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DEFICITS, 1970-2002: ARE THERE LESSONS  
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The End of Large Current Account Deficits, 1970-2002: Are There Lessons for the United States?

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**ABSTRACT**

The future of the U.S. current account – and thus of the U.S. dollar – depend on whether foreign investors will continue to add U.S. assets to their investment portfolios. However, even under optimistic scenarios, the U.S. current account deficit is likely to go through a significant reversal at some point in time. This adjustment may be as large of 4% to 5% of GDP. In order to have an idea of the possible consequences of this type of adjustment, I have analyzed the international evidence on current account reversals using both non-parametric techniques as well as panel regressions. The results from this empirical investigation indicate that major current account reversals have tended to result in large declines in GDP growth. I also analyze the large U.S. current account adjustment of 1987-1991.

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## I. Introduction

When Alan Greenspan was appointed Chairman of the Federal Reserve in 1987, the United States was running a current account deficit of 3.4% of GDP. This was considered to be very large figure at the time. During the next three years the current account deficit declined substantially, and by fourth quarter of 2004 it had shrunk to 1% of GDP. In 1991, and partially due to foreign contributions to the financing of the Gulf War, the United States posted a current account surplus of 0.7% of GDP. By the second quarter of 1992 the current account was again in deficit. Since then the deficit has grown steadily to its current level of approximately 6% of GDP.

A number of analysts have become increasingly alarmed by this very large and growing external imbalance. Some authors have argued that by relying on foreign central banks' purchases of government securities, the U.S. has become vulnerable to changes in expectations and economic sentiments. If capital flowing into the U.S. were to stop suddenly, it is argued, there would be a large depreciation of the dollar and, as a consequence, higher inflationary pressures. This would force the Federal Reserve to act decisively, hiking the Federal Funds rate significantly.<sup>1</sup> This, the story goes, would result in a recession in the U.S. and in a slowdown of the world economy.<sup>2</sup> The belief that a significant external adjustment and a large decline in the dollar are unavoidable is based on reasoning along the following lines: At approximately 6% of GDP the U.S. current account deficit is clearly unsustainable; thus, in the next few years the deficit has to be cut approximately in half. In a recent paper, Mussa has said:

“[T]here is probably a practical upper limit for the US net external liabilities at something less than 100 percent of US GDP and, accordingly...current account deficits of 5 percent or more of US GDP are not indefinitely sustainable.” (Mussa 2004, p 114).

From a policy and empirical points of view, an important question is whether these developments – a significant real depreciation, higher interest rates and a sharp

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<sup>1</sup> Obstfeld and Rogoff (2004, 2005).

<sup>2</sup> See, for example, Barry Eichengreen's op-ed piece in the December 21, 2004 issue of the *Financial Times*.

decline in GDP growth -- are indeed necessary outcomes of a current account reversal of the type many analysts forecast for the U.S. during the next few years. In principle, the *real* consequences of a current account reversal will depend on a number of factors, including whether the reversal is abrupt or gradual, whether the country is large or small, and whether the country is open to the rest of the world. According to standard theory, gradual reductions in the current account deficit do not have to be costly. In addition, current account adjustments in large and very open countries are expected to have different consequences than in smaller and more closed economies.

The purpose of this paper is to analyze the international evidence on current account reversals during the period 1971-2001. Although the U.S. case is unique, an analysis of the international experience will provide some light on the likely nature of a future U.S. current account adjustment. In particular, this research will provide information on whether a significant current account reversal would entail a decline in growth and, thus, an increase in unemployment.<sup>3</sup> Previous studies on the (real) consequences of current account reversals have generated conflicting results: after analyzing the evidence from a large number of countries, Milesi-Ferreti and Razin (2000) concluded that major current account reversals have not been costly. According to them, “reversals... are not systematically associated with a growth slowdown (p. 303).” Frankel and Cavallo (2004), on the other hand, concluded that sudden stops of capital inflows (a phenomenon closely related to reversals) have resulted in growth slowdown.<sup>4</sup> In this paper I analyze several aspects of current account reversals, including:<sup>5</sup>

- The incidence of current account reversals in different regions and groups of countries.
- The relationship between reversals and “sudden stops” of capital inflows.

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<sup>3</sup> Parts of this paper draw partially on my previous research on the current account and external adjustment. The results reported here however, differ from previous analyses in several respects, including the data set, the definition of “reversal,” the emphasis on large and industrial countries and the statistical techniques used.

<sup>4</sup> See also Croke, Kamin and Leduc (2005), Debelle and Galati (2005), Freund and Warnock (2005), Adalet and Eichengreen (2005), and Edwards (2004, 2005).

<sup>5</sup> In Edwards (2004) I used a smaller data set to investigate reversals in emerging countries. In Edwards (2005a) I included the case of industrial countries. However, I did not analyze whether the magnitude and speed of the reversal affected the nature of the associated costs.

- The relation between current account reversals and exchange rate depreciation.
- The relation between current account reversals and interest rates.
- The relation between current account reversals and inflation.
- The factors determining the probability of a country experiencing a current account reversal.
- The costs – in terms of growth slowdown – of current account reversals.

In analyzing these issues I have relied on two complementary statistical approaches: First, I use non-parametric tests to analyze the incidence and main characteristics of current account reversals. And second, I use panel regression-based analyses to estimate the probability of experiencing a current account reversal, and the cost of such reversal in terms of (short-term) declines in GDP growth. Although the data set covers all regions in the world, throughout most of the paper I emphasize the experiences of large countries and industrial countries.

The rest of the paper is organized as follows: In section II I provide some background information on the U.S. current account. The analysis deals both with historical trends, as well as with recent developments. I show that there are no modern historical precedents of a large country, such as the United States, running persistent and very large current account deficits. In Section III I use a cross-country data set to analyze the international evidence on current account reversals. I use non-parametric tests to analyze the behavior of interest rates, exchange rates, terms of trade, and economic growth in the period following a current account reversal. I use two alternative definitions of reversals, and I investigate whether the speed of the adjustment matters. In Section IV I use panel regression techniques to investigate two important issues: (a) what determines the probability that a country will experience a reversal; and (b) whether countries that have experienced reversals have faced real costs in the form of a decline in the rate of GDP growth. In this analysis I explicitly deal with potential endogeneity problems by estimating an instrumental variables version of a treatment regression. In Section V I discuss the U.S. current account adjustment of 1987-1991. Although this episode does not qualify as a “reversal,” as defined in this paper, it is the closest the U.S.

has been to a major current account reduction in modern times. Finally, in Section VI I present some concluding remarks. The paper also has a statistical appendix.

## **II. The U.S. Current Account Imbalance: An Unprecedented Story**

In this section I provide some background information on the evolution of the U.S. current account during the last thirty years. The analysis is divided in three parts: First, I deal with long-term trends and I discuss briefly the relation between the current account and the real exchange rate. Second, I focus on the more recent period, and I discuss the evolution and funding of the current account and its components during the last few years. Finally, I take a comparative perspective, and I compare the recent evolution of the U.S. current account and net international investment position with that of other countries. I show that no other large country in modern times has run a persistently large current account deficit of a magnitude (measured as percentage of GDP) similar to that posted by the U.S. This lack of other historical cases makes the analysis of the current U.S. situation particularly interesting and difficult.

### ***II.1 A Long Run Perspective***

In Figure 1 I present quarterly data for the U.S. current account balance as percentage of GDP, for the period 1973-2004.<sup>6</sup> I also include data on the evolution of the Federal Reserve's trade-weighted index of the U.S. dollar real exchange rate (an increase in the RER index represents a real exchange rate appreciation).<sup>7</sup> Several interesting features emerge from this figure:

- First, it shows that deficits have become increasingly large since 1992.
- Second, Figure 1 shows that for the first decade of floating exchange rates (1973-1982), the US ran, on average, a small current account surplus of 0.04% of GDP. In contrast, for the period 1983-2004 the mean current account balance has been a deficit of 2.4% of GDP.
- Figure 1 also shows that during the period under consideration the RER index experienced significant gyrations.

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<sup>6</sup> Parts of this section draw on Edwards (2005a).

<sup>7</sup> This is the Federal Reserve RER index.

- Finally, Figure 1 shows a pattern of negative correlation between the trade-weighted real value of the dollar and the current account balance. Periods of strong dollar have tended to coincide with periods of (larger) current account deficits. Although the relation is not one-to-one, the degree of synchronicity between the two variables is quite high: the contemporaneous coefficient of correlation between the (log of the) RER index and the current account balance is  $-0.53$ ; the highest correlation of coefficient is obtained when the log of the RER is lagged three quarters ( $-0.60$ ).

In Figure 2 I disaggregate the data on the current account into four categories: (a) the balance of trade of goods and services as a percentage of GDP; (b) the balance of trade in (non financial) services as a percentage of GDP; (c) the income account, also as a percentage of GDP; and (d) the transfers account as a percentage of GDP. As may be seen in Panel A, large and persistent trade deficits preceded in time the era of large current account deficits. Already in the late 1970s, the trade account was negative, and since mid 1976 it has had only one surplus quarter (1992Q2).<sup>8</sup> Panel B shows that since 1996 the surplus in (non-financial) services has declined steadily; in 2004 it was only 0.3 percent of GDP. As Panel C shows, the income account has been positive throughout the 1973-2004 period. To some extent, this is surprising, since for quite some years now the U.S. international investment position has been negative (that is, the U.S. has been a net debtor). The reason for the positive income account is that the return on U.S. assets held by foreigners has systematically been lower than the return on foreign assets in hands of U.S. nationals. Finally, Panel D shows that, with the exception of one quarter, the transfers account has been negative since 1973; during the last few years it has been stable at approximately 0.7% of GDP.

## ***II.2 Recent Imbalances***

In Table 1 I present data on the current account as a percentage of GDP, and its financing for the period 1990-2004. As may be seen, during the last few years the nature of external financing has changed significantly. Since 2002 net FDI flows have been

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<sup>8</sup> Mann (2004) shows that most of the U.S. trade deficit is explained by a deficit in automobiles and consumer goods.

negative; this contrasts with the 1997-2001 period when FDI flow contributed in an important way to deficit financing. Also, after four years on net positive equity flows (1998-2002), these became negative in 2003-04. As the figures in Table 1 show, during 2003 and 2004 the U.S. current account deficit was fully financed through net fixed income flows, and in particular through official foreign purchases of government securities.<sup>9</sup>

In Figure 3 I present the evolution of the U.S. NIIP as percentage of GDP. As may be seen, this has become increasingly negative: in 2004 U.S. net international liabilities reached 29 percent of GDP. An important feature of the NIIP is that gross U.S. international assets and gross U.S. international liabilities are held in different currencies. While more than 70% of gross foreign assets held by U.S. nationals are denominated in foreign currency, approximately 95% of gross U.S. liabilities in hands of foreigners are denominated in U.S. dollars. This means that *net* liabilities as a percentage of GDP are subject to “valuation effects” stemming from changes in the value of the dollar. Dollar depreciation reduces the value of net liabilities; a dollar appreciation, on the other hand, increases the dollar value of U.S. net liabilities. Because of this valuation effect, the deterioration of the U.S. NIIP during 2002-2004 was significantly smaller than the accumulated current account deficit during those two years; see Table 2 for details.

An important policy question refers to the “reasonable” long run equilibrium value of the ratio of U.S. net international liabilities to GDP; the higher this ratio, the higher will be the “sustainable” current account deficit. According to some authors, the current ratio of almost 30% of GDP is excessive, while others believe that a NIIP to GDP ratio of up to 50% would be reasonable.<sup>10</sup>

From an accounting point of view, the current account is the difference between savings and investment. A number of authors have argued that a worsening of a current account balance that stems from an increase in investment is very different from one that results from a decline in national savings. Some have gone as far as arguing that very large deficits in the current account “don’t matter,” as long as they are the result of higher (private sector) investment (Corden, 1994). Figure 4 shows that the recent deterioration

<sup>9</sup> See, for example, Martin Wolf’s October 1<sup>st</sup>, 2003 article in the Financial Times, “Funding America’s recovery is a very dangerous game,” (page 15).

<sup>10</sup> See Obstfeld and Rogoff (2004) and Mussa (2004).



of the U.S. current account has largely been the result of a decline in national savings, and in particular of public and household savings. Some analysts have argued that the recent decline in U.S. savings has been, at least partially, the result of the Fed's policy of (very) low interest rates. According to this view, low interest rates have helped fuel very rapid increases in housing prices and a concomitant process of "mortgage extraction." This has resulted in a decline in household savings to historically low levels. This, plus the decline in government savings, is behind the increase in the current account deficit.<sup>11</sup>

A simple implication of this trend – and one that is emphasized by most authors – is that an improvement in the U.S. current account situation will not only imply a RER adjustment; it will also require an increase in the national savings ratio, and in particular in household savings. Symmetrically, a correction of current global imbalances will also require a decline in Europe's and Japan's savings rates and/or an increase in their investment rates.<sup>12</sup>

### ***II.3 The U.S. Current Account Deficit in International Perspective***

In Table 3 I present data on the distribution of current account balances in the world economy, as well as in six groups of nations – Industrial, Latin America, Asia, Middle East, Africa and Eastern Europe – for the period 1970-2001. As may be seen, at almost 6% of GDP the U.S. deficit is *very large* from a historical and comparative perspective. It is in the top decile of deficits distribution for all industrial countries in the first thirty years of floating. As the data in Table 3 suggest the U.S. looks more like a Latin American or Asian country, than like an industrial nation.

