting back to normal.

[8]A velocity-based lending boom definition (such as Goldman Sachs' credit growth above 1.2 GDP growth) is a relative measure.

[9]Private domestic credit does not include direct banking credit from foreign banks to local actors (other than funds channeled through the domestic banking system). It could be argued that direct foreign credit should be included in our credit measure.

[10]We use the first five years of data to construct the trend.

[11]See the appendix for a complete set of figures.

[12]The thresholds for the relative (resp. absolute) deviation are 16.4 percent (3.65 percent), 19.5 percent (4.45 percent) and 24 percent (5.40 percent), for the one hundred, eighty and sixty cases respectively.

[13]In the case of real exchange rate overvaluation episodes, Goldfajn and Valdés (1999) find a sharp asymmetry between similarly-defined phases. In their sample, the build-up phase has a

duration that is almost twice the duration of the return-to-equilibrium phase.

[14]To avoid truncating lending boom episodes at the beginning and at the end of the sample, table 2 and figure 4 only consider complete episodes.

[15]There is a caveat in the interpretation of this figure. At face value, each number reads as the probability of having a lending boom in that period. Because our episodes last more than one period, however, the correct interpretation is the probability of a year/country observation being part of a boom episode. This distinction will also be important in the interpretation of table 4.

[16]These low numbers may be in part due to the methodology we adopt: with a rolling filter, if the credit to GDP is growing rapidly in the early years of the sample, this will be attributed to the trend. In unreported results, we used an HP filter defined throughout the sample period. The results indicated that the early 60's were a time of high lending boom episodes, around 12-20%, with a subsequent trough in the early seventies.

[17]We consider only complete events. See footnote 14.

[18]Looking at the underlying episodes, it appears that the difference between the two estimates at the beginning of the sample rests upon relatively few episodes with large duration under the relative criterion: Morocco (seven years), Senegal (fourteen years), Syria (twenty seven years) and Togo (fourteen years). See Appendix Appendix A.. By contrast, from 1983 onwards, both criterion estimate a duration falling from about eight years to roughly five years.

[19]See footnote 15. Each number reads as the probability of experiencing a lending boom in a given year on that continent.

[20]These results do not change if one considers countries as the basic observation instead of country/years.

[21]The results for Latin America are robust under the absolute criterion. In Africa, the number of episodes increased over decades while in Asia, we observe a pronounced peak in the 1980s.

[22]It would have been quite informative to include durable consumption in this set. Unfortunately there is no data available.

[23]In this figure, the country specific credit-to-GDP trend is constructed using a Hodrick-Prescott filter for the entire sample. The deviation from trend may therefore be below the threshold defining the episodes.

[24]The estimation window is extended to $t-5$ and $t+5$ for potential GDP growth. Notice that even 5 years after a lending boom, GDP growth is significantly below average.

[25]The results for the inflation rate exclude countries with hyperinflation or very high inflation episodes. The countries excluded are: Argentina, Bolivia, Brazil, Chile, Greece, Indonesia, Israel, Kuwait, Oman, Peru, Zambia, Zimbabwe. Thus, we cannot attribute this result to some of the well-known exchange rate based stabilization programs (Argentina 1978 and 1991, Brazil 1986, and Chile 1978). Some other well know ERBS with lending booms are still included, for instance: Mexico 1987 or Uruguay, 1978.

[26]This is the argument emphasized by Schneider and Tornell (1999b).

[27]We compute probabilities per period (year), so episodes of different duration are comparable to tranquil period probabilities.

[28]The results do not differ much among the individual phases that comprise the before and after parts. For simplicity we prefer to consider only these two categories rather than all seven different phases.

[29]They use World Bank financial sector reviews and interviews with World Bank specialists to assess the scope of the crisis and estimate its total cost (see Caprio and Klinguebiel (1997, Table 1)).

[30]The increase in probability using the Caprio and Klinguebiel index are 13 percent and 54 percent respectively for the 80 cases sample.

[31]The standard errors are quite large, however, so that the contingency table may have low power. If one considers the 60 and 100 cases samples the general results do not change. although with a smaller number of cases the post-boom probability of crisis increases (more so using the relative criterion than the absolute criterion).

[32]We thank Chris Sims for suggesting this to us.

[33]Indeed, our previous categorization did not flag Australia as a lending boom episode.

[34]To tackle this issue, at least in part, we did investigate the incidence of banking crisis, conditional on relevant macro variables (investment/GDP, real appreciation, size of the boom...). The results, not reported here but available from the authors, indicate no clear pattern.

[35]Our results do not change in any meaningful way if we consider a threshold of 15 percent instead.

[36]The experiences include Chile in 1982, Argentina in 1981, and Mexico in 1994. For details, see de la Cuadra and Valdés-Prieto (1993) and Edwards and Cox-Edwards (1987), Dornbush and Werner (1994), and Krueger and Tornell (1999).

[37]We keep the same thresholds as for the full analysis, so that episodes are comparables across subsamples.

[38]This may reflect low power, however.

[39]See Mendoza (1995) for an evaluation of the effect of terms of trade shocks in a open real business cycle economy.

[40]Of course, recurrence is a problem for this explanation. It is not possible to claim that this story explains every single episode. Empirically, financial liberalizations tend to occur gradually. Thus it is possible to observe sharp increase in lendings at key turning points in this process.

Table 1: **Number of Lending Boom Episodes**

Relative Deviation Threshold (% Cred/GDP)	Cases	Absolute Deviation Threshold (% GDP)	Cases
12	125	3	111
18	92	4	89
24	60	5	65
30	44	6	51
36	31	7	38
42	23	8	33

Episodes in total sample.

Table 2: **Average Duration of Lending Boom Episodes (years)**

	Relative Deviation					
	60 Cases	S.D.	80 Cases	S.D.	100 Cases	S.D.
Build-up Phase	2.5	(2.5)	2.3	(2.3)	2.3	(2.4)
Ending Phase	3.2	(2.1)	2.8	(2.0)	2.7	(2.0)
Total	6.7	(3.6)	6.1	(3.4)	6.0	(3.4)
	Absolute Deviation					
	60 Cases	S.D.	80 Cases	S.D.	100 Cases	S.D.
Build-up Phase	2.7	(2.3)	2.5	(2.3)	2.2	(2.2)
Ending Phase	2.0	(1.8)	1.9	(1.7)	1.6	(1.6)
Total	5.7	(3.3)	5.4	(3.3)	4.9	(3.1)

Measured in years. Total includes peak year.

Table 3: **Average Duration of Lending Boom Episodes with Smooth GDP (years)**

	Relative Deviation					
	60 Cases	S.D.	79 Cases		93 Cases	
Build-up Phase	1.8	(1.7)	1.8	(1.7)	1.9	(1.8)
Ending Phase	2.7	(2.7)	2.4	(2.5)	2.2	(2.4)
Total	5.5	(3.3)	5.2	(3.2)	5.1	(3.1)
	Absolute Deviation					
	55 Cases		83 Cases		99 Cases	
Build-up Phase	2.2	(2.6)	1.9	(2.4)	1.8	(2.4)
Ending Phase	1.6	(1.8)	1.4	(1.6)	1.2	(1.5)
Total	4.8	(3.4)	4.3	(3.1)	4.0	(3.1)

Measured in years. Total includes peak year.

Table 4: **Geographic Distribution of Lending Boom Episodes**

Criterion:		Relative Deviation		
Area	# Countries	60 Cases	80 Cases	100 Cases
America	21	12.3	14.9	16.8
Latin America	19	13.7	15.7	17.8
North America	2	0	8.2	8.2
Africa	28	11.2	14.7	17.1
Sub-Saharan Africa	24	11.8	14.4	17.1
Rest of Africa	4	7.9	16.5	17.2
Asia	20	15.0	16.3	18.6
Mid-East Asia	10	16.8	18.0	20.6
Far East Asia	10	13.4	14.6	16.7
Oceania	4	28.0	28.0	28.0
Europe	18	6.2	7.6	13.5
Criterion:		Absolute Deviation		
Area	# Countries	60 Cases	80 Cases	100 Cases
America	21	6.3	8.2	9.3
Latin America	19	6.3	8.4	9.6
North America	2	6.8	6.8	6.8
Africa	28	7.4	9.6	11.4
Sub-Saharan Africa	24	7.8	10.2	10.8
Rest of Africa	4	5.0	5.7	15.1
Asia	20	12.9	14.9	15.8
Mid-East Asia	10	6.3	9.8	11.7
Far East Asia	10	19.1	19.7	19.7
Oceania	4	15.2	17.6	23.2
Europe	18	15.4	16.2	16.7

Probability of observing a year/country episode in the geographical area.

Table 5: **Probability of Banking Crisis**

	Relative Deviation					
	Dummy-Caprio and Klingebiel			Dummy-Lindgren et al.		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	9.5	8.6	8.1	1.6	1.3	1.3
	(6.5)	(5.9)	(5.1)	(6.8)	(6.1)	(5.3)
After boom	14.3	14.1	12.7	10.4	10.6	9.5
	(5.1)	(4.6)	(4.1)	(5.2)	(4.7)	(4.2)
Tranquil time	12.4	12.6	13.4	6.8	6.8	7.3
	(1.5)	(1.7)	(1.9)	(1.5)	(1.7)	(1.9)
	Absolute Deviation					
	Dummy-Caprio and Klingebiel			Dummy-Lindgren et al.		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	9.8	9.3	8.1	2.56	2.4	2.1
	(5.8)	(5.1)	(4.8)	(6.0)	(5.3)	(4.9)
After boom	21.1	18.1	16.5	13.9	11.7	11.1
	(5.5)	(4.9)	(4.5)	(5.7)	(5.0)	(4.6)
Tranquil time	11.3	11.7	12.4	6.3	6.7	6.9
	(1.5)	(1.7)	(1.9)	(1.5)	(1.7)	(1.9)

Actual country/year cases to potential country/year ratio. Standard deviation in parenthesis. Before boom includes from t-2 to peak year. After boom includes from ending phase to t+2.

Table 6: **Probability of Currency Crisis**

	Frankel-Meese-Rose Dummy					
	Relative Criterion			Absolute Criterion		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	7.2	7.4	6.5	4.8	4.4	4.0
	(5.5)	(4.8)	(4.3)	(5.4)	(4.8)	(4.4)
After boom	6.7	7.2	7.2	7.3	8.0	7.3
	(5.2)	(4.6)	(4.1)	(5.7)	(5.0)	(4.6)
Tranquil time	5.6	5.4	5.4	5.8	5.8	6.0
	(1.0)	(1.1)	(1.3)	(1.0)	(1.1)	(1.2)

Actual country/year cases to potential country/year ratio. Standard deviation in parenthesis. Before boom includes from t+2 to build-up. After boom includes from peak year to t+2.

Table 7: **Probability of Banking Crisis, Latin America and the World**

	Relative Deviation, Caprio Klinguebiel criterion					
	Latin America			Rest of the World		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	14.5	11.5	11.1	7.0	7.1	7.0
	(10.9)	(9.6)	(9.4)	(8.1)	(7.3)	(6.1)
After boom	29.7	25.0	23.7	8.8	10.3	9.5
	(9.0)	(8.4)	(8.2)	(6.2)	(5.5)	(4.8)
Tranquil time	7.9	9.0	9.4	13.4	13.4	14.4
	(4.0)	(4.6)	(4.8)	(1.6)	(1.8)	(2.1)
	Absolute Deviation, Caprio Klinguebiel					
	Latin America			Rest of the World		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	19.6	17.4	16.7	7.4	7.0	6.0
	(12.5)	(10.6)	(10.4)	(6.6)	(5.9)	(5.4)
After boom	37.8	34.0	37.0	18.0	14.9	12.8
	(12.5)	(11.0)	(10.3)	(6.0)	(5.4)	(4.9)
Tranquil time	9.2	8.4	7.4	11.9	12.7	13.9
	(3.0)	(3.5)	(3.6)	(1.7)	(2.0)	(2.2)

Actual country/year cases to potential country/year ratio. Standard deviation in parenthesis. Before boom includes from t-2 to peak year. After boom includes from ending phase to t+2.

Table 8: **Probability of Currency Crisis, Latin America and the World**

	Relative Deviation, Frankel Meese Rose Dummy					
	Latin America			Rest of the World		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	15.5	15.2	14.4	3.6	4.0	3.5
	(9.4)	(8.3)	(7.8)	(6.7)	(5.9)	(5.1)
After boom	16.9	14.7	13.1	3.4	4.8	5.5
	(9.8)	(8.8)	(8.3)	(6.0)	(5.4)	(4.7)
Tranquil time	11.0	11.1	11.6	4.3	4.1	4.0
	(2.7)	(3.0)	(3.3)	(1.1)	(1.2)	(1.4)
	Absolute Deviation, Frankel Meese Rose Dummy					
	Latin America			Rest of the World		
	60 Cases	80 Cases	100 Cases	60 Cases	80 Cases	100 Cases
Before boom	12.3	10.8	10.1	2.9	2.7	2.6
	(11.9)	(10.3)	(10.0)	(6.0)	(5.4)	(4.9)
After boom	18.0	19.2	18.7	5.4	5.9	5.0
	(14.1)	(12.0)	(11.3)	(6.2)	(5.5)	(5.0)
Tranquil time	12.0	11.9	12.0	4.1	4.1	4.3
	(2.1)	(2.4)	(2.5)	(1.1)	(1.2)	(1.4)

Actual country/year cases to potential country/year ratio. Standard deviation in parenthesis. Before boom includes from t-2 to peak year. After boom includes from ending phase to t+2.