Since 1970 the U.S. has been the only *large* industrial country that has run current account deficits in excess of 5%. This reflects the unique position that the U.S. has in the international financial system, where its assets have been in high demand, allowing it to run high and persistent deficits. On the other hand, this fact also suggests that the U.S. is moving into uncharted waters. As Obstfeld and Rogoff (2004, 2005), among others, have pointed out, if the deficit continues at its current level, in twenty five years the U.S. net international liabilities will surpass the levels observed by any country in modern times.

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<sup>11</sup> Stephen Roach from Morgan Stanley has been a forceful supporter of this view.

<sup>12</sup> That is, the global "savings glut" identified by Bernanke (2005) would have to be reversed. See also the Chairman's Greenspan's Speech to the International Monetary Conference in Beijing, June 6, 2005.

During the last 30 years only small industrial countries have had current account deficits in excess of 5% of GDP: Australia, Austria, Denmark, Finland, Greece, Iceland, Ireland, Malta, New Zealand, Norway and Portugal. What is even more striking is that very few countries – either industrial or emerging -- have had *persistently high* current account deficits for more than five years. In Table 4 I present a list of countries with *persistently high* current account deficits for 1970-2001. In constructing this table I define a country as having a “*High Deficit*” if, in a particular year, its current account deficit is in its region’s tenth decile.<sup>13</sup> I then defined a *persistently high deficit country*, as a country with a “*High Deficit*” (as defined above) for at least 5 consecutive years.<sup>14</sup> As may be seen in Table 4 the list of persistently high deficit countries is extremely short, and none of these countries is large. This illustrates the fact that, historically, periods of high current account imbalances have tended to be short lived, and have been followed by periods of current account adjustments.

In Table 5 I present data on net international liabilities as a percentage of GDP for a group of advanced countries that have historically had a large negative NIIP position.<sup>15</sup> As may be seen, the picture that emerges from this table is quite different than that in Table 4 on current account deficits. Indeed, a number of advanced nations have had – and continue to have – a significantly larger net international liabilities position than the U.S. This suggests that, at least in principle, the U.S. NIIP could continue to deteriorate for some time into the future. However, even if this does happen, at some point this process would have to end, and the U.S. net international liabilities position as percentage of GDP would have to stabilize. It makes a big difference, however, at what level U.S. net international liabilities do stabilize. For example, if in the steady state foreigners are willing to hold the equivalent of 35% of U.S. GDP in the form of net U.S. assets, the U.S. could sustain a current account deficit of (only) 2.1% of GDP.<sup>16</sup> If, on the other hand,

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<sup>13</sup> Notice that the thresholds for defining *High* deficits are year and region-specific. That is, for every year there is a different threshold for each region.

<sup>14</sup> For an econometric analysis of current account deficits persistence see Edwards (2004). See also Taylor (2002).

<sup>15</sup> For the U.S. the data are from the Bureau of Economic Analysis. For the other countries the data are, until 1997, from the Lane and Milesi-Ferreti (2001) data set. I have updated them using current account balance data. Notice that the updated figures should be interpreted with a grain of salt, as I have not corrected them for valuation effects.

<sup>16</sup> This calculation assumes a 6% rate of growth of nominal GDP going forward.

foreigners' net demand for U.S. assets grows to 60% of GDP – which, as shown in Table 5, is approximately the level of (net) foreign holdings of Australian assets --, the U.S. sustainable current account deficit would be 3.6% of GDP. Moreover, if foreigners' are willing to hold (net) U.S. assets for the equivalent of 100% of GDP – a figure that Mussa (2004) considers implausible – the sustainable U.S. current account deficit can be as high as 6% of GDP – approximately its current level. Since there are no historical precedents for a large advanced nation running persistently large deficits, it is extremely difficult to have a clear idea on what will be the actual evolution of foreigners' demand for U.S. assets.

It is worth noting that an analysis for a longer period of time confirms the view that the recent magnitude of the current account deficit has no historical precedent in the United States. According to Backus and Lambert (2005) the U.S. ran a current account deficit of 5% of GDP in 1815, and a somewhat smaller but persistent deficit during the 1830s and 1870s. Greenspan (2004, p. 6) has pointed out that the large deficits during the 19<sup>th</sup> century were financed with capital flows related to “specific major development projects (such as railroads).”

### **III. On Current Account Reversals: An International Comparative Analysis**

Most recent analyses have concluded that the current level of the U.S. current account deficit is unsustainable in the long-run. Even under an optimistic scenario, where foreigners' demand for U.S. securities doubles from its current level, there would have to be a significant decline in the deficit. For example, if the (negative) NIIP were to go from its current level of 30% of GDP to 60% of GDP, the sustainable current account deficit would be 3.6%. This is almost three percentage points below its current level. In reality, however, the adjustment is likely to be even larger. The reason for this is that in order for the NIIP to go from -30% to -60% of GDP in a reasonable period of time the current account deficit needs to overshoot its steady state level by a significant margin. In Edwards (2005a) I present a model where the NIIP reaches 60% of GDP after 7 years; in this case, the current account deficit continues to increase, until it reaches a peak of 7.1% of GDP. It then declines until it converges to 3.6% of GDP. According to this work, and other recent models summarized in Table 6, at some point in time the U.S. will

undergo a significant current account adjustment. Although no one seems to know when this adjustment will actually take place, almost every analyst agrees that it will have to take place.

A key question is what will be the nature of this adjustment process? In this Section I address this issue by analyzing the international experience with current account reversals in the period 1970-2001. Although the U.S. case is unique – both because of the size of its economy and because the dollar is the main vehicle currency in the world –, an analysis of the international experience will provide *some* light on the likely nature of the adjustment. A particularly important question is whether this adjustment will entail real costs in the form of lower growth and higher unemployment.

In Table 7 I present a summary of previous studies on the real consequences of current account reversals and “sudden stops” in capital inflows (a phenomenon closely related to reversals). As may be seen, these studies have used different samples, different time periods, and slightly different definitions of reversals. These studies have also reached different results: for instance, after analyzing the evidence from a large number of countries, Milesi-Ferreti and Razin (2000) concluded that major current account reversals have not been costly. According to them, “reversals... are not systematically associated with a growth slowdown (p. 303).” Frankel and Cavallo (2004) concluded that sudden stops of capital inflows (a phenomenon closely related to reversals) have resulted in growth slowdown, while Crocke, Kamin and Leduc (2005) argue that there is no evidence suggesting that reversals have historically been associated with growth slowdown (see Table 7 for details).<sup>17</sup>

In this section I analyze several aspects of current account reversals, including:<sup>18</sup>

- The incidence of current account reversals in different regions and groups of countries.
- The relationship between reversals and “sudden stops” of capital inflows.

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<sup>17</sup> It should be noted that the study by Crocke et al (2005), as well as those by Debelle and Galalti (2005) and Freund and Warnok (2005) have used a rather mild definition of reversal, consisting of a reduction in the current account deficit of 2% of GDP in one year

<sup>18</sup> In Edwards (2004) I used a smaller data set to investigate reversals in emerging countries. In that paper, however, I did not consider the experience of large or industrial countries with reversals. Also, in that paper I used very simple framework for analyzing growth. In contrast, in this section I use a two steps dynamic of growth approach.

- The relation between current account reversals and exchange rate depreciation.
- The relation between current account reversals and interest rates.
- The relation between current account reversals and inflation.
- The factors determining the probability of a country experiencing a current account reversal.
- The costs – in terms of growth slowdown – of current account reversals.

In analyzing these issues I rely on two complementary statistical approaches: First, I use non-parametric tests to analyze the incidence and main characteristics of current account reversals. And second, I use panel regression-based analyses to estimate the probability of experiencing a current account reversal, and the cost of such reversal, in terms of short-term declines in output growth. Although the data set covers all regions in the world, in the discussion presented in this section, and in an effort to shed light on the U.S. case, I emphasize the experience of large countries and industrial countries.

### ***III.1 Current Account Reversals during 1970-2001: The International Evidence***

I consider two definitions of current account reversals: (a) The first one considers a reduction in the current account deficit of at least 4% of GDP in a one year period, and an accumulated reduction of at least 5% of GDP in three years. This definition is called “*Reversal 4%*.” (b) The second definition considers a reduction in the current account deficit of at least 2% of GDP in one year, with an accumulated reduction in three years of 5% of GDP. This definition is called “*Reversal 2%*.”<sup>19</sup> In the “*Reversal 4%*” definition, the adjustment is front loaded, while in the first one it is more evenly distributed through time. In Figure 5 I present data on the number of reversals by country group for the years 1971-2001.

In Table 8 I present data on the incidence for both definitions of current account reversals for the complete sample as well as for six groups of countries. As may be seen, for the overall sample the incidence of reversals is 6.5% and 9.4%, for “*Reversals 4%*” and “*Reversal 2%*”, respectively. The incidence of reversals among the industrial

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<sup>19</sup> In both cases the timing of the reversal is recorded as the year when the episode begins. Also, for a particular episode to classify as a current account deficit reversal, the initial balance has to be indeed a *deficit*.

countries is much smaller however, at 1.3% and 3.3% for “*Reversals 4%*” and “*Reversal 2%*”. The Pearson- $\chi^2$  and F-tests reported in Table 8 indicate that the hypothesis of equal incidence of reversals across regions is rejected strongly.

The advanced countries that have experienced current account *Reversals 4%* are:

- Greece (1986),
- Italy (1975),
- Malta (1997)
- New Zealand (1975),
- Norway (1978, 1989),
- Portugal (1982, 1983, 1985).

The industrial (or advanced) countries that have experienced current account *Reversals 2%* are:

- Denmark (1997)
- Finland (1976, 1977, 1993, 1994),
- Greece (1986),
- Iceland (1993)
- Ireland (1982),
- Italy (1975),
- Malta (1997)
- New Zealand (1976, 1986, 1988),
- Norway (1978, 1979, 1980, 1989),
- Portugal (1977, 1978, 1982, 1984, 1985, 1986),
- Spain (1977),
- Sweden (1994).

With the exception of Italy, all of these countries are very small indeed; this underlies the point that there are no historical precedents of large countries undergoing profound current account adjustments. As pointed out above, this implies that the results reported in this paper on current account reversals should be interpreted with a grain of salt, and should not be mechanically extended to the case of the U.S.

The data analysis presented above has distinguished countries by their stage of development and geographical location. An alternative way of dividing the sample – and one that is particularly relevant for the discussion of possible lessons for the U.S. – is by country size. I define “large countries” as those having a GDP in the top 25% of the distribution in 1995 (according to this criterion there are 44 “large” countries in the sample). The incidence of “*Reversals 4%*” among “large” countries is 3.9% for 1971-2001; the incidence of “*Reversals 2%*” among “large” countries is 6.3%.

### ***III.2 Current Account Reversals and Sudden Stops of Capital Inflows***

Since the mid-1990s a number of authors have analyzed episodes of *sudden stops* of capital inflows.<sup>20</sup> Although from an analytical perspective sudden stops and current account reversals are closely related, there is no reason for this relationship to be one-to-one. If there are changes in international reserves, it is perfectly possible that a country that suffers a sudden stop does not experience, at the same time, a current account reversal. In countries with floating exchange rates, however, changes in international reserves tend to be relatively small, and the relation between sudden stops and reversals should be stronger.

I defined a “*sudden stop*” episode as an abrupt and major reduction in capital inflows to a country that up to that time had been receiving large volumes of foreign capital. More specifically, an episode is defined as a “sudden stop” if the following two conditions are met: (1) the country in question must have received an inflow of capital (relative to GDP) larger than its region’s third quartile during the two years prior to the “sudden stop.” And (2), net capital inflows must have declined by at least 5% of GDP in one year.<sup>21</sup>

In Table 9 I present a data on the incidence of “sudden stops” and current account reversals (I use both definitions of reversal), for three samples: (a) large countries, defined as those countries that whose GDP is in the top quartile of the distribution; (b) industrial countries; and (c) the complete sample. Table 9 shows that for the complete sample, 37.7% of countries subject to a sudden stop also faced a “*Reversal 4%*” current

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<sup>20</sup> For recent papers, see Calvo et al (2004) and Frankel and Cavallo (2004). For capital flows and crises, see Eichengreen (2003).

<sup>21</sup> In order to check for the robustness of the results, I also used two alternative definitions of sudden stops, which considered a reduction in inflows of 3 and 7 of GDP in one year. Due to space considerations, however, I don’t report detailed results using these definitions.

account reversal. At the same time, 34.9% of those with “*Reversals 4%*” also experienced (in the same year) a sudden stop of capital inflows. Panel C also shows that 45.0% of countries subject to a sudden stop faced a “*Reversal 4%*” current account reversal. Also, 30.5% of those with *Reversals 2%* experienced (in the same year) a sudden stop of capital inflows. The  $\chi^2$  tests reported in Table 9 indicate that for all countries in the sample the hypothesis of independence between reversals and sudden stops is rejected. The results for industrial and large countries are quite similar. For both samples the  $\chi^2$  test indicates that the null hypothesis of independence between the two phenomena cannot be rejected. An analysis of the lead-lag structure of reversals and sudden stops suggest that sudden stops tend to occur either before or at the same time – that is, during the same year – as current account reversals. Indeed, according to a series of non-parametric  $\chi^2$  tests it is possible to reject the hypothesis that current account reversals precede sudden stops.

### ***III.3 Current Account Reversals and Exchange Rates***

An important policy question – and one that is particularly relevant within the context of current policy debate in the U.S. – is whether current account reversals have historically been associated with large exchange rate depreciations.<sup>22</sup> In Figure 6 I present the evolution of the median nominal exchange rate (with respect to the US dollar) in reversal countries. These data are presented as an index with a value of 100 the year of the reversal. The data are centered on the year of the reversal; they go from three years prior to the current account reversal to three years after the reversals. In this Figure a lower value of the index reflects a *nominal depreciation*. As may be seen, in all three samples – “large,” “industrial” and “all” countries – there is a nominal depreciation in the period surrounding the reversal. These depreciations range from 14% to 40%, depending on sample and the definition of reversal. In most emerging countries a large depreciation tends to have a short run contractionary effect on GDP growth. The reason for this is that in most of these countries many debts are expressed in foreign currency. Thus, currency depreciation tends to have a “balance sheet” effect, increasing the domestic currency value of these debts.<sup>23</sup>

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<sup>22</sup> For the relationship between depreciations and crises see Eichengreen et al (1996).

<sup>23</sup> See Adalet and Eichengreen (2005).



Figure 7 shows the behavior of the (median) real effective exchange rate index. As before, a decline in the index is a real depreciation. As may be seen, for the “large countries” sample, there is a real exchange rate depreciation the year of the reversal, with respect to the year before the adjustment. Moreover, for this sample of large countries the RER continues to depreciate during the next three years. The accumulated (median) RER depreciation between years -1 and +3 is 8.7% for the “*Reversal 4%*” definition of reversal; it is 11.8% for “*Reversal 2%*”. Figure 6 also shows that there is a RER depreciation in the “industrial countries” sample. In this case, however, there is an overshooting, and the maximum depreciation is achieved one year after the reversal – it is 7.2% for *Reversal 4%* and 5.2% for *Reversal 2%* episodes. Finally, the last panel in Figure 6 shows that for the “all countries” sample there are no significant changes in (median) RER behavior in the +/- 3 years that surround a current account reversal.

For comparison purposes, and in order to gain further insights, I constructed a dataset for a “control group” of countries that have not experienced a current account reversal. I then computed a battery of  $\chi^2$  tests for the equality of distributions (Kruskal-Wallis tests) between the reversal countries and the control group.<sup>24</sup> The results from these tests are presented in Table 10 (p-values in parentheses).<sup>25</sup> As may be seen, these  $\chi^2$  tests show that nominal exchange rates have behave differently in the reversal countries and in the control group countries – this is the case independently of the reversal group one looks at. They also show that, for the large countries sample, RERs have behaved differently in the reversal and control group countries.

The exchange rate adjustments in the reversal countries reported in Figures 6 and 7 are relatively small when compared with the “required” exchange rate depreciation that has been calculated in a number of studies, including those summarized in Table 6. Obstfeld and Rogoff (2004), for example, estimate that eliminating the U.S. current account deficit would imply a (real) depreciation of between 16 and 36 percent. Blanchard, Giavazzi and Sa (2005) have estimated a required depreciation of the U.S. trade weighted dollar in the order of 40%. There are many possible reasons for these

<sup>24</sup> The tests are performed on the *changes* in the variables of interest, during two time spans: between 3 years before and 3 years after the reversals, and between one year before and the year of the reversal. Three different control groups were constructed; one for each sample.

<sup>25</sup> These  $\chi^2$  tests refer to accumulated exchange rate changes in the -3 to +3 year period surrounding a reversal.

differences, including that the U.S. is a very large country, while the countries that have experienced reversals are much smaller. Also, the values of elasticities and other parameters may be different in the U.S. than in the average reversal country. Yet another possibility has to do with the level of economic activity and aggregate demand. Most recent models on the U.S. current account assume that the economy stays in a “full employment” path. It is possible, however, that the countries that have historically experienced reversals have also gone through economic slowdowns, and that a reduction in aggregate demand contributed to the adjustment effort.

#### ***III.4 Current Account Reversals, Interest Rates and Inflation***

A number of analysts have argued that one of the most serious consequences of a rapid current account reversal (and the concomitant nominal depreciation) is its effect on inflationary pressures and inflation. In this section I investigate this issue by analyzing the behavior of inflation and nominal (lending) interest rates in the period surrounding reversal episodes.<sup>26</sup> Figure 8 depicts data on (median) inflation rates for the three reversal samples; Figure 9, on the other hand, has data on nominal interest rates. As may be seen from Figure 8, in the “large countries” sample, there is a sharp increase in the (median) rate of inflation the year of the reversal. Although it stabilizes somewhat, inflation stays above its pre-reversal level for the three years after the current account adjustment. Figure 8 also shows that there is an increase in inflation after the reversals. In the industrial countries, however, the pattern is somewhat different from that of large countries; also, they exhibit some differences in behavior across the two definitions of reversals.

The data in Figure 9 on interest rates shows that in the three samples, and for both definitions of reversal, nominal interest rates are higher three years after the reversal than three years prior to the reversal. For the “large countries” the increase is rather gradual. Interest rates begin to increase two years before the reversal. For “*Reversal 2%*” interest rates peak one year after the crisis; for the “*Reversal 4%*” definition they peak three years after. In the industrial countries, on the other hand, there are no discernible changes in interest rates before the reversal; there is, however, a significant jump during the first

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<sup>26</sup> Gagnon (2005) analyzes behavior of interest rates behavior in the aftermath of currency crises. He does not concentrate on reversals, however.

year after the crisis. Finally, the data for the “all countries” show a steady increase in nominal interest rates in the year surrounding the reversals. Between three years prior to a “*Reversal 4%*” episode and one year after the reversal, median interest rates increased by 310 basis points in large countries, 570 basis points for industrial countries and 240 basis points for all countries. Under most circumstances increases in interest rates of this magnitude are likely to have a negative effect on aggregate demand and economic activity. In Section IV of this paper I deal with the effects of reversals on economic growth.

The Kruskal-Wallis tests in Table 10 indicate that, for the short time horizon, changes in inflation are significantly higher in the reversal countries than in the control group. These tests also show that for “large countries” changes in interest rates are significantly different in the reversal and control groups.

### ***III.5 The Probability of Experiencing Current Account Reversals***

In order to understand further the forces behind current account reversals I estimated a number of panel equations on the probability of experiencing a reversal. The empirical model is given by equations (1) and (2):

$$(1) \quad \rho_{ij} = \begin{cases} 1, & \text{if } \rho_{ij}^* > 0, \\ 0, & \text{otherwise.} \end{cases}$$

$$(2) \quad \rho_{ij}^* = \alpha \omega_{ij} + \varepsilon_{ij}.$$

Variable  $\rho_{jt}$  is a dummy variable that takes a value of one if country  $j$  in period  $t$  experienced a current account reversal, and zero if the country did not experience a reversal. According to equation (2), whether the country experiences a current account reversal is assumed to be the result of an unobserved latent variable  $\rho_{ij}^*$ .  $\rho_{ij}^*$ , in turn, is assumed to depend linearly on vector  $\omega_{ij}$ . The error term  $\varepsilon_{ij}$  is given by given by a variance component model:  $\varepsilon_{ij} = \nu_j + \mu_{ij}$ .  $\nu_j$  is iid with zero mean and variance  $\sigma_\nu^2$ ;

$\mu_{ij}$  is normally distributed with zero mean and variance  $\sigma_{\mu}^2 = 1$ . The data set used covers 87 countries, for the 1970-2001 period; not every country has data for every year, however. See the Data Appendix for exact data definition and data sources.

In determining the specification of this probit model I followed the literature on external crises, and I included the following covariates:<sup>27</sup> (a) The ratio of the current account deficit to GDP lagged one period. (b) A sudden stop dummy that takes the value of one if the country in question experienced a sudden stop in the previous year. (c) An index that measures the relative occurrence of sudden stops in the country's region (excluding the country itself) during that particular year. This variable captures the effect of "regional contagion." (d) The one-year lagged gross external debt over GDP ratio. Ideally one would want to have the net debt; however, there most countries there are no data on net liabilities. (e) The one-year lagged rate of growth of domestic credit. (f) The lagged ratio of the country's fiscal deficit relative to GDP. (g) The country's initial GDP per capita (in logs).

The results obtained from the estimation of this variance-component probit model for a sample of large countries are presented in Table 11; as before, I have defined "large" as having a GDP in the top 25% of its distribution. The results obtained are quite satisfactory; the vast majority of coefficients have the expected sign, and many of them are significant at conventional levels.<sup>28</sup> The results may be summarized as follows: Larger (lagged) current account deficits increase the probability of a reversal, as does a (lagged) sudden stop of capital inflows. Countries with higher GDP per capita have a lower probability of a reversal. The results do not provide strong support for the contagion hypothesis: the variable that measures the incidence of sudden stops in the county's region is significant in only one of the equations (its sign is always positive, however). There is also evidence that an increase in a country's (gross) external debt increases the probability of reversals. Although, the U.S. is a very special case the results reported in Table 11 provide some support to the idea that during the last few years the probability of the U.S. experiencing a reversal has increased.

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<sup>27</sup> See, for example, Frankel and Rose (1996), Milesi-Ferreti and Razin (2000) and Edwards (2002).

<sup>28</sup> Results for the other two samples of countries are quite similar; they are not reported here due to space considerations.

#### IV. Current Account Reversals and Growth

One of the most important questions regarding a (possible) current account reversal in the United States is whether it will affect negatively economic activity and growth. In this Section I investigate the relation between current account reversals and real economic performance using the comparative data set presented above. I am particularly interested in analyzing the following issues: (a) historically, have current account adjustments had an effect on GDP growth? (b), Have the effects of reversals depend on the structural characteristics of the country in question, including its economic size (i.e. whether it is a large country), its degree of trade openness and the extent to which it restricts capital mobility. And (c) have the effects of the reversals on economic growth depended on the magnitude and speed at which the adjustment takes place. In addressing these issues I emphasize the case of large countries; as a comparison, however, I do provide results for the complete sample of countries.

Authors that have analyzed the real effects of current account reversals have reached different conclusions. Milesi-Ferreti and Razin (2000), for example, used both *before-and-after* analyses as well as cross-country regressions to deal with this issue and concluded that “reversal events seem to entail substantial changes in macroeconomic performance between the period before and the period after the crisis but *are not systematically associated with a growth slowdown* (p. 303, emphasis added).” Edwards (2002), on the other hand, used dynamic panel regression analysis and concluded that major current account reversals had a negative effect on investment, and that they had “a negative effect on GDP per capita growth, even after controlling for investment (p. 52).”<sup>29</sup> Debelle and Galati (2005) used a before and after approach and concluded that (2%) reversals did not result in a slowdown in growth, a result that was also obtained by Croke et al (2005). Freund and Warnock (2005), on the other hand, used a multivariate statistical approach and found that reversals have been associated with a slowdown in economic growth. None of these studies, however, has analyzed the potential role of the speed of adjustment on the effects of reversals on growth..

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<sup>29</sup> In a recent paper, Guidotti et al (2004) consider the role of openness in an analysis of imports and exports behavior in the aftermath of a reversal. See also Frankel and Cavallo (2004).

#### IV.1 Preliminaries

In Figure 10 I present data on (median) GDP growth per capita in the period surrounding current account reversals. As may be seen in this Figure, in the three samples considered in this study there is a decline in GDP growth in the year of the reversal. This decline is particularly pronounced in the “large countries” and “industrial countries” samples. It is interesting to notice, however, that the drop in the rate of GDP growth appears to be short lived. In the “large countries” and “all countries” samples there is a very sharp recovery in growth one year after the reversal episode. Kruskal-Wallis tests, reported in Table 10 indicate that in the reversal countries growth is significantly lower in the years surrounding the reversals than in a control group of countries that have not experienced a reversal (the p-values range from 0.07 to 0.00).

#### IV.2 Growth Effects of Current Account Reversals: An Econometric Model

The point of departure of the econometric analysis is a two-equation formulation for the *dynamics* of real GDP per capita growth of country  $j$  in period  $t$ . Equation (3) is the long run GDP growth equation; equation (4), on the other hand, captures the growth dynamics process.

$$(3) \quad \tilde{g}_t = \alpha + x_j \beta + r_j \theta + \omega_j .$$

$$(4) \quad \Delta g_{jt} = \lambda [\tilde{g}_j - g_{jt-1}] + \phi v_{jt} + \mu_{jt} + \varepsilon_{jt} .$$

$\tilde{g}_j$  is the long run rate of real per capita GDP growth in country  $j$ ;  $x_j$  is a vector of structural, institutional and policy variables that determine long run growth;  $r_j$  is a vector of regional dummies;  $\alpha$ ,  $\beta$  and  $\theta$  are parameters, and  $\omega_j$  is an error term assumed to be heteroskedastic. In equation (3),  $g_{jt}$  is the rate of growth of per capita GDP in country  $j$  in period  $t$ . The terms  $v_{jt}$  and  $u_{jt}$  are shocks, assumed to have zero mean, finite variance and to be uncorrelated among them. More specifically,  $v_{jt}$  is assumed to be an external terms of trade shock, while  $u_{jt}$  captures other shocks, including *current account reversals*.  $\varepsilon_{jt}$  is an error term, which is assumed to have a variance component form, and  $\lambda$ ,  $\phi$ , and  $\gamma$  are parameters that determine the particular characteristics of the growth

process. Equation (4) has the form of an equilibrium correction model and states that the actual rate of growth in period  $t$  will deviate from the long run rate of growth due to the existence of three types of shocks:  $v_{tj}$ ,  $u_{tj}$  and  $\xi_{tj}$ . Over time, however, the actual rate of growth will tend to converge towards its long run value, with the rate of convergence given by  $\lambda$ . Parameter  $\varphi$ , in equation (4), is expected to be positive, indicating that an improvement in the terms of trade will result in a (temporary) acceleration in the rate of growth, and that negative terms of trade shock are expected to have a negative effect on  $g_{jt}$ .<sup>30</sup> From the perspective of the current analysis, a key issue is whether *current account reversals* have a negative effect on growth; that is, whether coefficient  $\gamma$  is significantly negative. In the actual estimation of equation (4), I used dummy variables for reversals. An important question – and one that is addressed in detail in the Subsection that follows – is whether the effects of different shocks on growth are different for countries with different structural characteristics, such as its degree of trade and capital account openness.<sup>31</sup>

Equations (3) - (4) were estimated using a two-step procedure. In the first step I estimate the long run growth equation (3) using a cross-country data set. These data are averages for 1970-2001, and the estimation makes a correction for heteroskedasticity. These first stage estimates are then used to generate long-run predicted growth rates to replace  $\tilde{g}_j$  in the equilibrium error correction model (4). In the second step, I estimated equation (4) using GLS for unbalanced panels; I used both random effects and fixed effects estimation procedures.<sup>32</sup> The data set used covers 157 countries, for the 1970-2001 period; not every country has data for every year, however. See the Data Appendix for exact data definition and data sources.