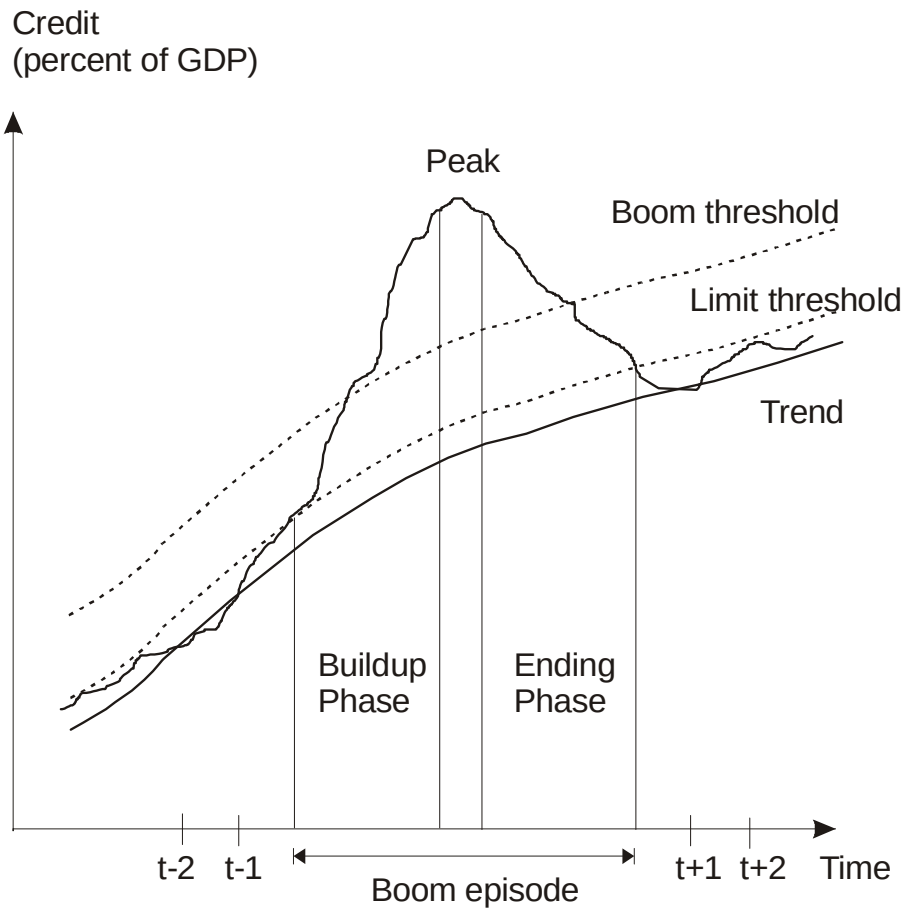


Figure 1: Lending Boom Episode Definition

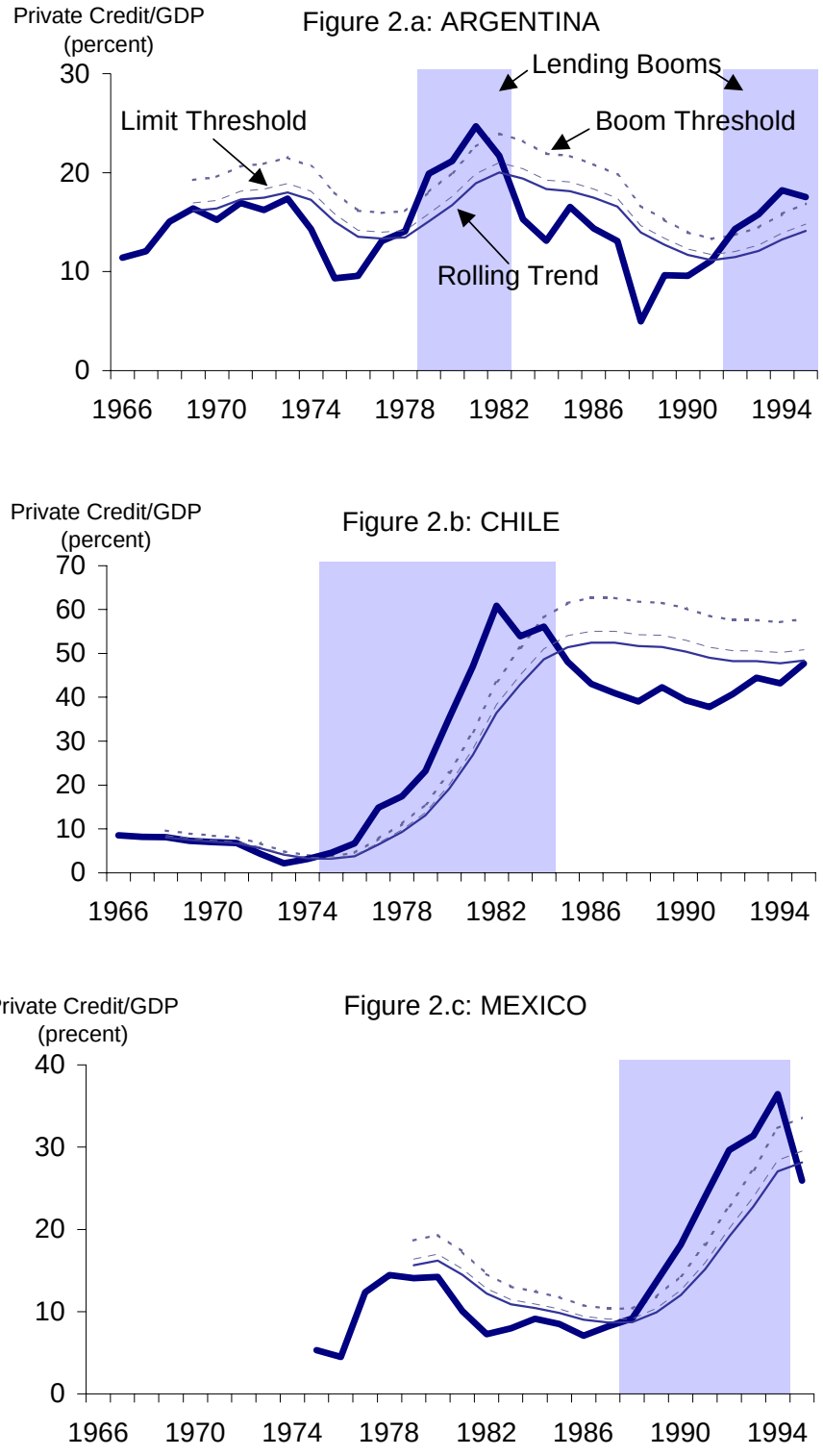
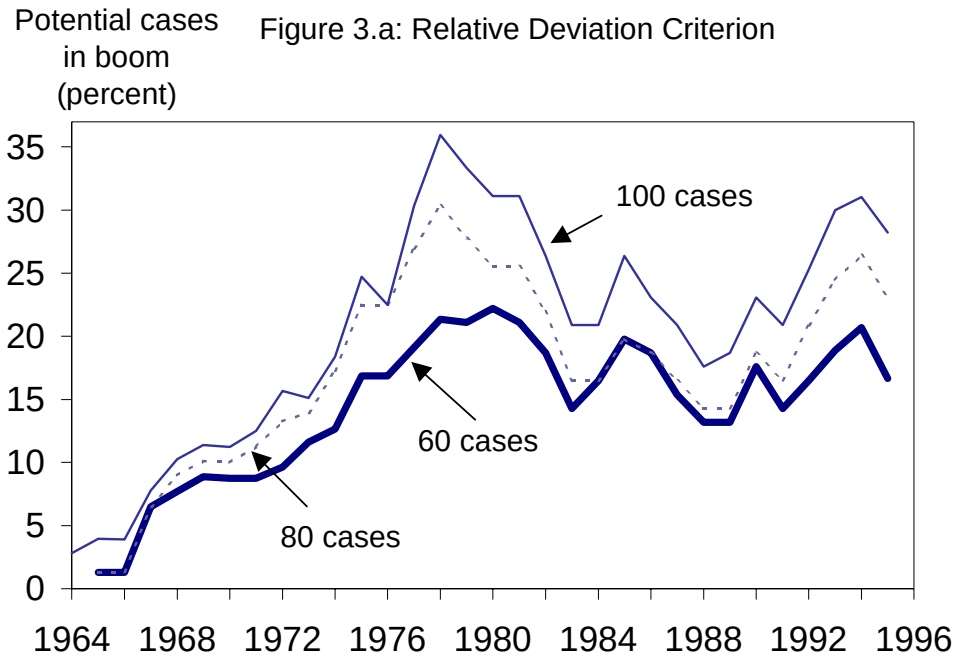


Figure 2: Selected Lending Booms in Latin America.



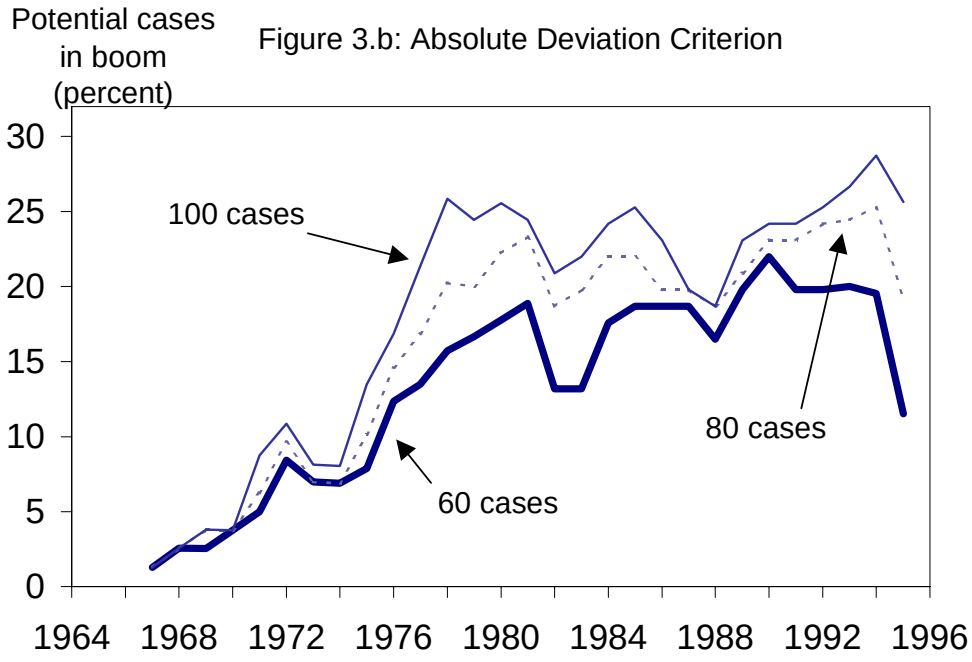
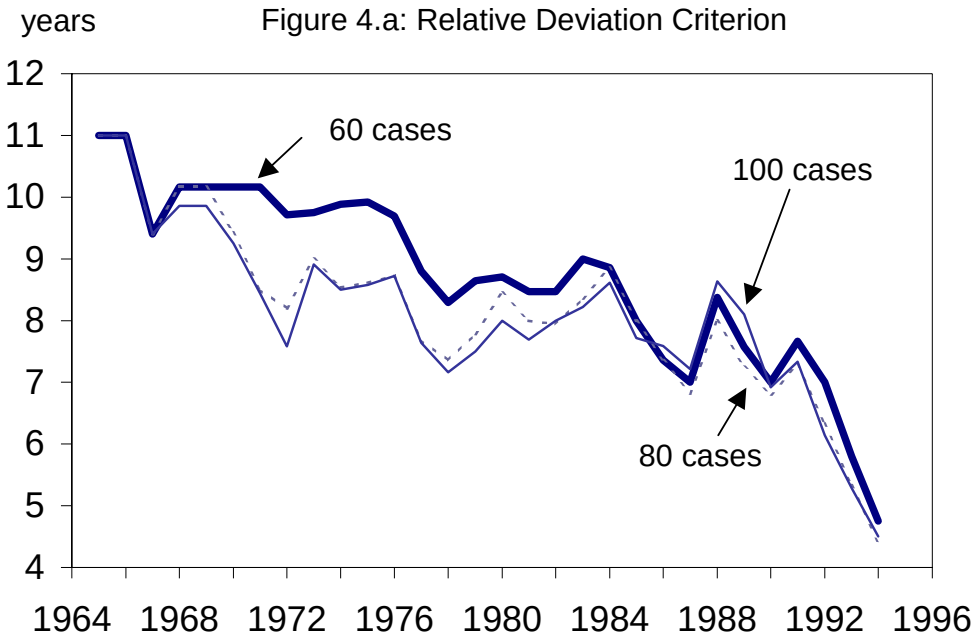


Figure 3: Time Distribution of Boom Episodes



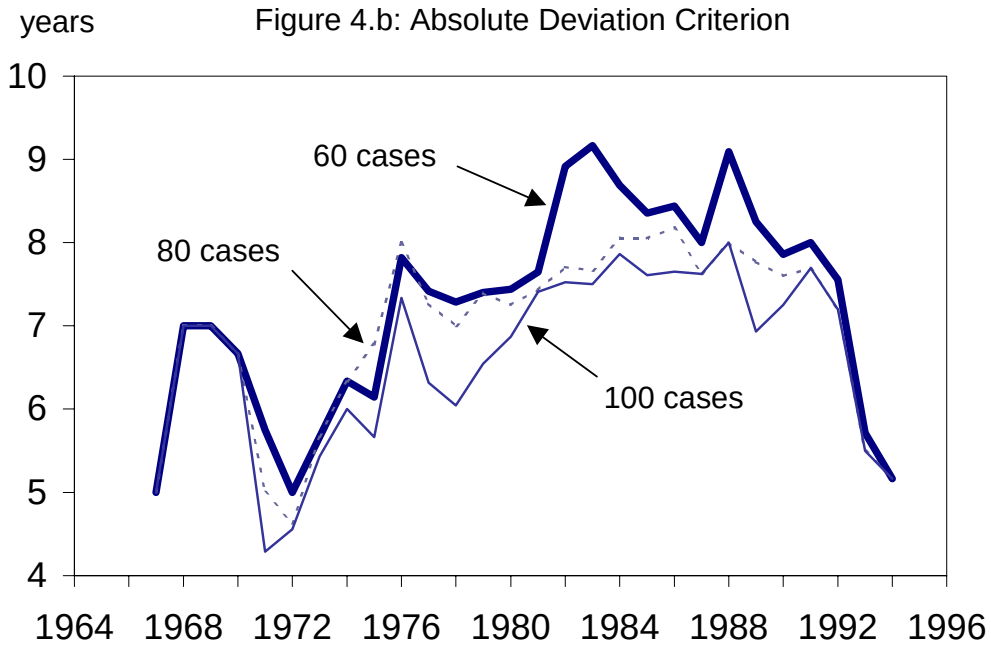


Figure 4: Duration of Boom Episodes. Completed Episodes Only.