In estimating equation (3) for long-run per capita growth, I followed the standard literature on growth, as summarized by Barro and Sala-I-Martin (1995), Sachs and Warner (1995) and Dollar (1992) among others. I assume that the rate of growth of GDP ( $\tilde{g}_j$ ) depends on a number of structural, policy and social variables. More specifically, I include the following covariates: the log of initial GDP per capita; the investment ratio;

<sup>30</sup> See Edwards and Levy Yeyati (2004) for details.

<sup>31</sup> On capital account liberalization and growth, see Eichengreen and Leblang (2003)

<sup>32</sup> Due to space considerations, only the random effect results are reported.

the coverage of secondary education, as a proxy for human capital; an index of the degree of openness of the economy; the ratio of government consumption relative to GDP; and regional dummies. The results obtained from these first-step estimates are not reported due to space considerations.

In Table 12 I present the results from the second step estimation of the growth dynamics equation (4), when random effects were used. The results are presented for two samples -- “large countries,” and “industrial countries” --, and for the two definitions of reversals discussed above. The estimated coefficient of the growth gap is, as expected, positive, significant, and smaller than one. The point estimates are on the high side -- between 0.69 and 0.78 --, suggesting that, on average, deviations between long run and actual growth get eliminated rather quickly. For instance, according to equation (12.1), after 3 years, approximately 82% of a unitary shock to real GDP growth per capita will be eliminated. Also, as expected, the estimated coefficients of the terms of trade shock are always positive, and statistically significant, indicating that an improvement (deterioration) in the terms of trade results in an acceleration (de-acceleration) in the rate of growth of real per capita GDP. As may be seen from Table 12, in all regressions the coefficient of the current account reversals variable is *significantly negative*, indicating that reversals result in a deceleration of growth in both samples. For large countries these results suggest that, on average, a “*Reversal 4%*” reversal has resulted in a reduction of GDP growth of 5.25% in the first year. This effect persists through time, and is eliminated gradually as  $g$  converges towards  $\tilde{g}_j$ . In the case of “*Reversal 2%*” the estimated negative effect is significantly, at -4.3%. According to these results, the negative growth effects of a “front loaded” current account reversal – that is, a “*Reversal 4%*” episode -- are significantly larger than those of a more gradual reversal or a “*Reversal 2%*” type of episode. The results for the industrial countries sample are reported in equations 12.3 and 12.4 in Table 12. As may be seen, the negative effect on growth is milder than for large countries; it is still the case, however, that a “front loaded” reversal has a more severe effect on growth than a more gradual reversal episodes. When lagged values of the reversals indicators are added to these regressions their coefficients turned out to be non-significant at conventional levels.



To summarize, the results presented in Table 12 are revealing, and provide some light on the costs of an eventual current account reversal in the U.S. Historically, “large countries” and “industrial countries” that have gone through reversals have experienced deep GDP growth reductions; these reductions are higher if the current account reversal is “front loaded.” These estimates indicate that, on average, and with other factors given, and depending on the sample and the definition of reversal, the decline of GDP growth per capita has been in the range of 2.2 to 5.3 percent in the first year of the adjustment. Three years after the initial adjustment GDP growth will still be below its long run trend.

#### ***IV.2 Extensions, Endogeneity and Robustness***

In this sub-section I discuss some extensions and deal with robustness issues, including the potential endogeneity bias of the estimates. More specifically, I address the following issues: (a) the effects of terms of trade changes; (a) the role of countries structural characteristics in determining the costs of adjustment.

*A. Terms of Trade Effects:* The results in Table 12 were obtained controlling for terms of trade changes. That is, the coefficient of the *Reversal 4%* and *Reversal 2%* coefficients capture the effect of a current account reversal, maintaining terms of trade constant. As discussed in Sections II, however, in large countries external adjustment is very likely to affect the terms of trade. The exact nature of that effect will depend on a number of factors, including the size of the relevant elasticities and the extent of home bias in consumption. In order to have an idea of the effect of current account reversals allowing for international price adjustments, I re-estimated equation (4) excluding the terms of trade variable for the “large countries” sample. The estimated coefficients for the reversals coefficients were smaller (in absolute terms) than those in Table 12, indicating that when the terms of trade are allowed to adjust, the growth effect of the reversal is less severe. That is, for large countries, the terms of trade adjustment following a reversal generates offsetting forces on growth. The estimated coefficient of the *Reversal 4%* is now -4.1 (it is -5.3 in Table 12). The new estimated coefficient of *Reversal 2%* is now -3.6; it was -4.4 in Table 12). Interestingly, when the terms of trade variable is excluded from the regressions for the “industrial countries” and “all countries” samples, the coefficients of *Reversal* are not affected.

*B. Openness and the Costs of Adjustment:* Recent studies on the economics of external adjustment have emphasized the role of trade openness. Edwards (2004), Calvo et al (2004) and Frankel and Cavallo (2004), among others, have found that countries that are more open to international trade tend to incur in a lower cost of adjustment. Most of these studies, however, have not made a distinction between large and small countries, nor have they distinguished between industrial and other countries. I added two interactive regressors to equations of the type of (4). More specifically, I included the following terms: (a) a variable that interacts the reversals indicator with trade openness; and (b) a variable that interacts the reversal indicator with an index of the degree of international capital mobility. Trade openness is proxied by the fitted value of the imports plus exports to GDP ratio obtained from a gravity model of bilateral trade.<sup>33</sup> The index on international capital mobility, on the other hand, was developed by Edwards (2005b), and ranges from zero to 100, with higher numbers denoting a higher degree of capital mobility. The results obtained are presented in Table 13. As may be seen, the coefficients of the reversal indicators continue to be significantly negative, as in the previous analysis. However, the variable that interacts trade openness and reversals is not significant for large and industrial countries, indicating that for these two groups trade openness has not affected the way in which reversals affect growth. However, for the complete sample, this coefficient is significantly positive, indicating that countries that are more open to trade have a lower cost of reversals. The coefficient for the variable that interacts reversals with capital mobility is not significant for the “large” and “industrial” countries sample; it is significantly negative for the “all countries sample” (results available from the author). The results reported in Table 13, then, suggest that the way in which structural characteristics affect adjustment are different for different type of countries. While openness appears to be important for small non-industrial countries, they are not important for countries that are large or advanced.

*C. Endogeneity :* The results discussed above were obtained using a random effects GLS for unbalanced panels, and under the assumption that the reversal variable is exogenous. It is possible, however, that whether a reversal takes place is affected by

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<sup>33</sup> The use of gravity trade equations to generate instruments in panel estimation has been pioneered by Jeff Frankel. See, for example, Frankel and Cavallo (2004).

growth performance, and, thus, is endogenously determined. In order to deal with this issue I have re-estimated equation (4) using an instrumental variables GLS panel procedure. In the estimation the following instruments were used: (a) the ratio of the current account deficit to GDP lagged one and two periods. (b) A lagged sudden stop dummy that takes the value of one if the country in question has experienced a sudden stop in the previous year. (c) An index that measures the relative occurrence of sudden stops in the country's region (excluding the country itself) during that particular year. This variable captures the effect of "regional contagion." (d) The one-year lagged external gross debt over GDP ratio. (e) The ratio of net international reserves to GDP, lagged one year. (f) The one-year lagged rate of growth of domestic credit. (g) The country's initial GDP per capita (in logs). The results obtained, not presented here due to space considerations, show that the coefficients of the reversal indicators are significantly negative, confirming that historically current account reversals have had a negative effect on growth. The absolute values of the estimated coefficients, however, are larger than those obtained when random effects GLS were used.

*D. Alternative Indicators of Current Account Reversals:* Throughout the analysis I have used reversal indicators that constraint the current account deficit adjustment to be at least 5% of GDP in a three-year period. As a way of gaining additional insights into the effects of current account reversals, in Table 14 I present results obtained when two alternative reversal indicators are used: "*Reversal 14*" is defined as an episode where the current account deficit declines in at least 4% in one year, independently of what happens in the years to come. "*Reversal 12*," on the other hand, is defined as an episode where the current account deficit declines in at least 2% in one year, independently of whether the deficits continues to decline in the following years. These two new variables, then, provide "less demanding" definitions of reversals. The results in Table 14, confirm those discussed above. They show that reversals have had a negative effect on growth in all three samples. In addition, these results indicate that the magnitude of the reversal matters; deeper reversals (4% in one year) have a more negative effect on growth than milder reversals (2% in one year). Also, a comparison between the results in Tables 12 and 14 suggest that the effects on growth of sustained reversals have a greater effect on growth.

*E. Robustness and Other Extensions:* In order to check for the robustness of the results I also estimated several versions of equation (4) for the large countries sample. In one of these exercises I introduced lagged values of the reversal indicators as additional regressors. The results obtained – available on request – show that lagged values of these indexes were not significant at conventional levels. I also varied the definition of “large countries;” the main message of the results, however, is not affected by the sample.

## **V. The U.S. Current Account Reversal of 1987-1991**

Between 1987 and 1991 the U.S. current account deficit experienced a major reversal. In the third quarter of 1987 the deficit stood at 3.7%, a figure that was then considered to be exceptionally high. During the next three years the deficit declined gradually, and in the fourth quarter of 1990 it was 1% of GDP. During the next two quarters, and as a result of foreign countries’ contributions to financing of the Gulf War, the current account briefly posted a surplus of 0.8% of GDP. The 1987-1991 adjustment process was accompanied by a major depreciation of the U.S. dollar. The dollar began to loose value in the second quarter of 1985, almost two years before the current account deficit began its turnaround.<sup>34</sup> Although this episode does not qualify as a “reversal” in the empirical analysis presented in the preceding sections, it is the closest to a major current account adjustment that the U.S. has experienced in modern times. In this section I analyze the behavior of some key economic variables in the period surrounding this adjustment.

In Figure 11 I present quarterly data for the period 1983-1993 for: (a) the current account balance; (b) the trade-weighted real exchange rate index for the U.S. dollar; (c) the cyclical component of real GDP; and (d) the cyclical component of the rate of unemployment.<sup>35</sup> In Figure 12 I present monthly data for the same period (1983-1993) for: (i) the rate of inflation; (ii) the Federal Funds interest rate; and (c) the 10 year Treasury Note interest rate. In both Figures I have shaded the period October 1987-June 1991, which corresponds to the actual period when the current account deficit declined.

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<sup>34</sup> This two-year lag coincides with the conventional wisdom of the time it takes a dollar depreciation to affect the current account.

<sup>35</sup> These cyclical components were computed using a Hodrick-Prescott filter on the complete time series from 1951 through 2005.

From an analytical point of view, however, we are also interested in the behavior of these key variables in the period immediately preceding and immediately following the adjustment. The picture that emerges from these Figures may be summarized as follows:

- During the adjustment process the U.S. dollar depreciated significantly in real terms. Between the second quarter of 1985 and the second quarter of 1991 the dollar lost 30% of its value in real trade-weighted terms. Between the third quarter of 1987 and the second quarter of 1991 – the shaded period in Figures 11 and 12 --, the trade weighted dollar lost 9.5% of its value.
- During the early part of the adjustment there was no decline in GDP, nor was there an increase in unemployment. However, during the latter part of the adjustment – starting in the second quarter of 1990 – there was a decline in GDP and a marked increase in unemployment. Indeed, as may be seen from Figure 11, GDP stayed below its stochastic trend well into 1993; unemployment was above its own trend until early 1994. According to the National Bureau of Economic Research in August of 1990 the U.S. entered into a recession that lasted until March of 1991.<sup>36</sup>
- During the first part of the adjustment there was a sharp increase in the Federal Funds interest rate. In October 1986 the Federal Funds rate was 5.85%; by March 1989 it had increased by 400 basis points, to 9.85%. In June 1989 the Fed cut rates by 25 basis points, and began a period of interest rate reduction. By the end of the adjustment, in June 1991, the Federal Funds rate stood at 5.9%.
- The yield on the 10-year Treasury Note increased significantly in the months preceding the actual current account adjustment. The yield went from 7.1% in January 1987, to 9.4% in September of that year – an increase of 230 basis points. From that time and until March 1989, the yield on the 10-year Note moved between 9% and 9.4%. Starting in April 1989, long term interest rates began to fall, reaching 8% in April 1991. In June 1993, two years after the current account adjustment had ended, the

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<sup>36</sup> I am not necessarily implying causality in this description of the data.

long term interest rate was 6%. The yield curve became inverted in January, 1989, and stayed inverted until January 1990.