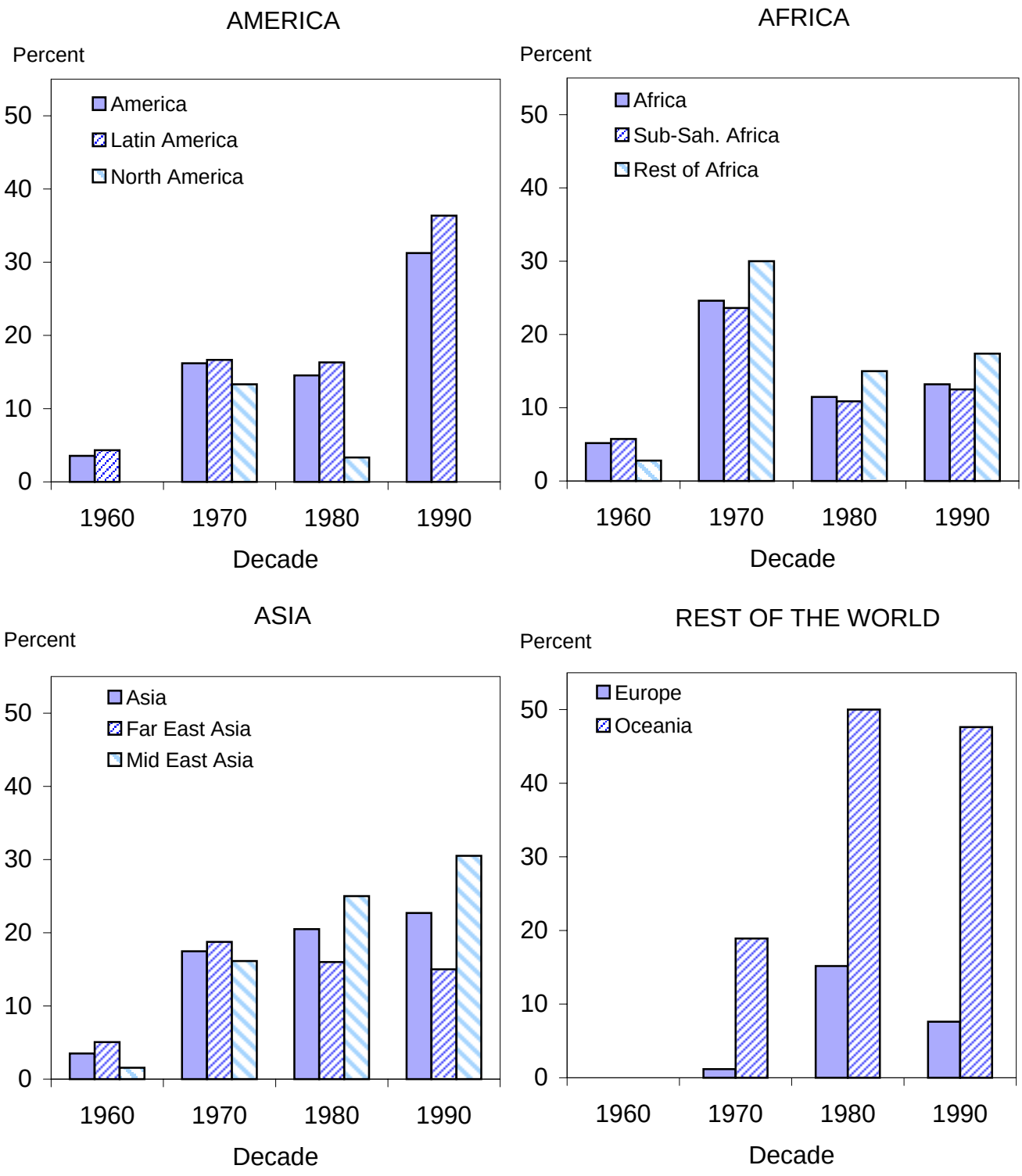


Figure 5. Geographic Distribution by Decades, Eighty Cases, Relative Deviation Criterion

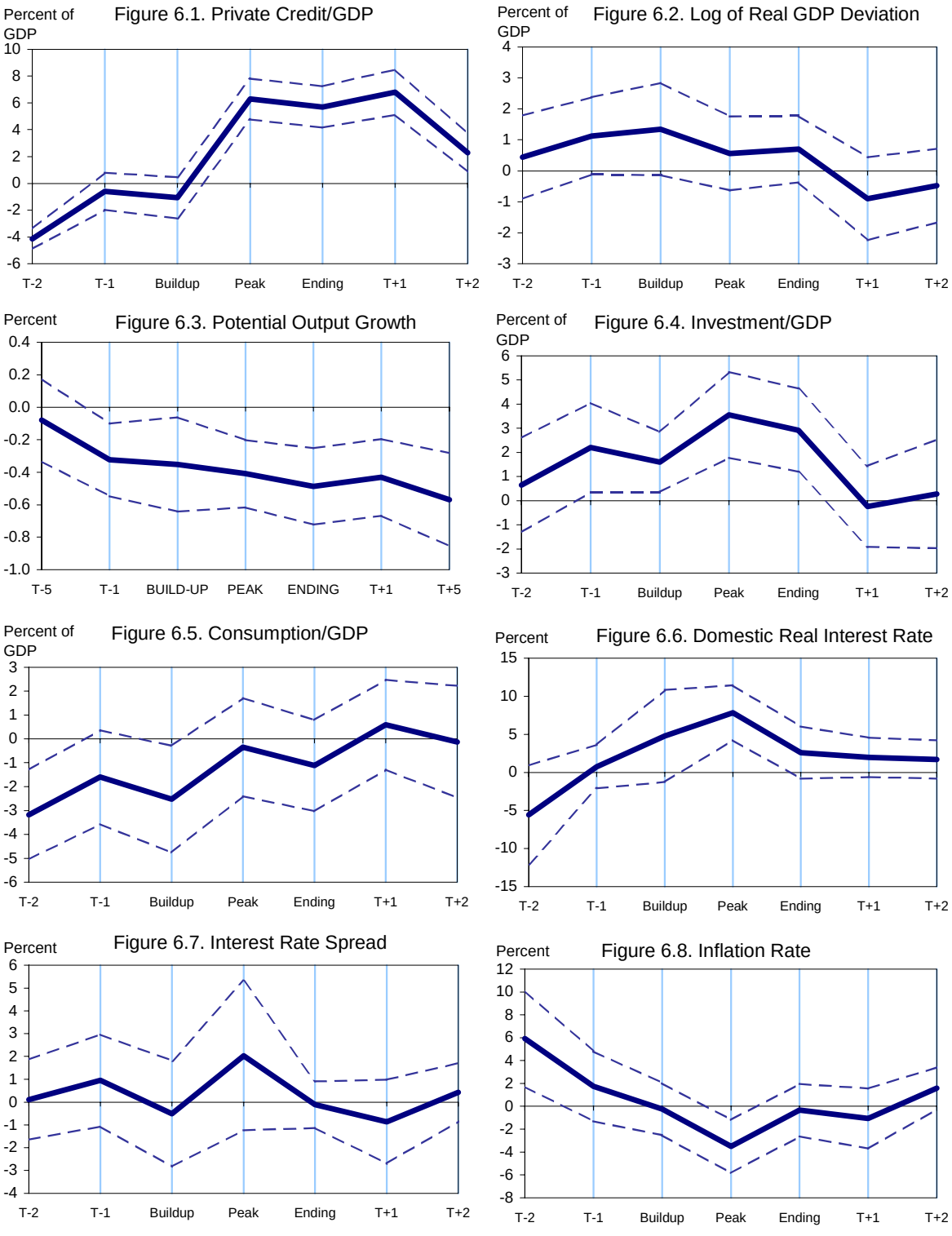
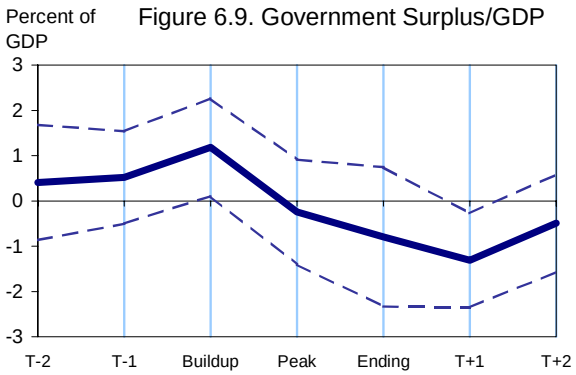
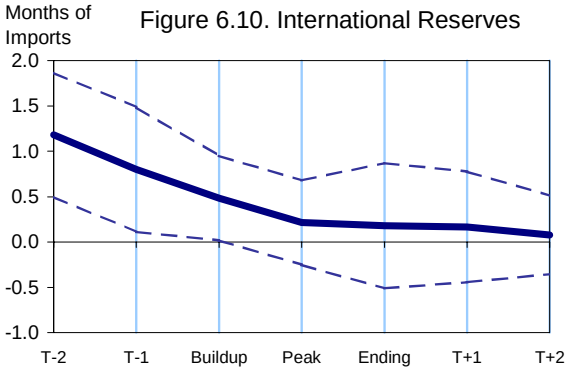
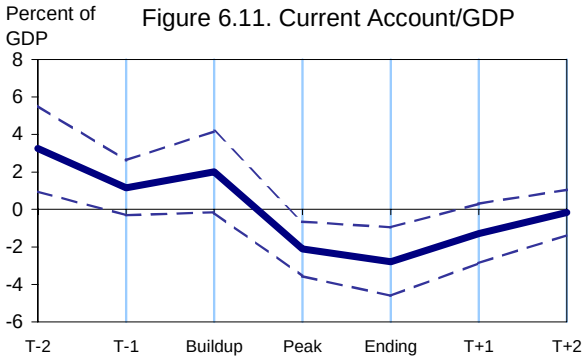
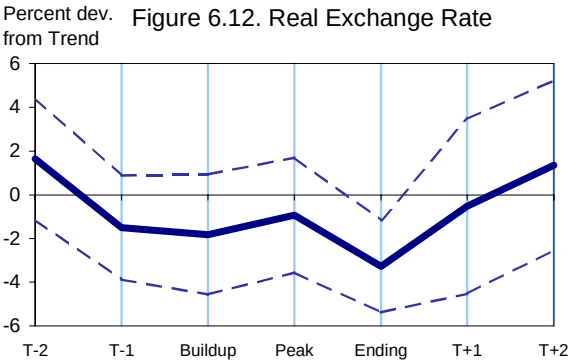


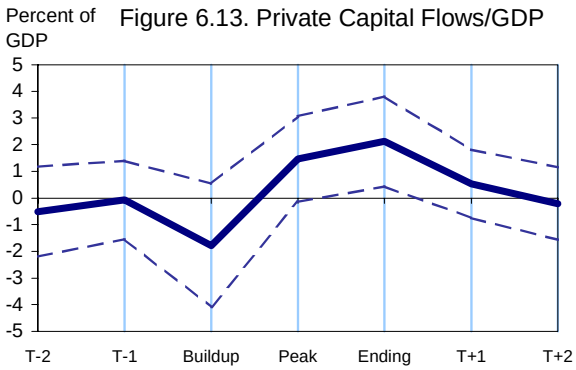
Figure 6: Macroeconomic Indicators around Episodes, Eighty Cases, Relative Deviation Criterion.

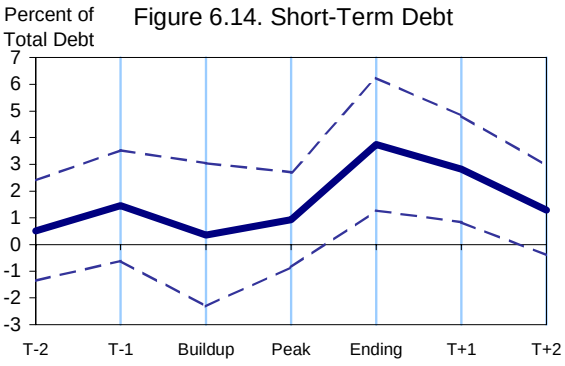


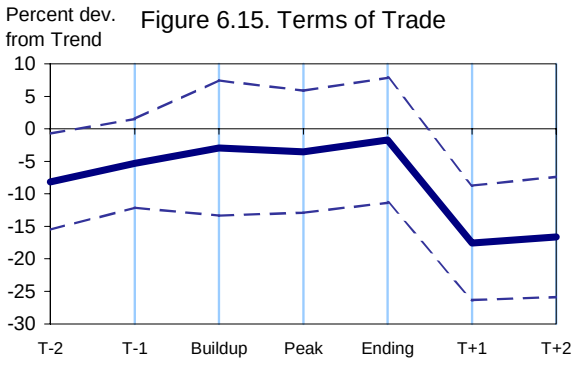












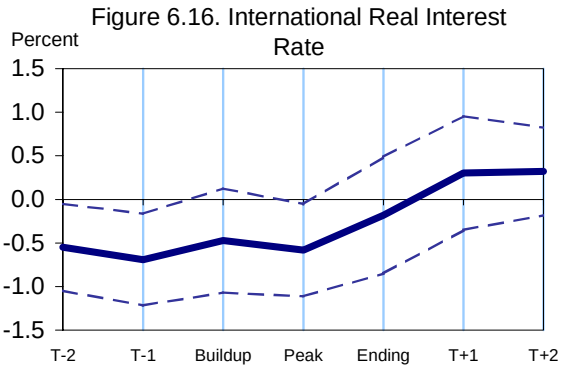


Figure 6: Macroeconomic Indicators around Episodes, Eighty Cases, Relative Deviation Criterion (cont.).

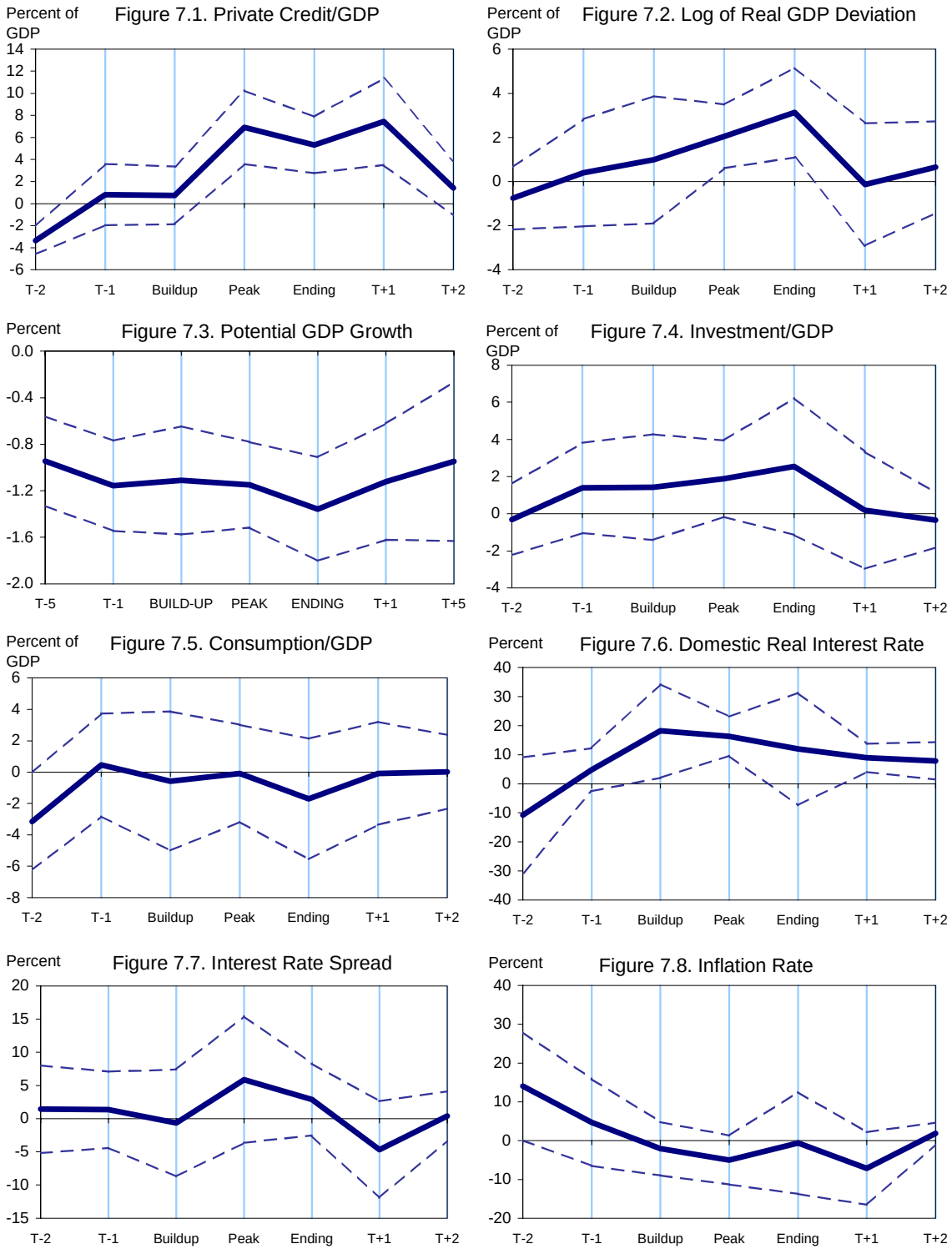


Figure 7: Macroeconomic Indicators around Episodes in Latin America, Eighty Cases, Relative Deviation Criterion.

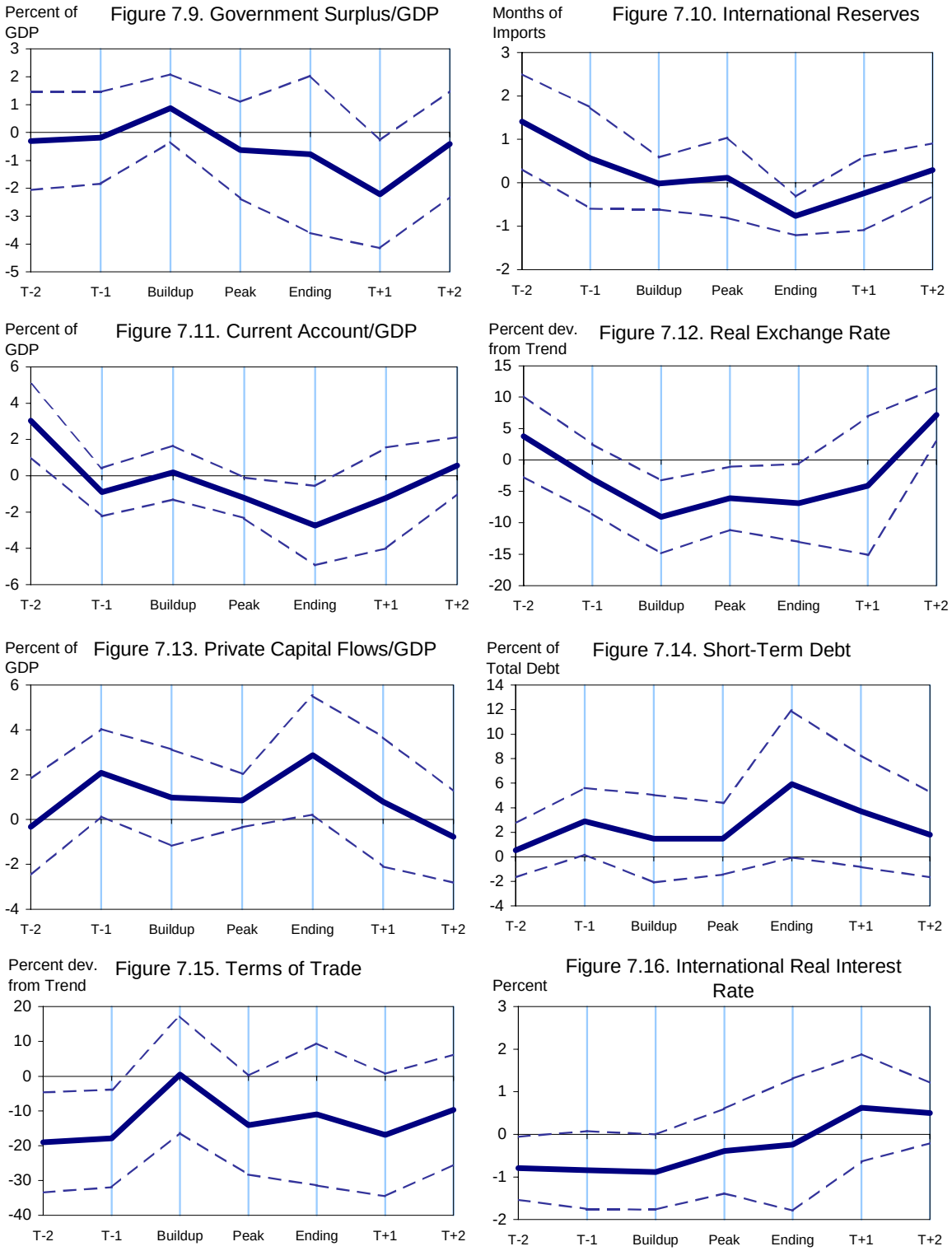


Figure 7: Macroeconomic Indicators around Episodes in Latin America, Eighty Cases, Relative Deviation Criterion (cont.).

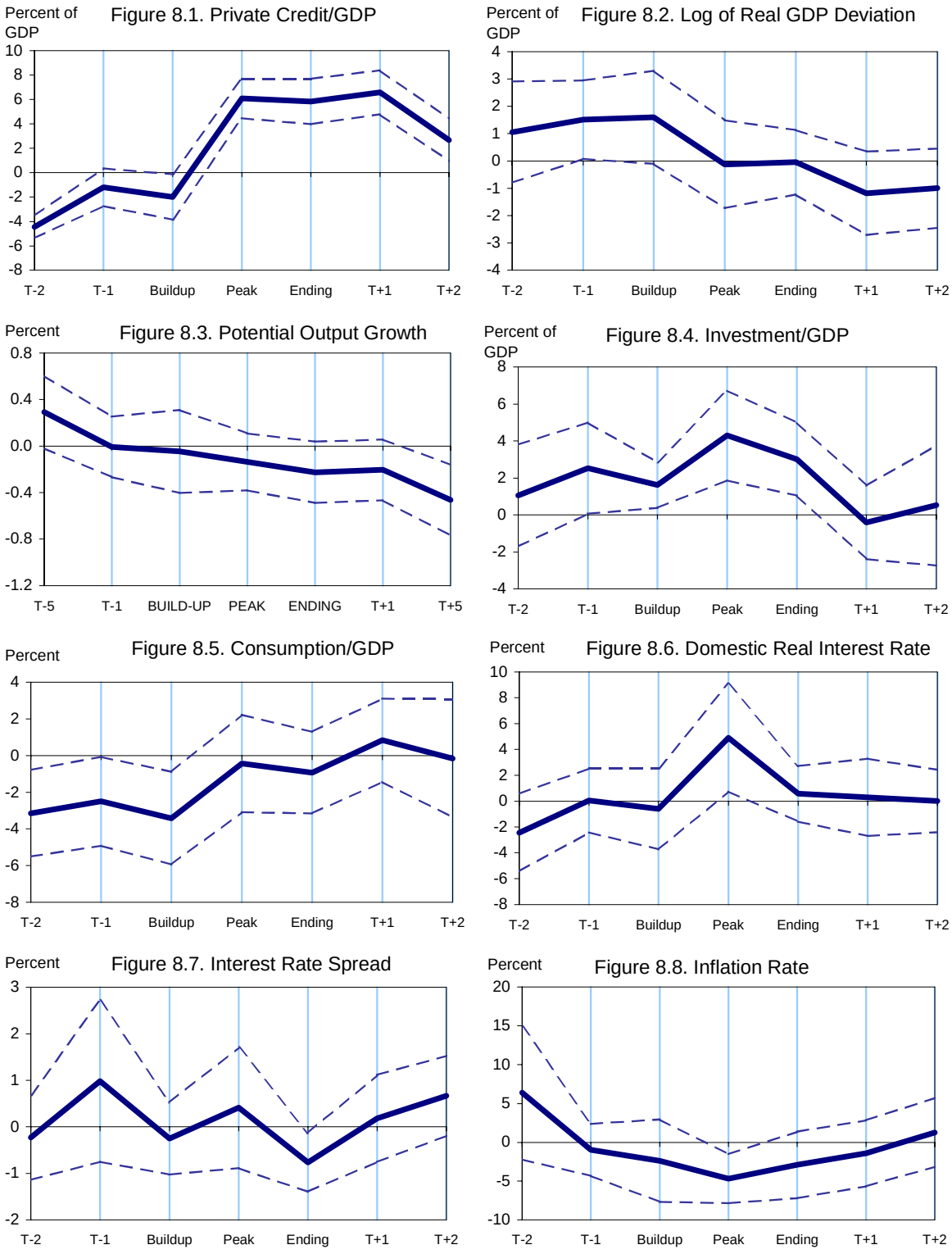


Figure 8: Macroeconomic Indicators around Episodes in the Rest of the World, Eighty Cases, Relative Deviation Criterion.

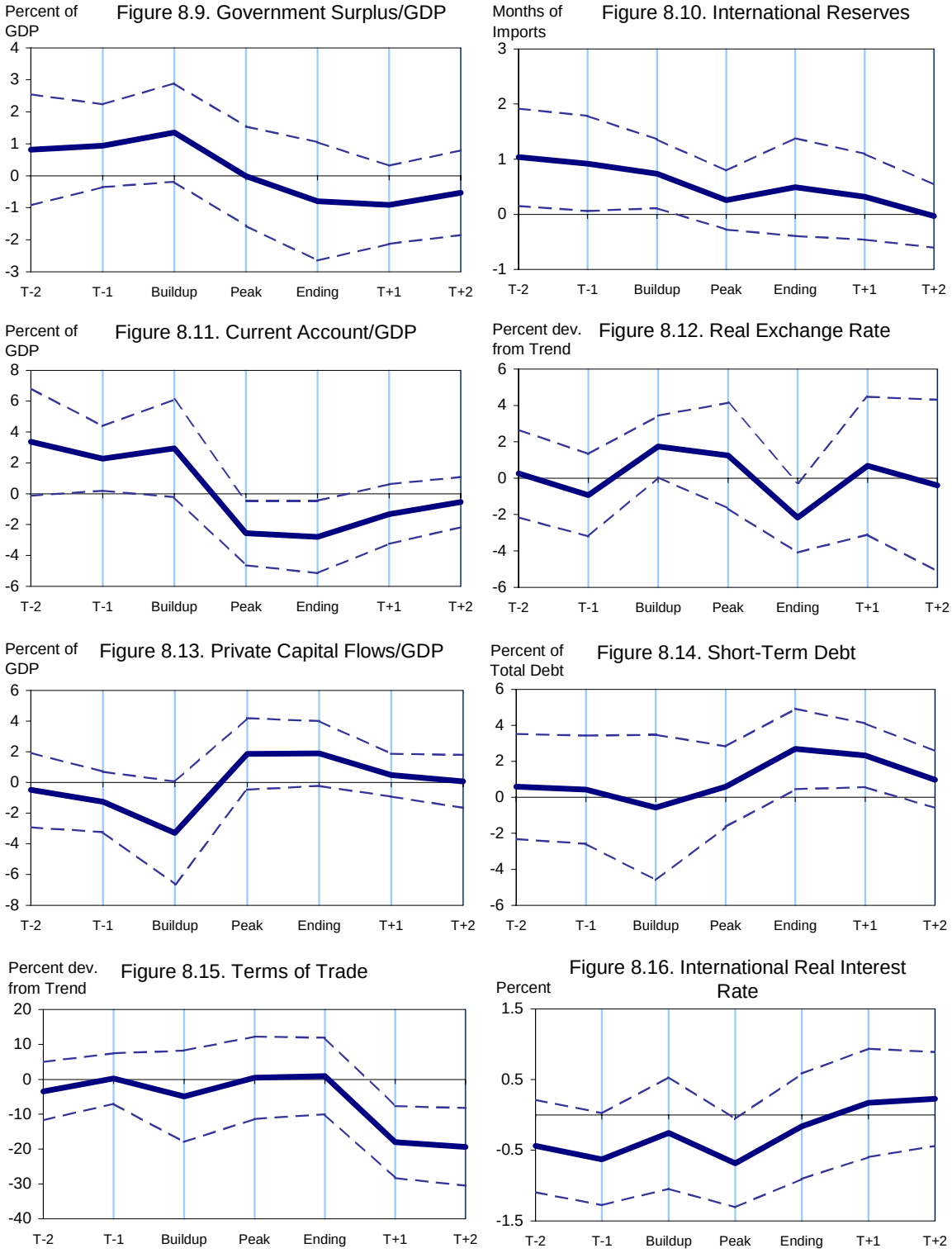


Figure 8: Macroeconomic Indicators around Episodes in the Rest of the World, Eighty Cases, Relative Deviation Criterion (cont.).