- In the period preceding the adjustment there was an increase in inflation. This continued to exhibit an upward trend until late 1990, when it reached 6%.

Two other features of the 1987-1991 current account adjustment episode are worth noting. First, during that period the U.S. terms of trade (prices of exports over imports) did not experience significant changes. And second, during this adjustment episode the actual external adjustment took place through a decline in three categories of capital inflows: (a) foreigners' net purchases of private securities (bonds and equities); (b) foreign central banks net purchases of treasury securities; and (c) net bank credit. (See Figure 13 for the composition of current account financing for the period 1980-1993).

The 1987-1991 current account adjustment in the U.S. was significant, but gradual. And although the episode does not qualify as a "current account" reversal, as defined in Section III of this paper, it does provide some useful information. As Figures 11 and 12 show, this adjustment was not characterized by a traumatic collapse in output. However, its general pattern had many similarities with the major current account reversals analyzed in Sections III and IV of this paper. The 1987-91 adjustment episode in the U.S. was characterized by: (a) a steep depreciation of the U.S. dollar. (b) An increase in inflation. (c) Higher interest rates; the Fed Funds rate increased through the first half of the adjustment, while the 10 year rate increased in the months prior to the beginning of the actual adjustment. (d) A decline in GDP below trend towards the latter part of the adjustment. In fact, the U.S. entered into a recession while the adjustment was taking place. (e) An increase in the rate of unemployment above trend, during the final quarters of the adjustment.

## **VI. Concluding Remarks**

In this paper I have illustrated the uniqueness of the current U.S. external situation. As shown in Section II, never in the history of modern economics has a large

industrial country run persistent current account deficits of the magnitude posted by the U.S. since 2000. This significant increase in the U.S. current account deficit may be explained by the increase in the international demand for U.S. securities during the last few years.<sup>37</sup> The future of the U.S. current account – and thus of the U.S. dollar – depend on whether foreign investors will continue to add U.S. assets to their investment portfolios. However, even under optimistic scenarios the U.S. current account deficit will have to go through a significant reversal at some point in time.

In order to have an idea of the possible consequences of this type of adjustment, I have analyzed the international evidence on current account reversals. The results from this empirical investigation indicate that major current account reversals have tended to result in large declines in GDP growth. Historically, “large countries” that have gone through major reversals have experienced deep GDP growth reductions. Three years after the initial adjustment GDP growth will still be below its long run trend. An analysis of the U.S. current account adjustment of 1987-1991 shows that that episode many similarities with the major current account reversals discussed in this paper.

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<sup>37</sup> This, in turn, is a manifestation of the “global savings glut.”

Figure 1: Current Account Balance and Real Exchange Rate

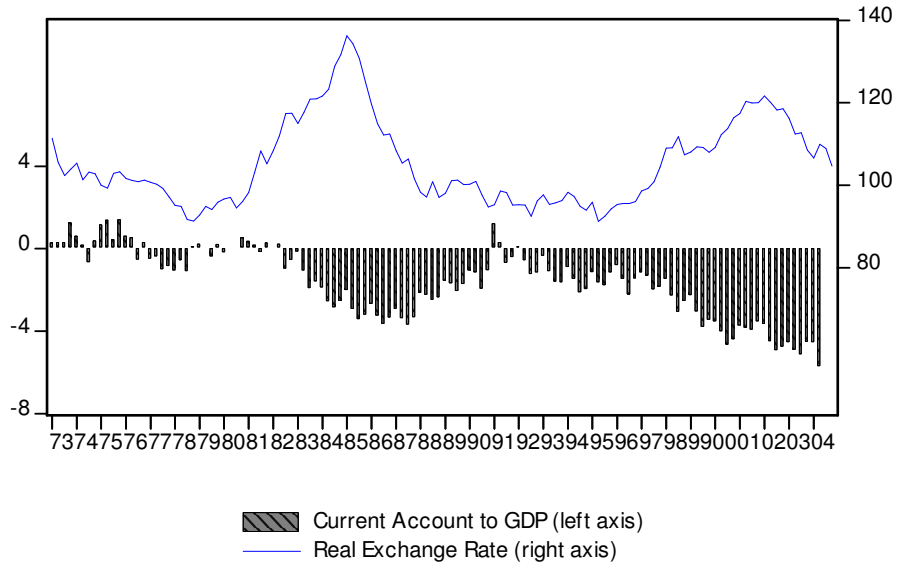
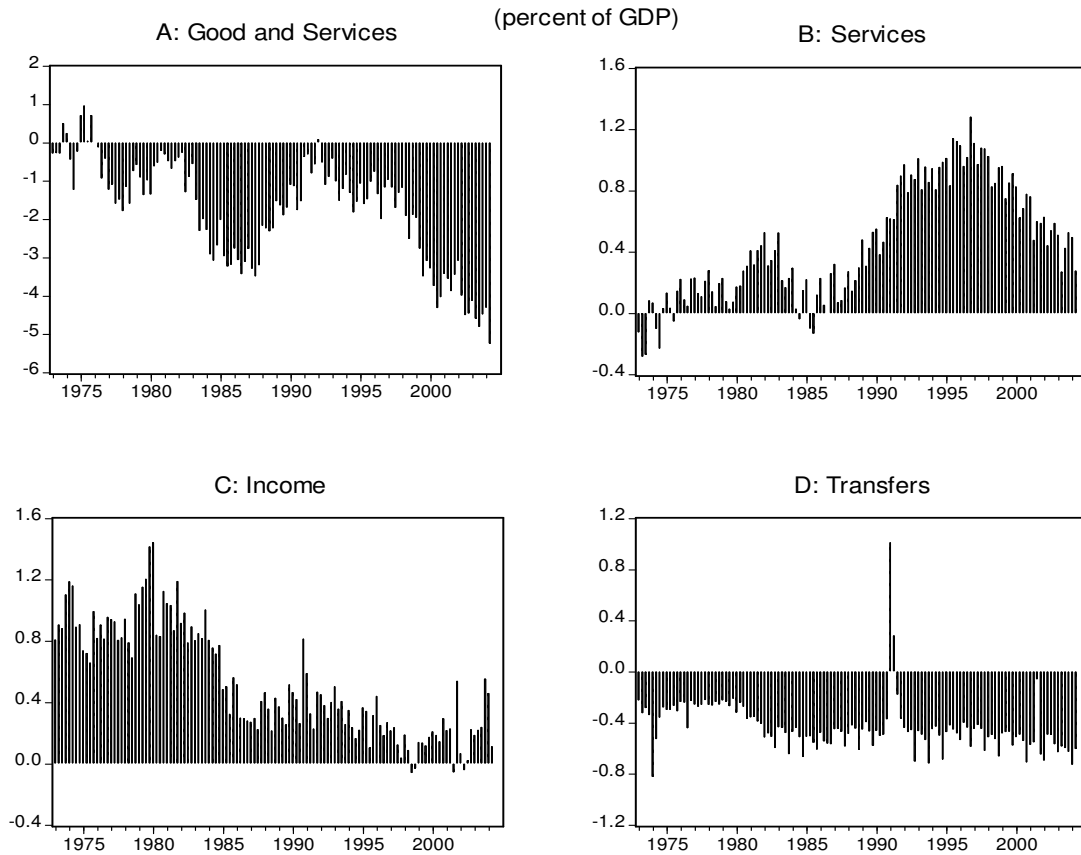


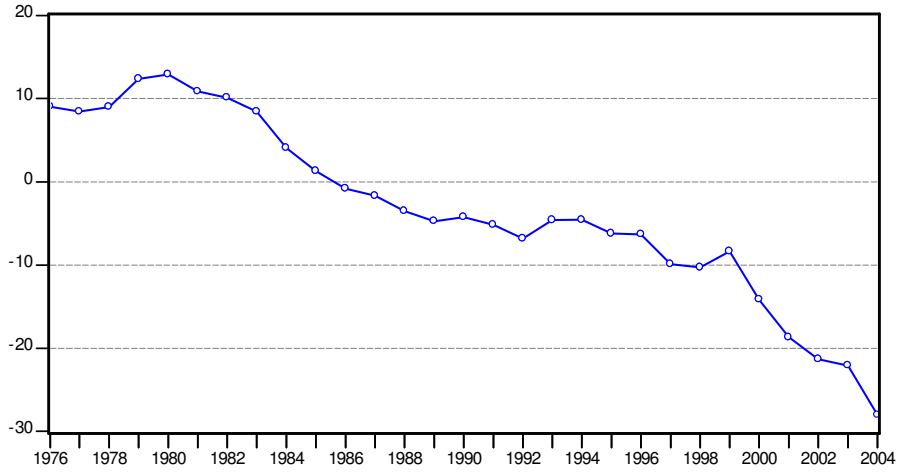
Figure 2: Components of Current Account Deficit, 1973-2004



Source: International Transactions, Economic Report of President 2005



Figure 3: U.S. Net International Investment Position, 1976-2004  
(Percent of GDP)



Source: BEA, International Investment Position

Figure 4: U.S. Investment and Savings, 1970-2003  
(Percent of GDP)

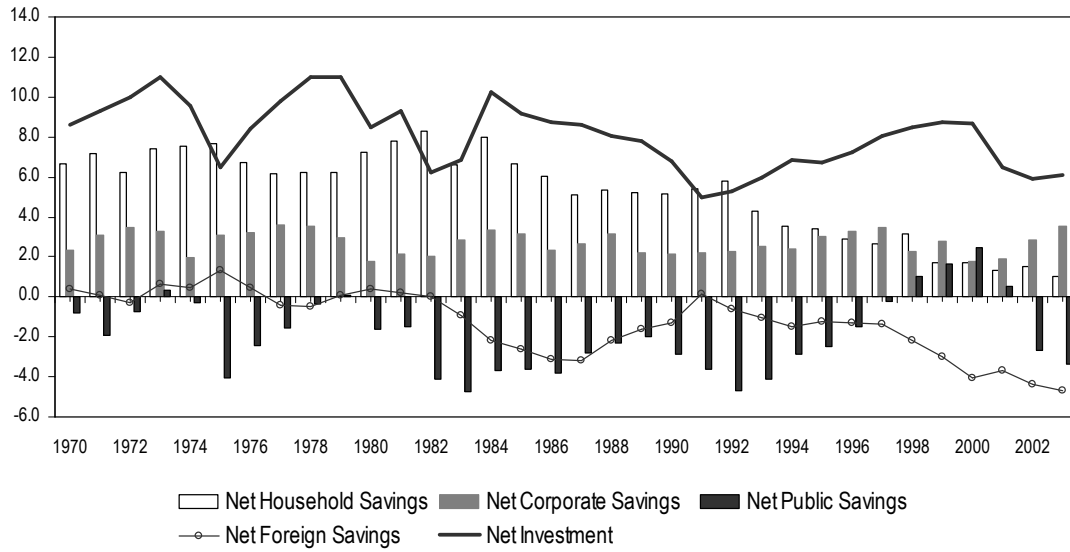


Figure 5: Number of Reversals by Country Group

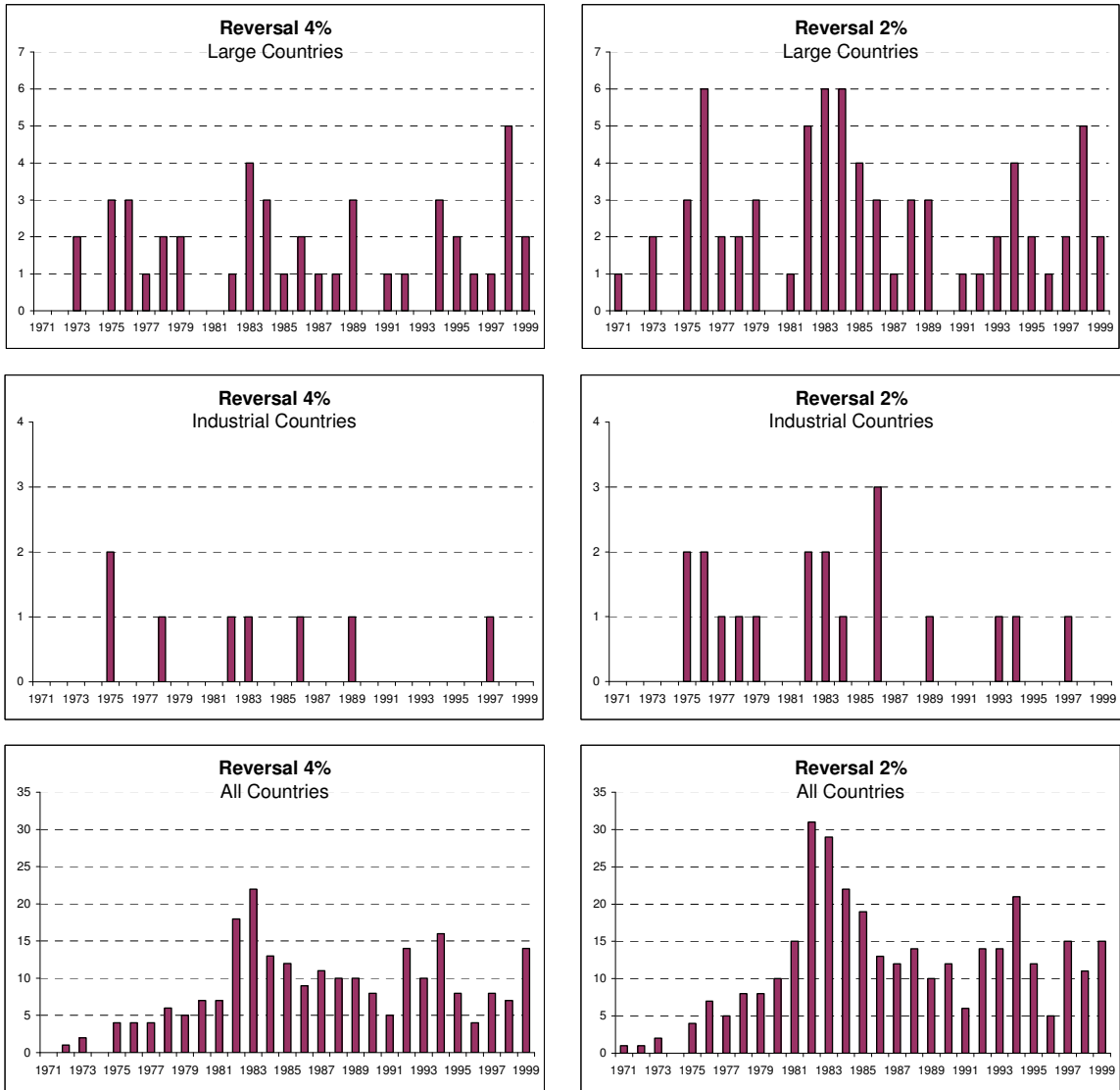


Figure 6: Evolution of Nominal Exchange Rate (Median)

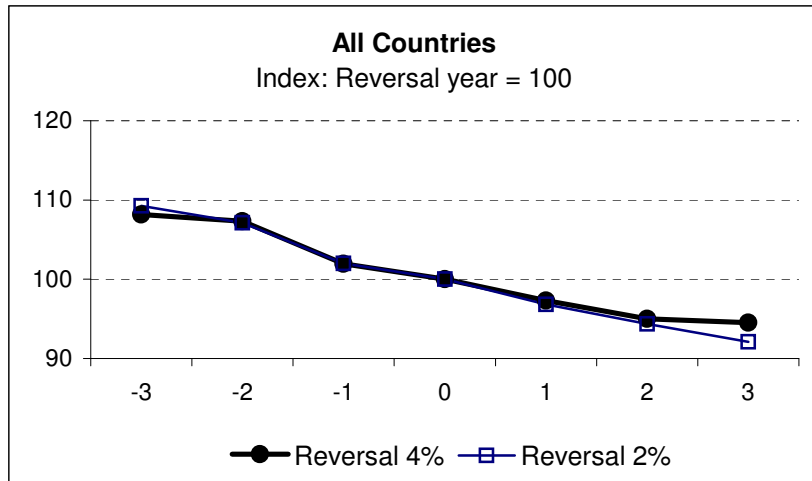
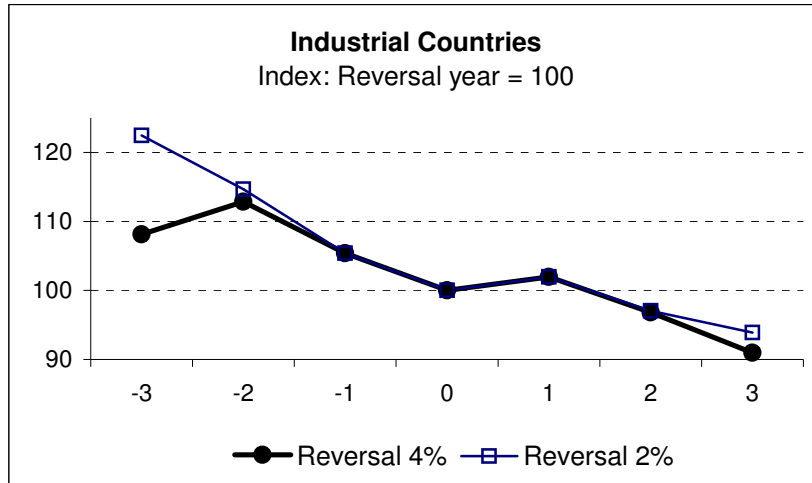
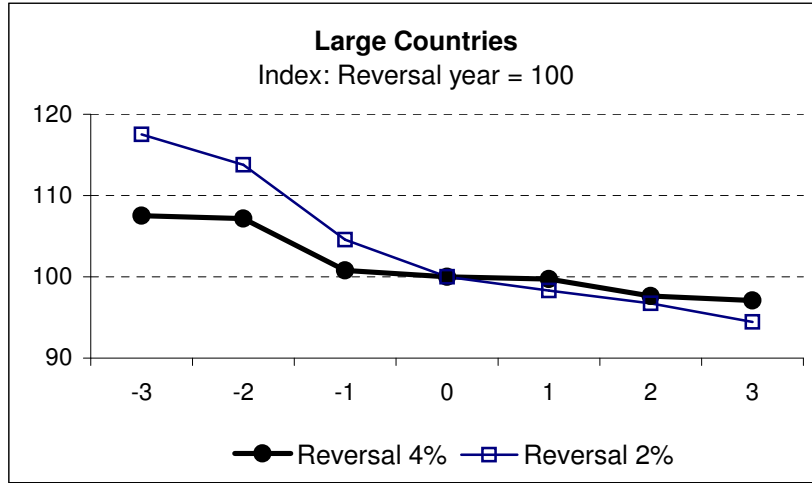


Figure 7: Evolution of Effective Real Exchange Rate (Median)

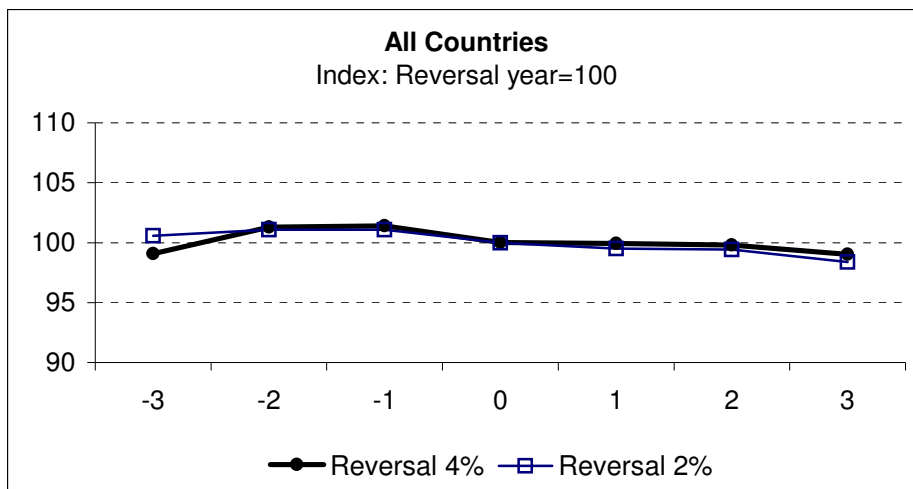
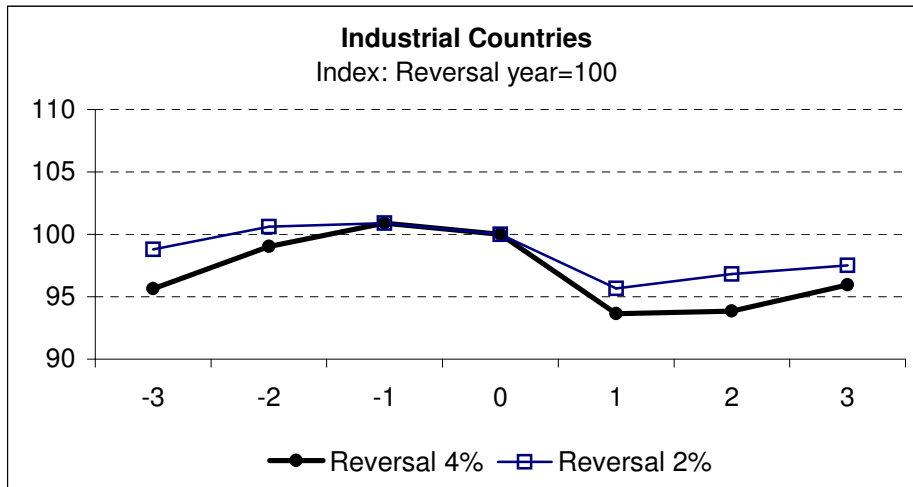
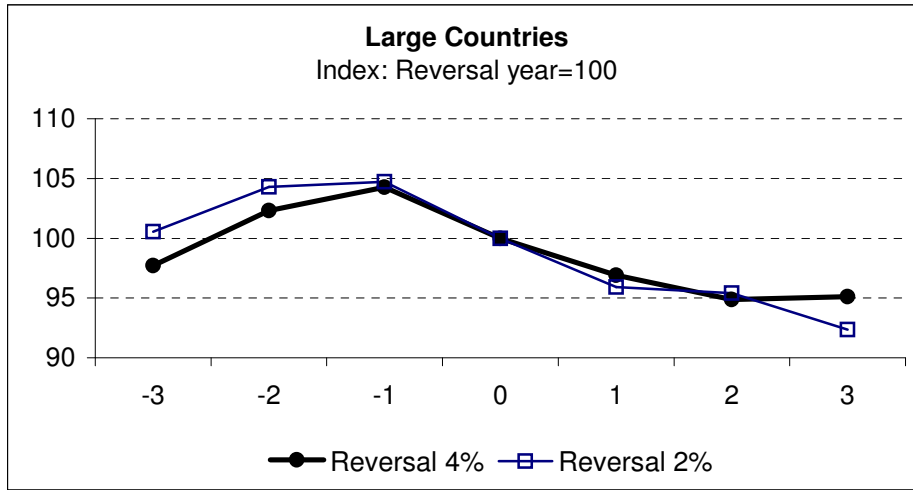


Figure 8: Evolution of Inflation Rate (Median)

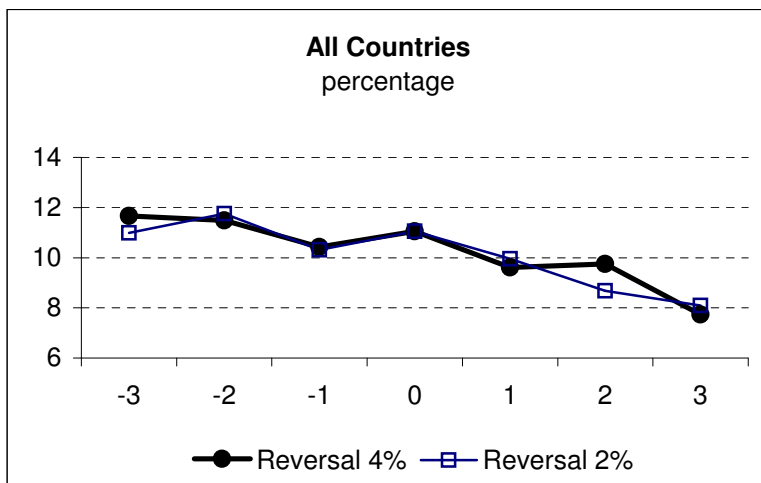
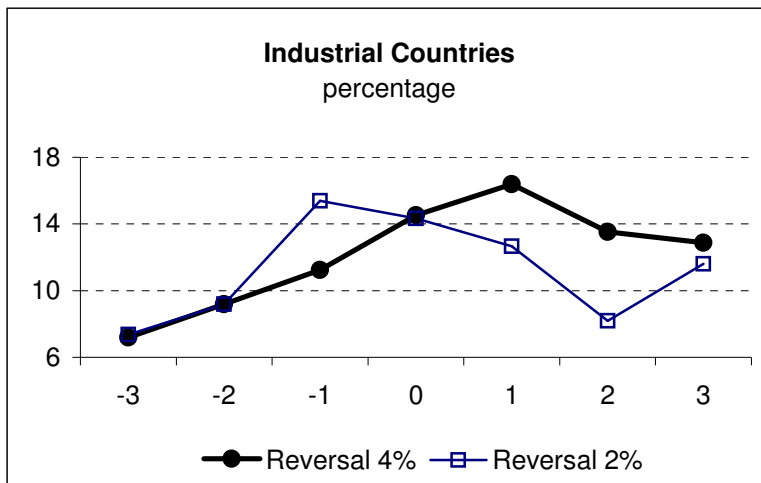
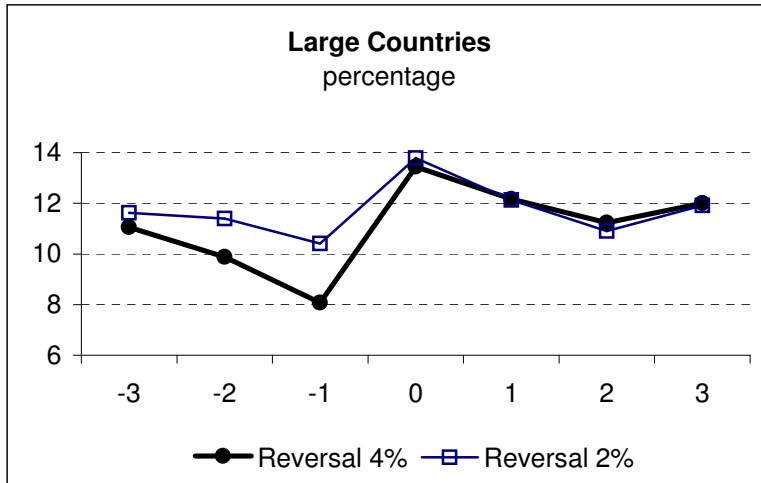