Appendix A. Country and Episodes List

Table 9: **Country List**

Algeria	El Salvador	Lesotho	Saudi Arabia
Argentina	Fiji	Madagascar	Senegal
Australia	Finland	Malawi	Singapore
Austria	France	Malaysia	South Africa
Bangladesh	Gabon	Mali	Spain
Belgium	Gambia, The	Mauritania	Sri Lanka
Benin	Germany	Mauritius	Swaziland
Bolivia	Greece	Mexico	Sweden
Botswana	Guatemala	Morocco	Switzerland
Brazil	Honduras	Nepal	Syrian Arab Rep.
Cameroon	Hungary	Netherlands	Thailand
Canada	India	New Zealand	Togo
Central Afr. Rep.	Indonesia	Niger	Trinidad & Tobago
Chad	Iran, Islamic Rep.	Nigeria	Tunisia
Chile	Ireland	Norway	Turkey
Colombia	Israel	Oman	U. Arab Emirates
Congo	Italy	Pakistan	United Kingdom
Costa Rica	Jamaica	Panama	United States
Cote d'Ivoire	Japan	Papua N. Guinea	Uruguay
Denmark	Jordan	Paraguay	Venezuela
Dominican Rep.	Kenya	Peru	Zambia
Ecuador	Korea, Rep.	Philippines	Zimbabwe
Egypt, Arab Rep.	Kuwait	Portugal	

Table 10: **Episode List - 80 Cases Relative**

Algeria	1968	1969	Gabon	1985	1987	Panama	1992	1995
Argentina	1979	1982	Gambia, The	1977	1981	P. New Guinea	1979	1986
Argentina	1992	1995	Guatemala	1995	1995	Paraguay	1990	1995
Australia	1985	1992	Hungary	1987	1987	Peru	1981	1985
Belgium	1989	1995	Indonesia	1984	1993	Peru	1990	1994
Benin	1972	1980	Israel	1977	1979	Philippines	1992	1995
Bolivia	1975	1979	Jamaica	1981	1983	Portugal	1992	1995
Bolivia	1986	1994	Jordan	1974	1985	Saudi Arabia	1975	1988
Botswana	1990	1994	Kenya	1995	1995	Senegal	1968	1981
Brazil	1986	1986	Korea, Rep	1967	1971	Sri Lanka	1977	1979
Brazil	1988	1990	Kuwait	1975	1986	Swaziland	1990	1994
Brazil	1993	1994	Lesotho	1993	1995	Sweden	1987	1991
Cameroon	1974	1981	Malawi	1978	1980	Syria	1969	1995
Canada	1976	1982	Malaysia	1967	1976	Togo	1967	1980
Chad	1973	1980	Mali	1980	1986	UK	1972	1974
Chad	1985	1987	Mauritania	1967	1973	UK	1981	1991
Chile	1975	1984	Mauritania	1975	1978	Uruguay	1980	1982
Columbia	1993	1995	Mexico	1988	1994	Venezuela	1975	1978
Congo	1975	1977	Morocco	1972	1978	Zambia	1994	1995
Congo	1982	1987	Morocco	1991	1995	Zimbabwe	1987	1995
Costa Rica	1971	1972	Nepal	1970	1974			
Costa Rica	1992	1994	Nepal	1978	1980			
Denmark	1984	1990	Nepal	1994	1995			
Ecuador	1977	1985	New Zealand	1973	1982			
Ecuador	1993	1995	New Zealand	1985	1995			
Egypt	1974	1979	Niger	1974	1975			
Egypt	1981	1986	Niger	1978	1983			
El Salvador	1992	1995	Nigeria	1976	1983			
France	1978	1981	Norway	1984	1990			
Gabon	1977	1978	Panama	1965	1975			

Table 11: **Banking Crisis List**

Lindgreen, Garcia and Saal (1996)

Argentina	1980	1982	Jordan	1989	1990	South Africa	1985	1985
Argentina	1989	1990	Kuwait	1984	1986	Spain	1977	1985
Argentina	1995	1995	Malaysia	1985	1988	Sweden	1990	1993
Benin	1988	1988	Mexico	1982	1982	Thailand	1983	1987
Cameroon	1989	1993	Mexico	1994	1996	Turkey	1982	1982
Cameroon	1995	1996	Niger	1983	1996	Turkey	1991	1991
C. African Rep.	1976	1992	Norway	1987	1993	Uruguay	1981	1985
Chad	1979	1983	Panama	1988	1989	Venezuela	1994	1996
Chile	1981	1987	Philippines	1981	1987			
Congo	1994	1996	Senegal	1983	1988			
Finland	1991	1994						

Caprio and Klinguebiel (1997)

Argentina	1980	1982	Egypt	1990	1991	Nigeria	1993	1993
Argentina	1989	1990	Finland	1991	1993	Nigeria	1995	1995
Argentina	1995	1995	France	1994	1995	Norway	1987	1989
Australia	1989	1990	Germany	1976	1979	Paraguay	1985	1985
Bangladesh	1987	1996	Hungary	1991	1995	Philippines	1981	1987
Benin	1988	1990	India	1994	1995	Senegal	1988	1991
Bolivia	1986	1987	Indonesia	1994	1994	Singapore	1982	1982
Brazil	1994	1995	Israel	1977	1983	South Africa	1977	1977
Cameroon	1987	1996	Japan	1990	1996	Spain	1977	1985
C. African Rep.	1980	1989	Kenya	1985	1989	Sri Lanka	1989	1993
C. African Rep.	1994	1994	Kenya	1992	1995	Sweden	1991	1991
Chad	1980	1996	Kuwait	1986	1986	Thailand	1983	1987
Chile	1976	1976	Madagascar	1988	1988	Togo	1993	1995
Chile	1981	1983	Malaysia	1985	1988	Turkey	1982	1985
Columbia	1982	1987	Mauritania	1984	1993	United Kingdom	1976	1976
Congo	1980	1991	Mexico	1981	1982	United States	1984	1991
Costa Rica	1987	1987	Morocco	1982	1985	Uruguay	1981	1984
Cote d'Ivoire	1988	1991	Morocco	1995	1995	Venezuela	1980	1980
Ecuador	1982	1984	Nepal	1988	1988	Venezuela	1994	1995
Egypt	1982	1985	New Zealand	1987	1990	Zambia	1995	1995

Table 12: **Currency Crisis List - Frankel and Rose (1996)**

Algeria	1989	Congo	1994	Jamaica	1990	Portugal	1982
Algeria	1994	Costa Rica	1981	Jamaica	1994	Senegal	1981
Argentina	1967	Costa Rica	1991	Jordan	1989	Senegal	1994
Argentina	1975	Cote d'Ivoire	1981	Kenya	1993	South Africa	1984
Argentina	1978	Cote d'Ivoire	1994	Korea	1964	Spain	1981
Argentina	1981	Denmark	1981	Korea	1980	Sri Lanka	1978
Argentina	1984	Dom. Rep.	1985	Lesotho	1984	Swaziland	1984
Argentina	1987	Dom. Rep.	1988	Madagascar	1981	Sweden	1993
Argentina	1990	Dom. Rep.	1991	Madagascar	1984	Syria	1988
Australia	1985	Ecuador	1983	Madagascar	1987	Togo	1981
Bangladesh	1975	Ecuador	1986	Madagascar	1994	Togo	1994
Belgium	1981	Ecuador	1989	Malawi	1982	Tr. and Tob.	1986
Benin	1981	Ecuador	1992	Malawi	1995	Tr. and Tob.	1993
Benin	1994	Egypt	1979	Mali	1981	Turkey	1970
Bolivia	1973	Egypt	1990	Mali	1994	Turkey	1978
Bolivia	1982	El Salvador	1986	Mauritania	1993	Turkey	1981
Bolivia	1985	El Salvador	1990	Mexico	1977	Turkey	1984
Bostwana	1985	Finland	1993	Mexico	1982	Turkey	1987
Brazil	1964	France	1981	Mexico	1985	Turkey	1991
Brazil	1968	Gabon	1981	Mexico	1988	Turkey	1994
Brazil	1976	Gabon	1994	Mexico	1995	Uruguay	1966
Brazil	1979	Gambia	1984	Morocco	1981	Uruguay	1972
Brazil	1982	Greece	1981	Nepal	1968	Uruguay	1975
Brazil	1985	Greece	1984	Nepal	1991	Uruguay	1978
Brazil	1988	Guatemala	1986	Netherlands	1981	Uruguay	1982
Brazil	1991	Guatemala	1990	Niger	1981	Uruguay	1985
Brazil	1994	Honduras	1990	Niger	1981	Uruguay	1988
Cameroon	1981	Honduras	1994	Nigeria	1986	Uruguay	1991
Cameroon	1994	India	1966	Nigeria	1989	Uruguay	1994
C. African Rep.	1981	India	1991	Nigeria	1992	Venezuela	1964
C. African Rep.	1994	Indonesia	1979	Pakistan	1972	Venezuela	1984
Chad	1981	Indonesia	1983	PNG	1995	Venezuela	1987
C. African Rep.	1994	Indonesia	1987	Paraguay	1984	Venezuela	1990
Chile	1964	Iran	1993	Paraguay	1987	Venezuela	1993
Chile	1967	Ireland	1981	Peru	1968	Venezuela	1996
Chile	1970	Israel	1975	Peru	1976	Zambia	1983
Chile	1973	Israel	1978	Peru	1979	Zambia	1986
Chile	1976	Israel	1981	Peru	1982	Zambia	1989
Chile	1982	Israel	1984	Peru	1985	Zambia	1992
Chile	1985	Italy	1976	Peru	1988	Zambia	1995
Columbia	1966	Italy	1981	Peru	1991	Zimbabwe	1983
Columbia	1984	Italy	1993	Philippines	1970	Zimbabwe	1991
Columbia	1989	Jamaica	1978	Philippines	1983	Zimbabwe	1994
Congo	1981	Jamaica	1984	Portugal	1977		

Appendix B. Data Sources

Table 13: **Data Sources**

Definition	Source	Observations
Private Credit/GDP	IMF-IFS (line 22d)	2997
ln(GDP in constant dollars)	WB-World Tables	2747
Current Account/GDP	WB-World Tables	1947
ln(Multilateral Real Exchange Rate)	Goldfajn and Valdés (1999)	2480
Private Capital Inflows/GDP	Global Developing Finance	1807
Consumption/GDP	WB-World Tables	2903
Investment/GDP	WB-World Tables	2956
Fiscal Deficit/GDP	WB-World Tables	1780
International Reserves/Imports	WB-World Tables	1962
Openness (trade/GDP)	WB-World Tables	3180
Terms of Trade	Goldfajn and Valdés (1999)	2606
Domestic Real Interest Rate	WB-World Tables	1487
International Real Interest Rate	WB-World Tables	3367
Percentage Short Term Debt	WB-World Tables	1685
Interest Rate Spread (dep/len)	WB-World Tables	1377
Inflation	WB-World Tables	3161
CK Banking Crisis Dummy	Caprio and Klinguebiel (1997)	1911
LGS Banking Crisis Dummy	Lindgren et al. (1996)	1911
Currency Crisis Dummy	Frankel and Rose (1996)	3157

Appendix C. Country Episodes (80 cases, relative deviation)

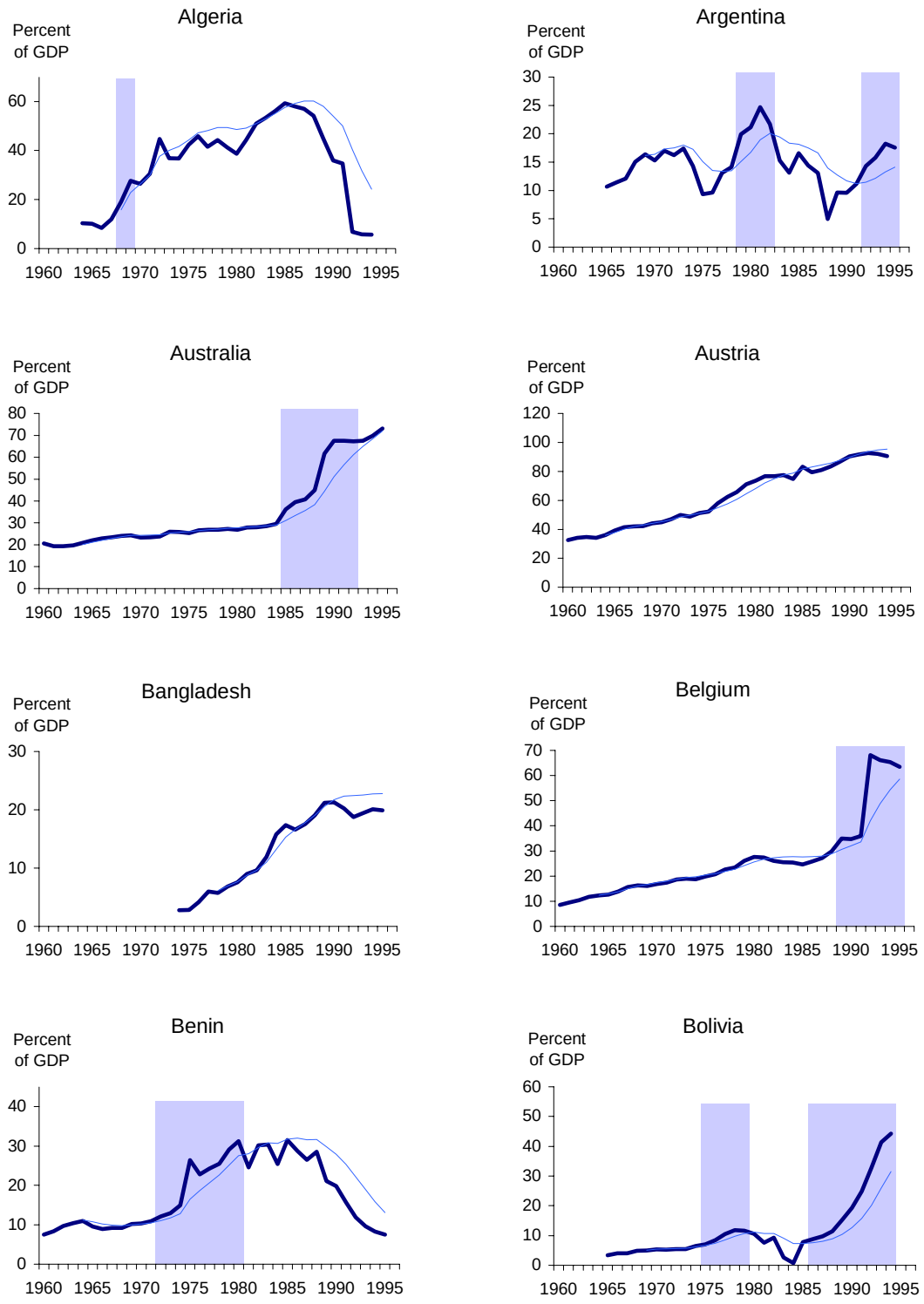

Algeria
Percent of GDP
0 20 40 60
1960 1965 1970 1975 1980 1985 1990 1995
Argentina
Percent of GDP
0 5 10 15 20 25 30
1960 1965 1970 1975 1980 1985 1990 1995
Australia
Percent of GDP
0 10 20 30 40 50 60 70 80
1960 1965 1970 1975 1980 1985 1990 1995
Austria
Percent of GDP
0 20 40 60 80 100 120
1960 1965 1970 1975 1980 1985 1990 1995
Bangladesh
Percent of GDP
0 10 20 30
1960 1965 1970 1975 1980 1985 1990 1995
Belgium
Percent of GDP
0 10 20 30 40 50 60 70
1960 1965 1970 1975 1980 1985 1990 1995
Benin
Percent of GDP
0 10 20 30 40
1960 1965 1970 1975 1980 1985 1990 1995
Bolivia
Percent of GDP
0 10 20 30 40 50 60
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

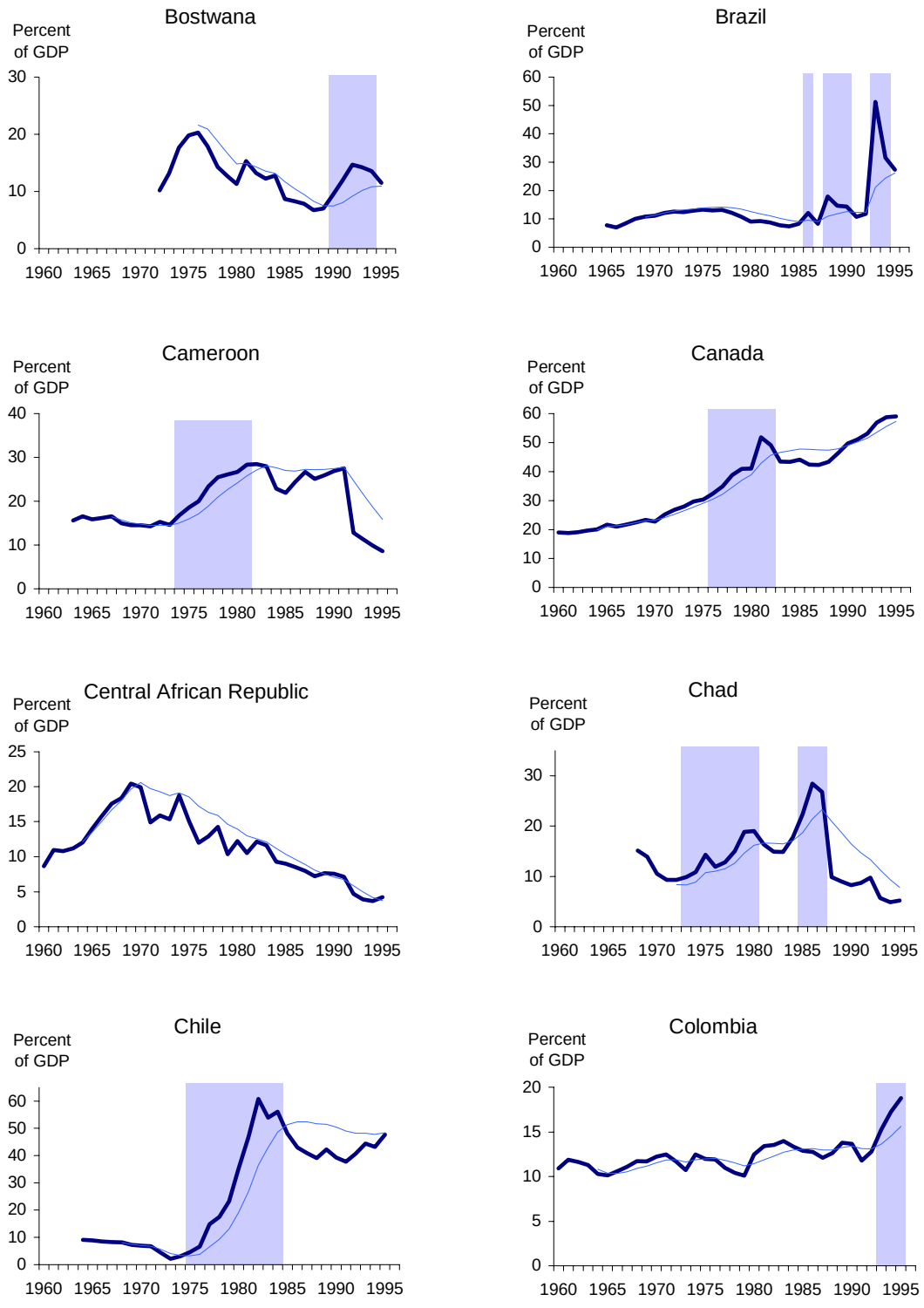

Bostwana
Percent of GDP
Brazil
Percent of GDP
Cameroon
Percent of GDP
Canada
Percent of GDP
Central African Republic
Percent of GDP
Chad
Percent of GDP
Chile
Percent of GDP
Colombia
Percent of GDP
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

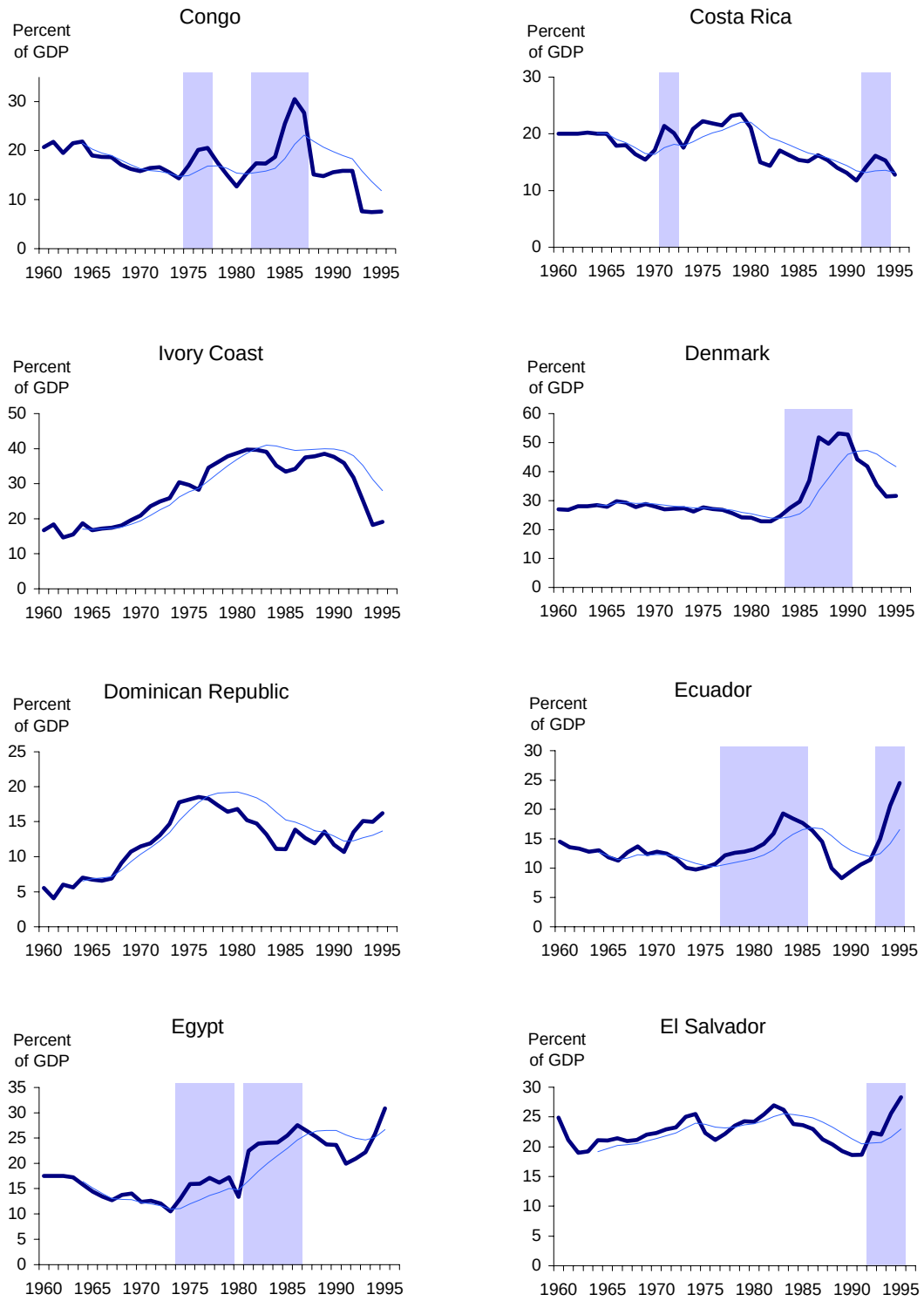

Congo
Percent of GDP
0
10
20
30
1960 1965 1970 1975 1980 1985 1990 1995
Costa Rica
Percent of GDP
0
10
20
30
1960 1965 1970 1975 1980 1985 1990 1995
Ivory Coast
Percent of GDP
0
10
20
30
40
50
1960 1965 1970 1975 1980 1985 1990 1995
Denmark
Percent of GDP
0
10
20
30
40
50
60
1960 1965 1970 1975 1980 1985 1990 1995
Dominican Republic
Percent of GDP
0
5
10
15
20
25
1960 1965 1970 1975 1980 1985 1990 1995
Ecuador
Percent of GDP
0
5
10
15
20
25
30
1960 1965 1970 1975 1980 1985 1990 1995
Egypt
Percent of GDP
0
5
10
15
20
25
30
35
1960 1965 1970 1975 1980 1985 1990 1995
El Salvador
Percent of GDP
0
5
10
15
20
25
30
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

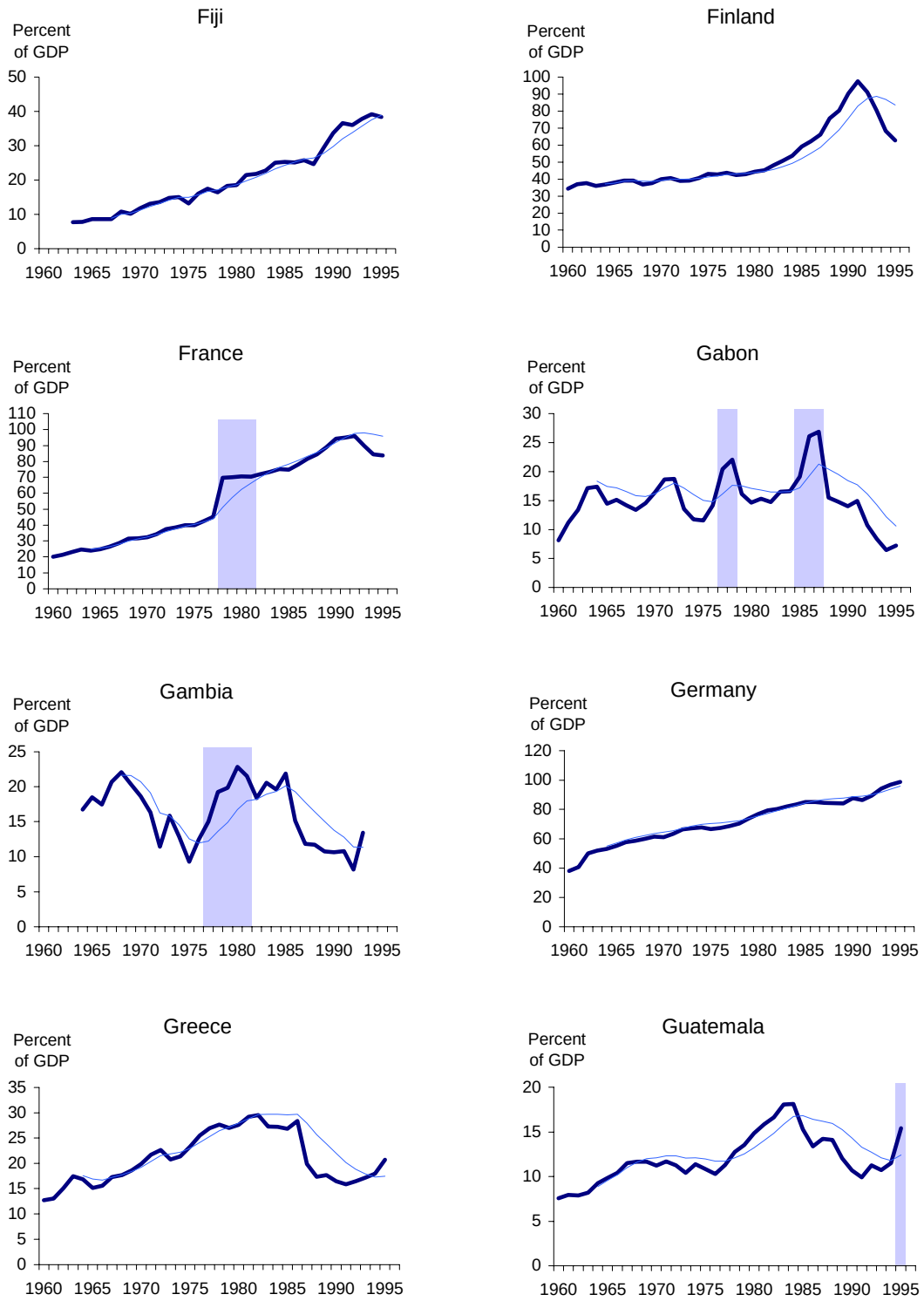

Fiji
Percent of GDP
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Finland
Percent of GDP
100
90
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
France
Percent of GDP
110
100
90
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Gabon
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Gambia
Percent of GDP
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Germany
Percent of GDP
120
100
80
60
40
20
0
1960 1965 1970 1975 1980 1985 1990 1995
Greece
Percent of GDP
35
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Guatemala
Percent of GDP
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