Figure 9: Evolution of Nominal Interest Rate (Median)

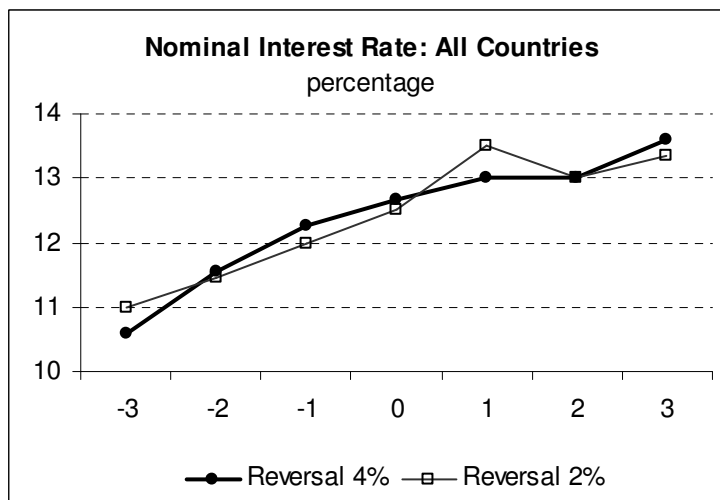
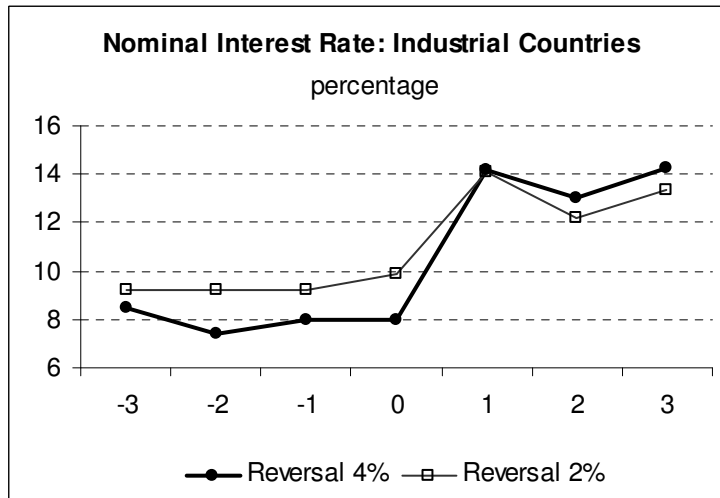
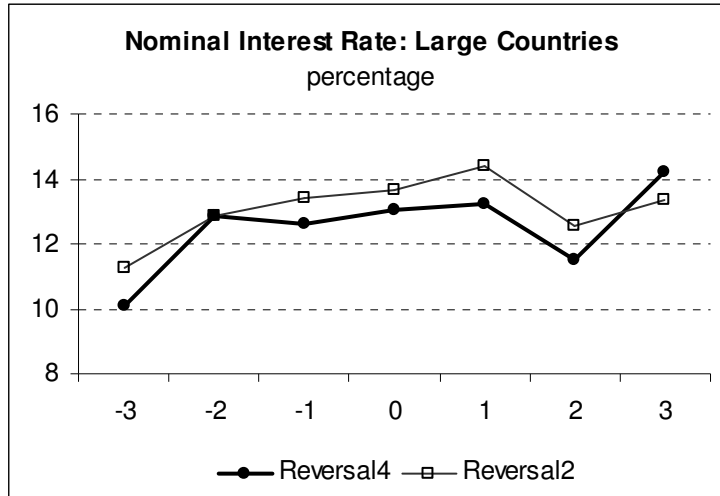


Figure 10: Evolution of Per Capita GDP Growth  
(Median)

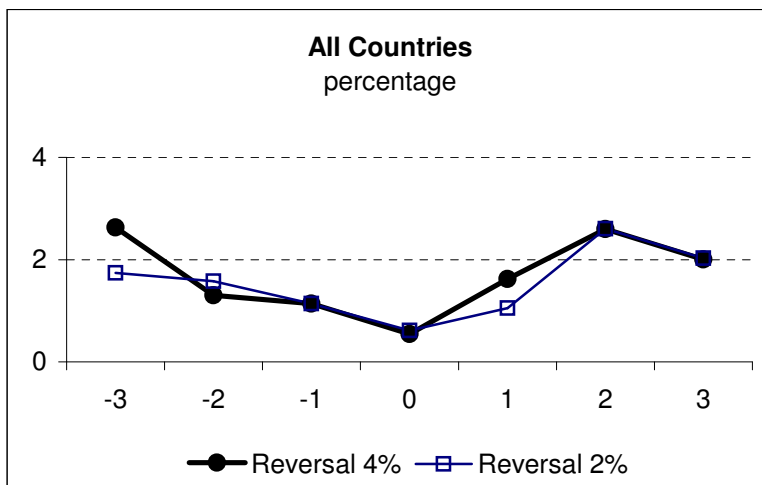
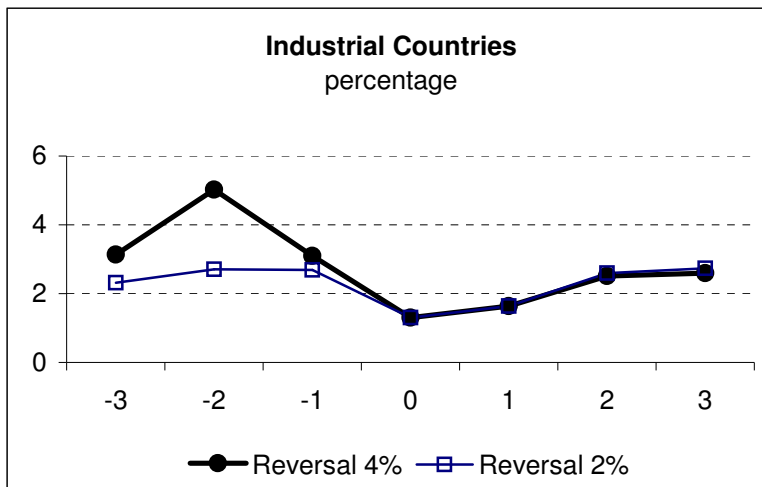
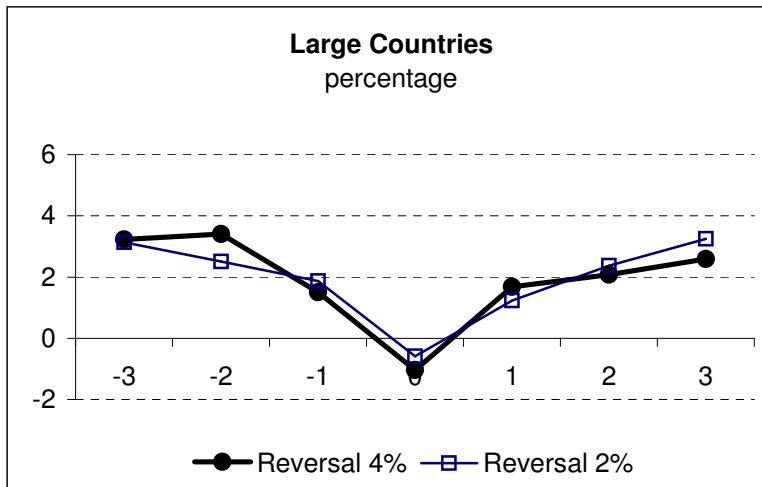


Figure 11: Macro Behavior in Period Surrounding U.S. Current Account Adjustment, 1987-1991

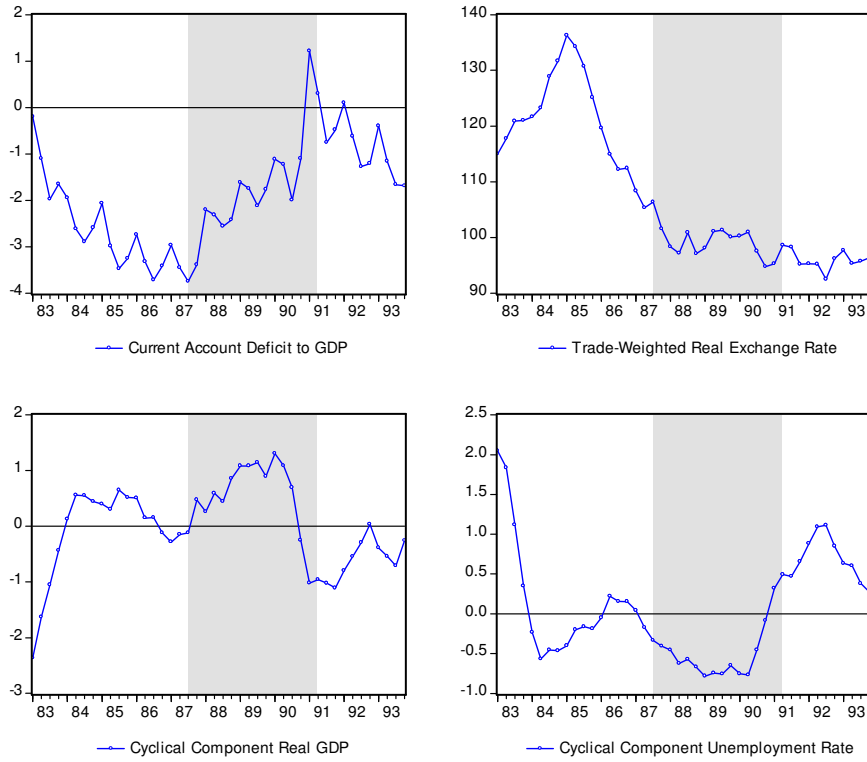




Figure 12: Inflation and Interest Rates in Period Surrounding U.S. Current Account Adjustment, 1987-1991

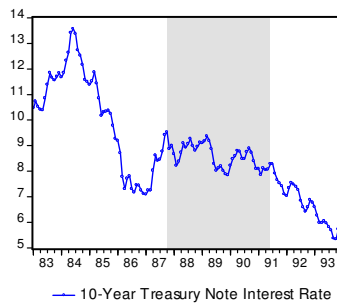
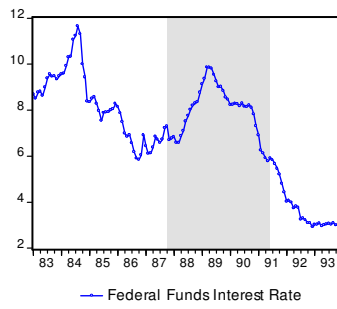
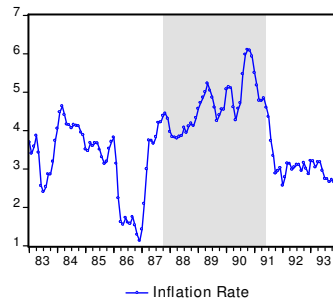
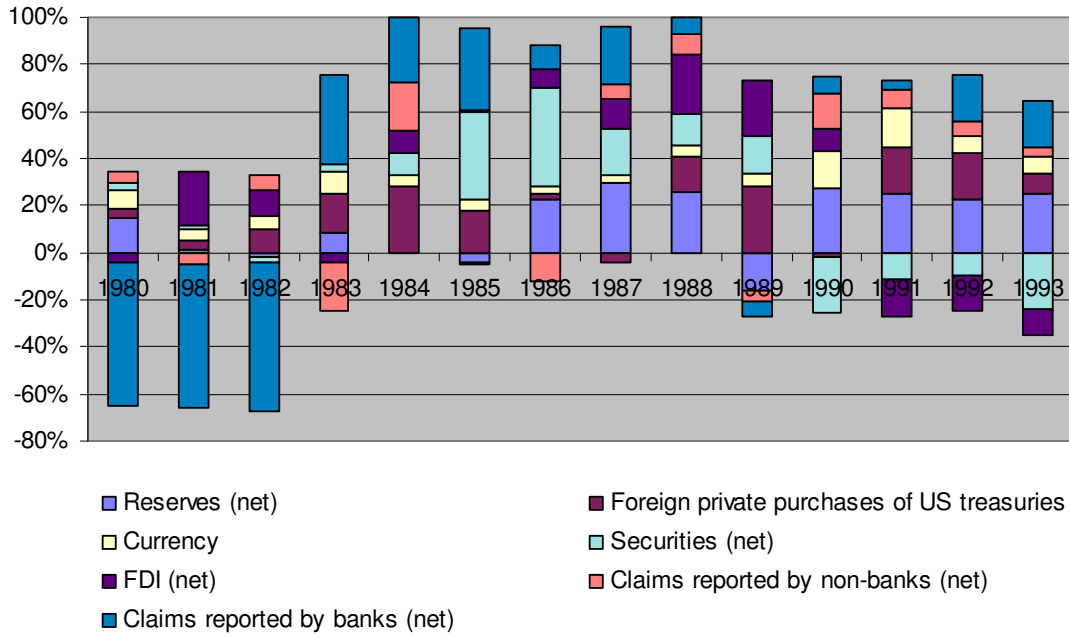