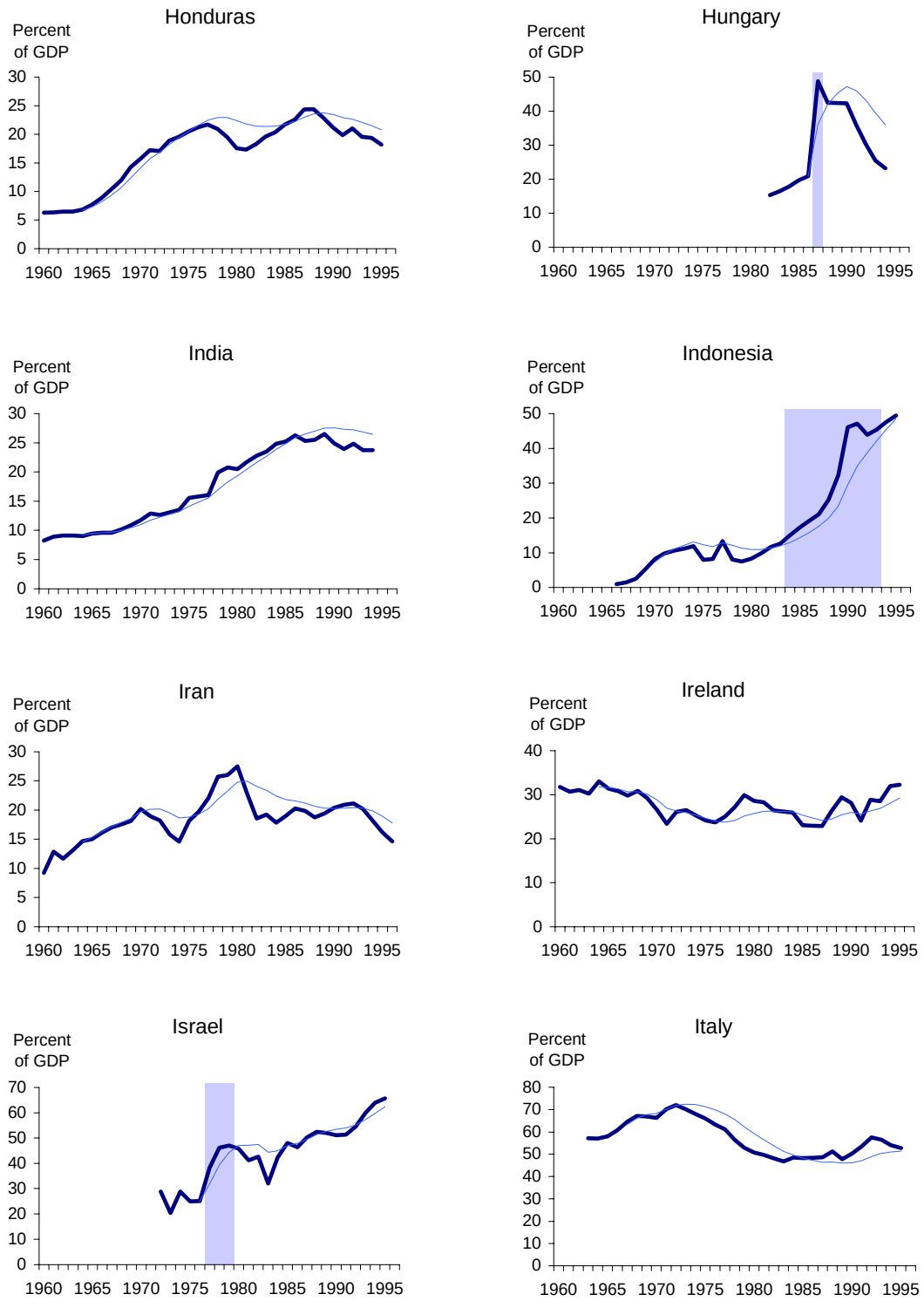

Honduras
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Hungary
Percent of GDP
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
India
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Indonesia
Percent of GDP
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Iran
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Ireland
Percent of GDP
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Israel
Percent of GDP
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Italy
Percent of GDP
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:


Jamaica
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Japan
Percent of GDP
120
100
80
60
40
20
0
1960 1965 1970 1975 1980 1985 1990 1995
Jordan
Percent of GDP
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Kenya
Percent of GDP
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Korea
Percent of GDP
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Kuwait
Percent of GDP
100
90
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Lesotho
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Madagascar
Percent of GDP
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

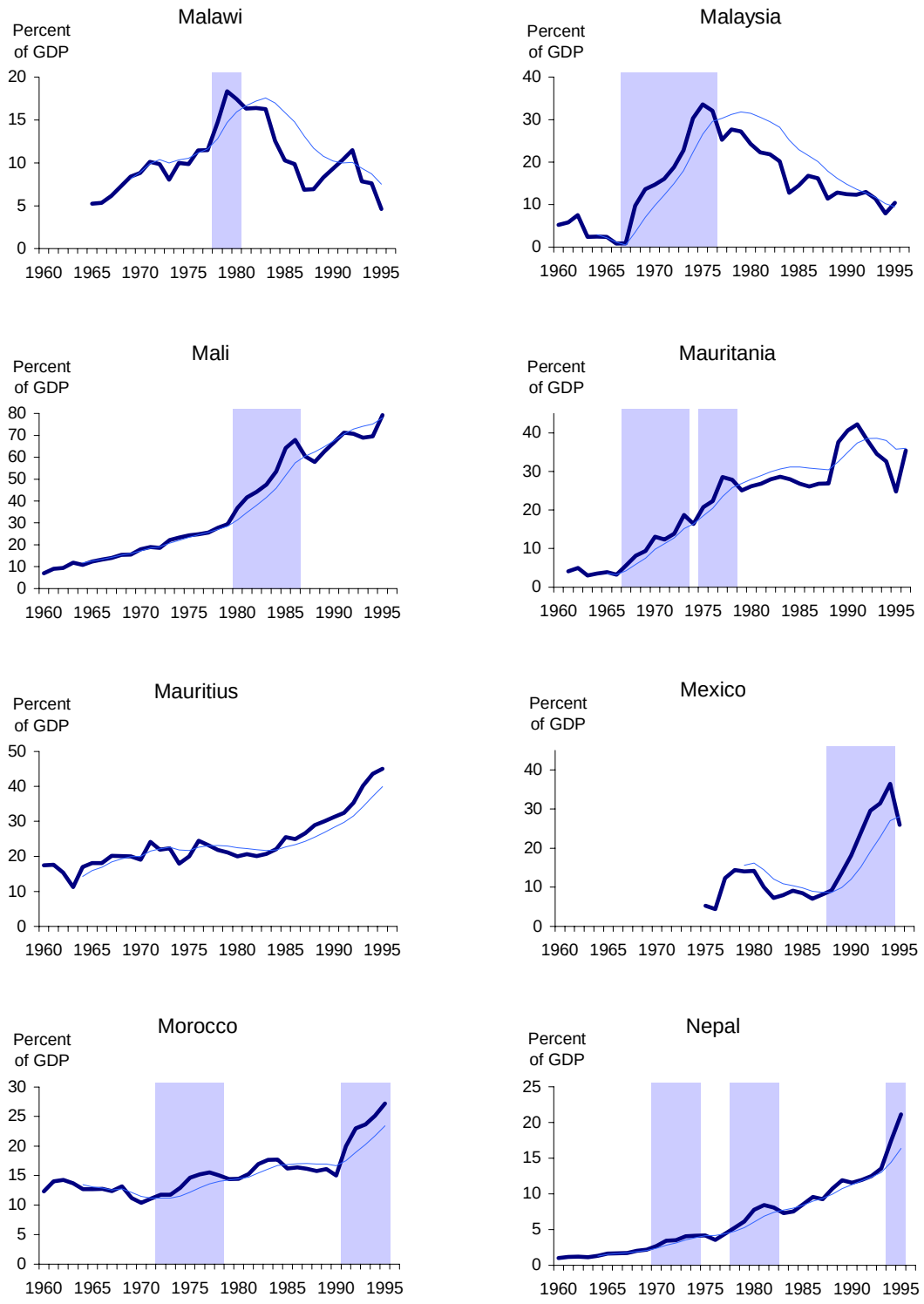

Malawi
Percent of GDP
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Malaysia
Percent of GDP
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Mali
Percent of GDP
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Mauritania
Percent of GDP
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Mauritius
Percent of GDP
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Mexico
Percent of GDP
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Morocco
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Nepal
Percent of GDP
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

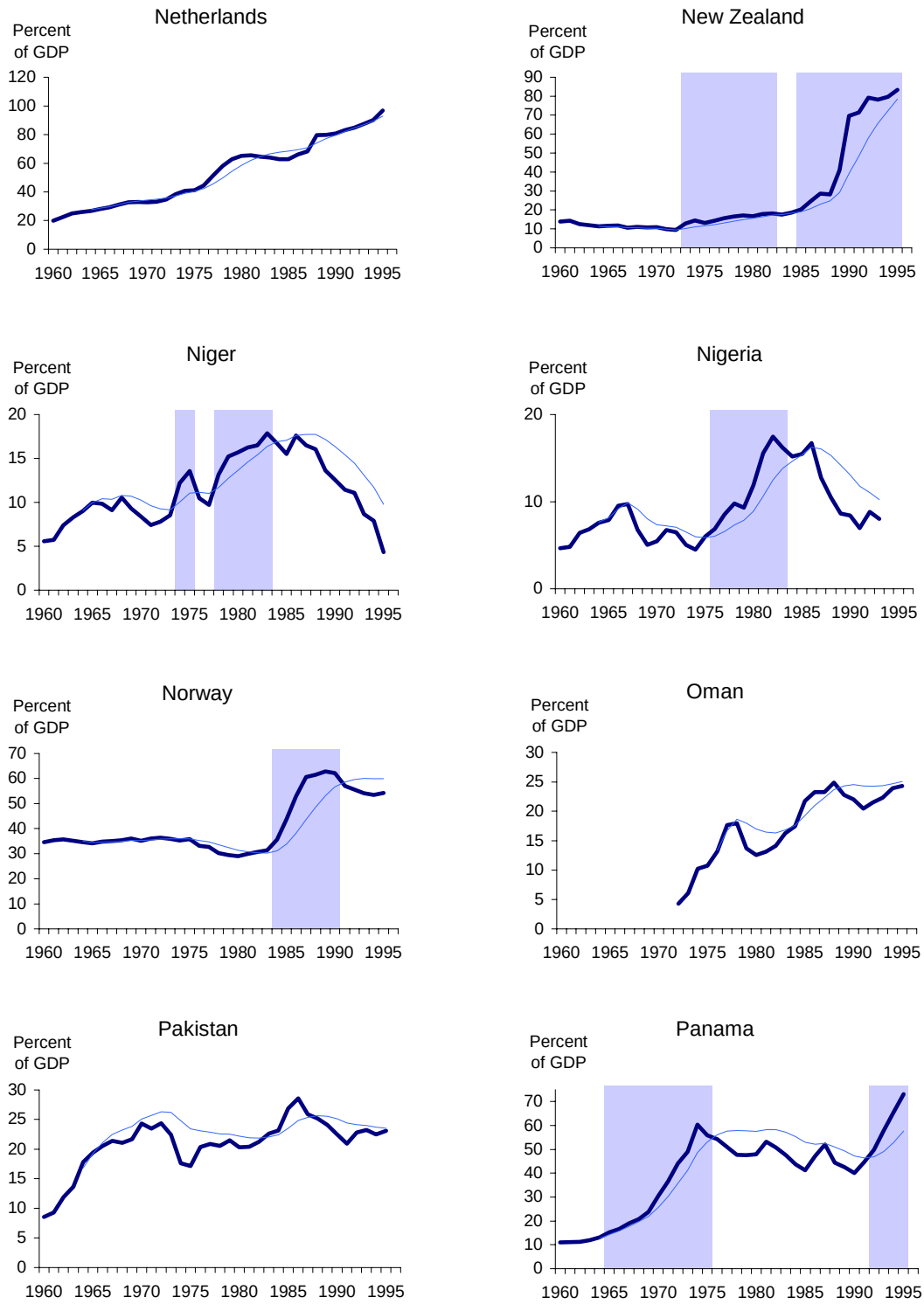

Netherlands
Percent of GDP
120
100
80
60
40
20
0
1960 1965 1970 1975 1980 1985 1990 1995
New Zealand
Percent of GDP
90
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Niger
Percent of GDP
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Nigeria
Percent of GDP
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Norway
Percent of GDP
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Oman
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Pakistan
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Panama
Percent of GDP
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