Figure 13: U.S. Current Account Financing, 1980-1993



**Table 1**  
**U.S. Net Financial Flows: 1990-2004**  
(\$ Billion)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Reserves (net)	31.8	23.2	44.4	70.4	44.9	100.1	133.4	18.0	-26.7	52.3	42.5	23.1	110.3	250.1	358.1
Foreign private purchases of U.S. treasuries	-2.5	18.8	37.1	24.4	34.3	91.5	147.0	130.4	28.6	-44.5	-70.0	-14.4	100.4	113.4	108.1
Currency	18.8	15.4	13.4	18.9	23.4	12.3	17.4	24.8	16.6	22.4	5.3	23.8	21.5	16.6	14.8
Securities (net)	-27.2	-10.5	-19.1	-66.2	-6.2	-45.1	-46.0	44.6	32.1	182.6	338.0	309.2	301.4	178.6	323.2
Debt securities	-	-	-	-	-	-	13.0	84.2	145.5	104.2	267.7	300.3	269.8	241.8	360.1
Equity securities	-	-	-	-	-	-	-36.8	24.7	-30.3	84.5	93.0	12.6	37.5	-63.2	-36.8
FDI (net)	11.3	-14.7	-28.4	-32.6	-34.0	-41.0	-5.4	0.8	36.4	64.5	162.1	24.7	-62.4	-133.9	-133.0
Claims reported by non-banks (net)	17.3	8.0	13.2	11.3	-35.0	14.4	-32.6	-5.2	-15.1	-21.5	31.9	57.6	32.6	55.1	-41.5
Claims reported by banks (net)	8.6	3.4	37.4	55.7	100.1	-44.9	-75.1	7.9	4.2	-22.0	-31.7	-7.5	66.1	65.2	-15.6
Net financing	58.0	43.5	97.9	81.8	127.4	87.3	138.7	221.3	76.2	233.8	478.0	416.6	569.9	542.7	614.0
Current account deficit	79.0	-3.7	48.0	82.0	118.0	109.5	120.2	136.0	209.6	296.8	413.4	385.7	473.9	530.7	665.9

Source: BEA, U.S. International Transactions and International Investment Position

**Table 2**  
**U.S. Net International Investment Position and Current Account Deficit: 1998-2004**  
(\$ Billion)

	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>
NIIP	900.0	775.5	1388.7	1889.7	2233.0	2430.7	--
Change in NIIP	79.3	-124.5	613.3	500.9	343.3	197.7	--
Current Account Deficit	209.5	296.8	413.4	385.7	473.9	530.7	665.7
Valuation changes	130.2	421.3	-199.8	-115.2	130.6	333.0	--

Source: Bureau of Economic Analysis

**Table 3**  
**Distribution of Current Account Deficits**  
**By Region: 1970-2001**

<i>Region</i>	<i>Mean</i>	<i>Median</i>	<i>1<sup>st</sup> Perc.</i>	<i>1<sup>st</sup> Quartile</i>	<i>3<sup>rd</sup> Quartile</i>	<i>9<sup>th</sup> Perc.</i>
	<b><u>A: 1970-2001</u></b>					
Industrialized countries	0.6	0.7	-3.8	-1.6	3.0	4.8
Latin Am. and Caribbean	5.4	4.1	-2.5	1.1	8.0	16.9
Asia	3.0	2.7	-7.1	-0.6	6.3	11.3
Africa	6.3	5.3	-3.4	1.2	9.9	16.9
Middle East	0.0	1.4	-18.8	-5.0	6.4	13.6
Eastern Europe	3.9	3.0	-2.4	0.3	6.1	10.7
Total	3.9	3.3	-5.0	-0.1	7.1	13.1

Source: Author's elaboration based on World Development Indicators

**Table 4**  
**List of Countries with Persistent High Current Account Deficits**  
**By Region: 1970-2001**

<i>Region/ Country</i>	<i>Period</i>
<b><u>Industrialized Countries</u></b>	
Ireland	1978-1984
New Zealand	1984-1988
<b><u>Latin America and Caribbean</u></b>	
Guyana	1979-1985
Nicaragua	1984-1990 & 1992-2000
<b><u>Asia</u></b>	
Bhutan	1982-1989
<b><u>Africa</u></b>	
Guinea-Bissau	1982-1993
Lesotho	1995-2000
<b><u>Eastern Europe</u></b>	
Azerbaijan	1995-1999

Source: Author's elaboration based on World Development Indicators

**Table 5**  
**Net Sock of Liabilities: U.S and other Industrial Countries: Selected Years**  
 (Percent of GDP)

<i>Country</i>	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2003</i>
Australia	--	--	47.4	55.1	65.2	59.1
Canada	34.7	36.3	38.0	42.4	30.6	20.6
Denmark	--	--	--	26.5	21.5	13.0
Finland	14.6	19.0	29.2	42.3	58.2	35.9
Iceland	--	--	48.2	49.8	55.5	66.0
New Zealand	--	--	88.7	76.6	120.8	131.0
Sweden	--	20.9	26.6	41.9	36.7	26.5
United States	-12.9	-1.3	4.2	6.2	14.1	22.1

Source: Bureau of Economic Analysis and Lane and Milesi-Ferretti (2001).

**Table 6**  
**U.S. Current Account Adjustment and the U.S. Dollar:**  
**Selected Studies, 1999-2005**

<i>AUTHORS</i>	<i>METHODOLOGY</i>	<i>MAIN ASSUMPTIONS</i>	<i>MAIN RESULTS</i>
Mann (1999)	<ul style="list-style-type: none"> <li>▪ Model tracks U.S. NIIP through time.</li> <li>▪ Analyzes trajectory of NIIP under three scenarios, and asks whether these trajectories are sustainable.</li> <li>▪ Elasticities-based adjustment mechanism.</li> <li>▪ Considers two scenarios for global growth.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Income elasticity of imports (1.7) exceeds income elasticity of exports (1.0).</li> <li>▪ Base case <i>scenario</i> assumes no RER adjustment for the USD.</li> <li>▪ A USD adjustment <i>scenario</i> assumes a RER depreciation of 25%.</li> <li>▪ A structural adjustment <i>scenario</i> assumes that exports' elasticity increases to 1.3.</li> </ul>	<ul style="list-style-type: none"> <li>▪ In base case scenario the NIIP becomes increasingly negative and the CA is unsustainable in the medium run.</li> <li>▪ Under RER depreciation scenario CA is within sustainable ranges even in a 10 year <i>long horizon</i>.</li> <li>▪ Under structural adjustment, CA deficit is 3% in a 10 year horizon, if the global economy has high performance.</li> </ul>
Obstfeld and Rogoff (2000)	<ul style="list-style-type: none"> <li>▪ Develops and calibrates optimizing model of small open economy, with two goods: tradable and nontradable.</li> <li>▪ Output is exogenous; prices are assumed to be flexible; monetary policy stabilizes the price level.</li> <li>▪ Analyzes the effect on RER of an exogenous shock that results in a reduction of the CA deficit of 4.4% of GDP.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Elasticity of substitution between tradables and nontradables is assumed to be equal to one.</li> <li>▪ Assumes a 6% nominal interest rate, and a NIIP of 20% of GDP.</li> <li>▪ Tradables output is assumed to be 25% of GDP.</li> <li>▪ Assumes that full-employment is maintained.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Base case result indicates that an elimination of the CA deficit will imply a 16% RER depreciation, and a 12% nominal depreciation of the USD.</li> <li>▪ Assuming a share of tradables equal to 15%, results in a RER depreciation of 20%.</li> <li>▪ The effect on the nominal value of the USD could be even higher if the reduction in the CA is very rapid.</li> </ul>

Table 6, continuation

<i>AUTHORS</i>	<i>METHODOLOGY</i>	<i>MAIN ASSUMPTIONS</i>	<i>MAIN RESULTS</i>
O'Neill and Hatzious (2002)	<ul style="list-style-type: none"> <li>▪ Analyzes the trajectory of NIIP as a percentage of GDP.</li> <li>▪ Argues that at the observed levels of CA deficits, the NIIP is moving towards the levels of Canada, Australia and New Zealand. It is difficult to believe that this is possible for a large country such as the U.S.</li> <li>▪ Estimates “required” RER depreciation in order to bring CA deficit to 2% and NIIP not to surpass 40%.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Analyzes the rates of return obtained by foreign owners of U.S. assets.</li> <li>▪ Argues that with the exception of FDI these rates of return have been modest.</li> <li>▪ Shows that FDI has declined significantly as a source of financing of the U.S. CA deficit.</li> </ul>	<ul style="list-style-type: none"> <li>▪ It is unlikely that U.S. will be able to continue to attract foreign purchasing for its assets at observed low rates of return. Thus, the U.S. CA deficit is clearly unsustainable.</li> <li>▪ A return to sustainability (2% of GDP) will imply a depreciation of the RER of as much as 43%.</li> </ul>
Wren-Lewis (2004)	<ul style="list-style-type: none"> <li>▪ Calibrates a partial equilibrium model to obtain set of bilateral RER consistent with attaining certain (exogenous) current account deficits.</li> <li>▪ No attempt is made to determine what is the sustainable level of the U.S. current account.</li> <li>▪ Considers the effect of a U.S. fiscal shock and of a U.S. technological shock.</li> </ul>	<ul style="list-style-type: none"> <li>▪ To determine initial conditions, author estimates “underlying” (or cycle-adjusted) CA balances.</li> <li>▪ Considers 3 possible long term scenarios: 1%, 2% and 3% CA deficit.</li> <li>▪ Three-good partial equilibrium model (including a nontraded) of small economy.</li> <li>▪ Elasticities and other parameter values taken from regression analysis and from OECD data set.</li> </ul>	<ul style="list-style-type: none"> <li>▪ CA deficit of 2% of GDP is consistent with a yen/dollar rate of 88, and a dollar/euro of 1.18.</li> <li>▪ If there is a positive technological shock, the “sustainable” CA deficit may be higher. This would be consistent a yen/dollar rate of 89-100, and a dollar/euro of 1.11-1.19.</li> <li>▪ Estimates that if China has a CA surplus of 1% of GDP the Rmb/USD would be 6.71.</li> </ul>

Table 6, continuation

<i>AUTHORS</i>	<i>METHODOLOGY</i>	<i>MAIN ASSUMPTIONS</i>	<i>MAIN RESULTS</i>
Benassy-Quere et al (2004)	<ul style="list-style-type: none"> <li>▪ Estimates econometrically RER path consistent with nontradable equilibrium.</li> <li>▪ The RER is assumed to depend on the country's net foreign assets (NFA) position and on relative productivity.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Model estimated simultaneously for 15 currencies.</li> <li>▪ Data on NFA obtained from lane and Milesi-Ferreti (2004) and relative productivities obtained as ratio of CPI to PPI.</li> <li>▪ No attempt is made to impose external equilibrium condition.</li> <li>▪ Results provided for two cases: USD as numeraire and euro as numeraire.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The extent of misalignment of the different currencies depends on how broad is the adjustment.</li> <li>▪ Using the USD as numeraire, estimates that in 2003 the euro was undervalued between 1.2% and 7.6%.</li> <li>▪ Using the USD as numeraire, estimates that in 2001 the yen was undervalued between 14.3% and 22.1%.</li> </ul>
Mussa (2004)	<ul style="list-style-type: none"> <li>▪ Analyzes trajectory of NIIP and argues that it is unlikely that it will continue to grow at current pace. If it did it would reach 100% of GDP.</li> <li>▪ Argues that challenge is for RER adjustment to be gradual and that it does not disrupt growth.</li> <li>▪ Argues that fiscal adjustment in the U.S. is necessary for smooth correction of imbalances.</li> <li>▪ No attempt is made at calculating the "outer limit" of U.S. NIIP.</li> <li>▪ Analyzes the RER adjustment compatible with a gradual reduction of the CA deficit to 2% of GDP and a NIIP between 40% and 50%.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Based on results from large econometric models assumes that a 1% reduction of the U.S. CA deficit is associated with a 10% depreciation of the RER.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Relative to its value in mid 2004, Mussa calculates that the RER will have to depreciate another 20% to achieve a long term CA deficit of 2%.</li> <li>▪ Discusses policies that will assist the adjustment process: (a) Fiscal consolidation in the U.S. will help keep U.S. demand growing below the pace of output growth. (b) Monetary policy in Europe and Japan should be more expansive.</li> <li>▪ Concludes that "some" international policy cooperation is likely to help the adjustment process.</li> </ul>



Table 6, continuation

<i>AUTHORS</i>	<i>METHODOLOGY</i>	<i>MAIN ASSUMPTIONS</i>	<i>MAIN RESULTS</i>
O'Neill and Hatzious (2004)	<ul style="list-style-type: none"> <li>▪ Update of O'Neill and Hatzious (2002) model.</li> <li>▪ Analyzes the trajectory of NIIP as a percentage of GDP, and finds that path is not sustainable.</li> <li>▪ Introduces the role of productivity gains to original framework.</li> <li>▪ Analyzes the composition of capital flows into the U.S.</li> <li>▪ Incorporates the role of valuation effects.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Estimates a trade balance equation and uses the coefficients to compute the “required” RER depreciation to achieve different CA adjustment targets.</li> <li>▪ Trade equation also includes foreign and U.S. demand growth.</li> </ul>	<ul style="list-style-type: none"> <li>▪ A reduction of the CA deficit to 3% would imply RER depreciation of the order of 21.6% to 23.6%.</li> <li>▪ A reduction of the CA deficit to 2% would imply RER depreciation of the order of 32.1% to 34.1%.</li> <li>▪ An elimination of the CA deficit to 2% would imply RER depreciation of the order of 53% to 55%. (Notice that these figures are significantly higher than those estimated by Obstfeld and Rogoff, 2004).</li> </ul>
Obstfeld and Rogoff (2004)	<ul style="list-style-type: none"> <li>▪ Extension of the Obstfeld-Rogoff (2002) model to a two-country world.