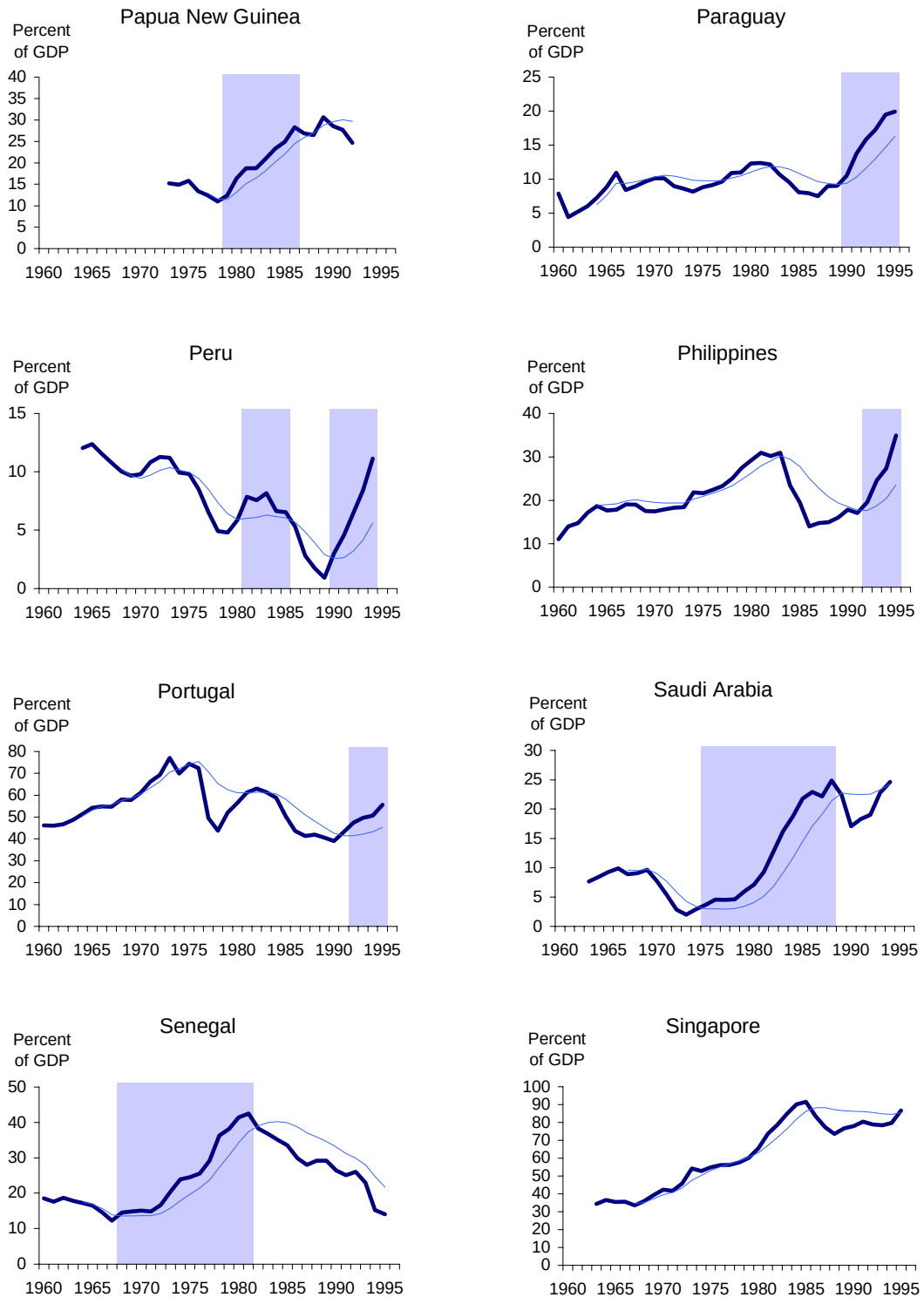

Papua New Guinea
Percent of GDP
Paraguay
Percent of GDP
Peru
Percent of GDP
Philippines
Percent of GDP
Portugal
Percent of GDP
Saudi Arabia
Percent of GDP
Senegal
Percent of GDP
Singapore
Percent of GDP
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

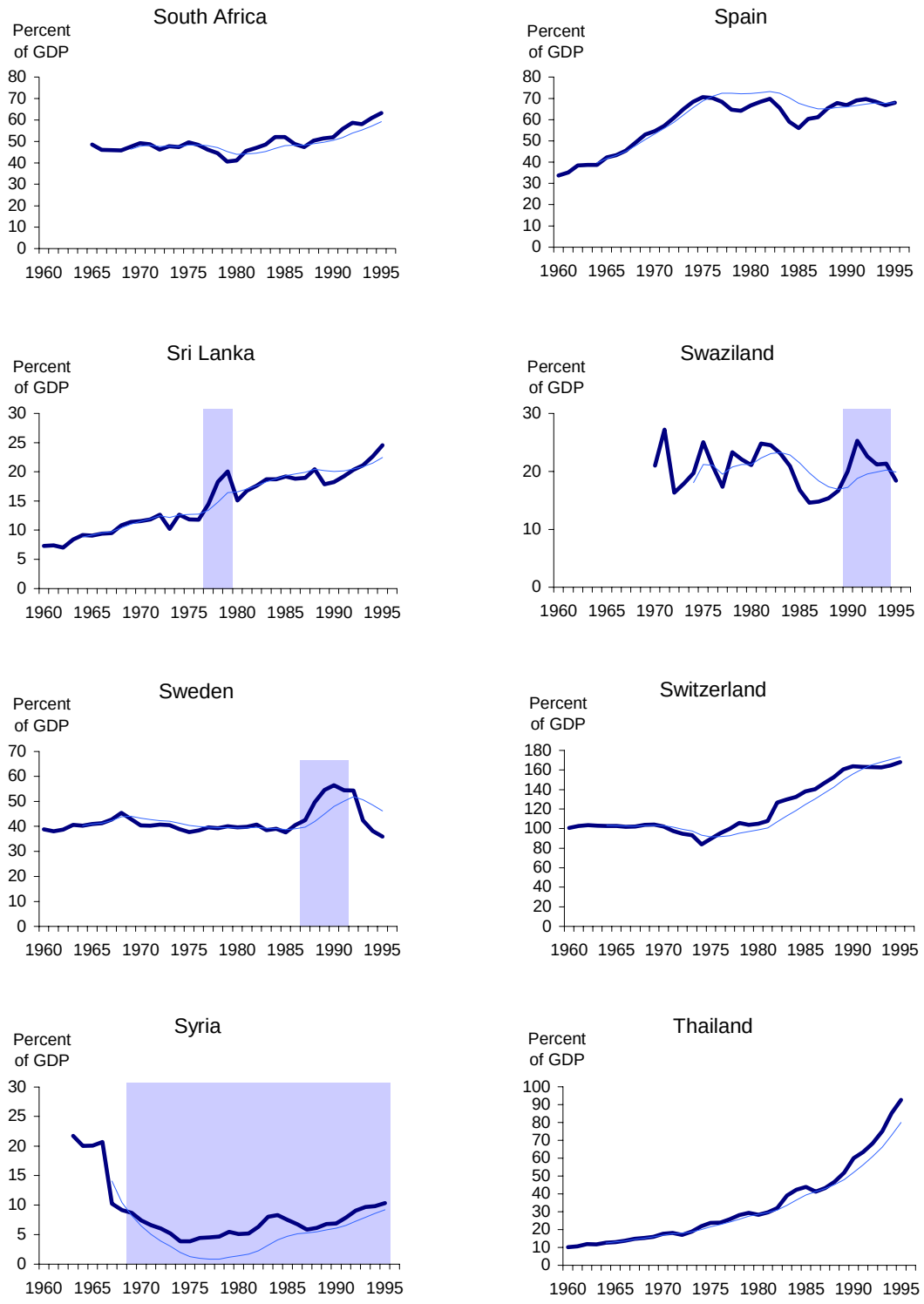

South Africa
Percent of GDP
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Spain
Percent of GDP
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Sri Lanka
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Swaziland
Percent of GDP
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Sweden
Percent of GDP
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995
Switzerland
Percent of GDP
180
160
140
120
100
80
60
40
20
0
1960 1965 1970 1975 1980 1985 1990 1995
Syria
Percent of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995
Thailand
Percent of GDP
100
90
80
70
60
50
40
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:

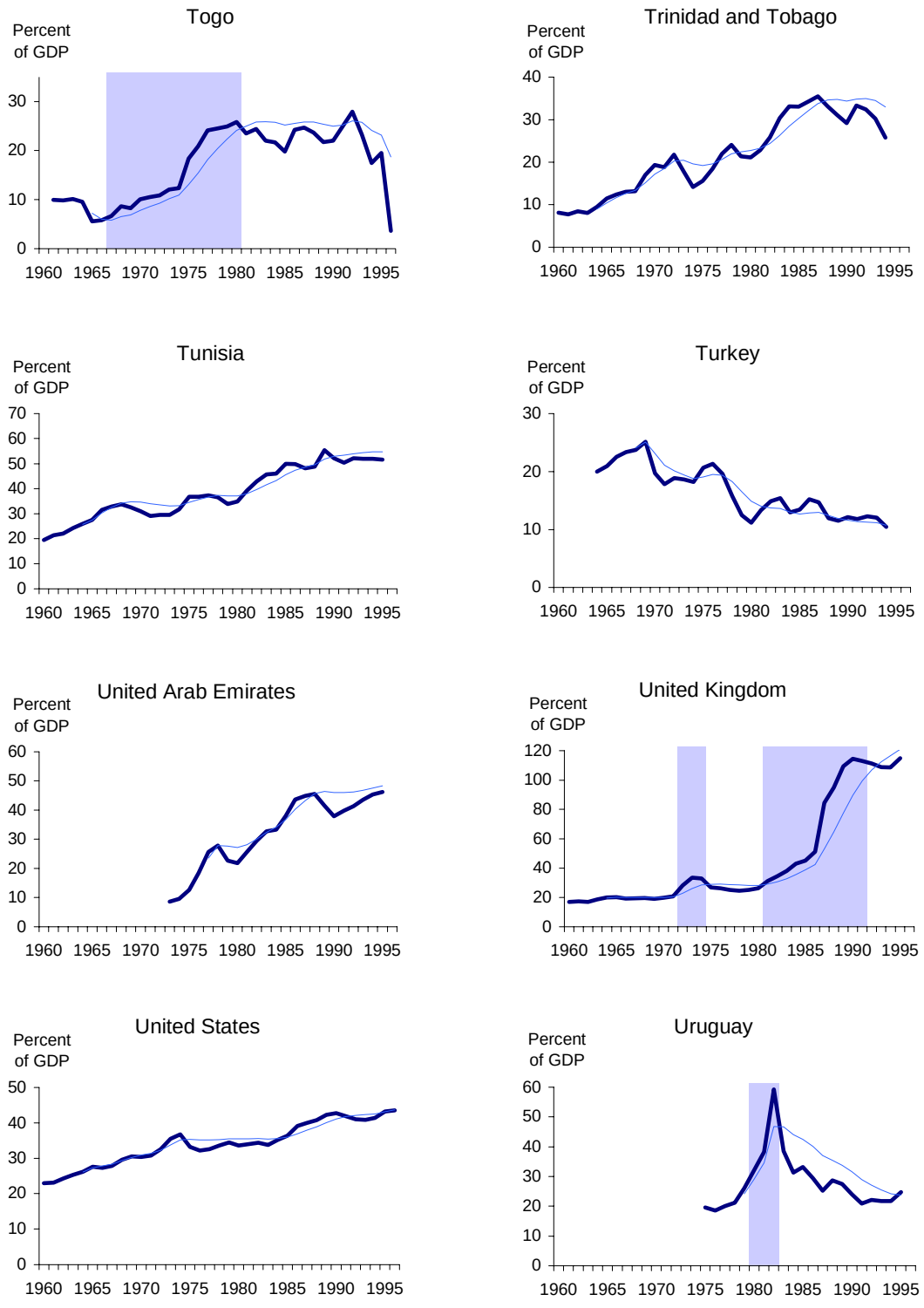
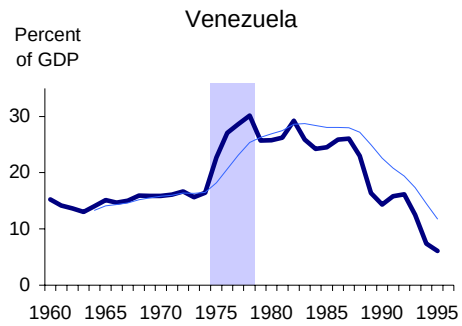
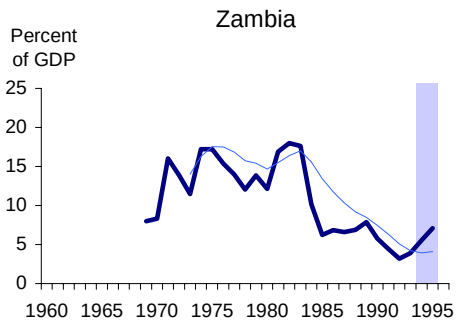

Togo
Percent of GDP
0
10
20
30
1960 1965 1970 1975 1980 1985 1990 1995
Trinidad and Tobago
Percent of GDP
0
10
20
30
40
1960 1965 1970 1975 1980 1985 1990 1995
Tunisia
Percent of GDP
0
10
20
30
40
50
60
70
1960 1965 1970 1975 1980 1985 1990 1995
Turkey
Percent of GDP
0
10
20
30
1960 1965 1970 1975 1980 1985 1990 1995
United Arab Emirates
Percent of GDP
0
10
20
30
40
50
60
1960 1965 1970 1975 1980 1985 1990 1995
United Kingdom
Percent of GDP
0
20
40
60
80
100
120
1960 1965 1970 1975 1980 1985 1990 1995
United States
Percent of GDP
0
10
20
30
40
50
1960 1965 1970 1975 1980 1985 1990 1995
Uruguay
Percent of GDP
0
10
20
30
40
50
60
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9:


Venezuela
Percent
of GDP
30
20
10
0
1960 1965 1970 1975 1980 1985 1990 1995


Zambia
Percent
of GDP
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995

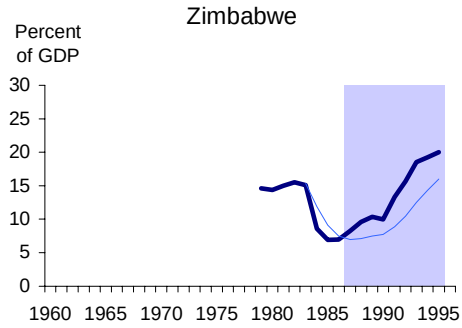

Zimbabwe
Percent
of GDP
30
25
20
15
10
5
0
1960 1965 1970 1975 1980 1985 1990 1995

Figure 9: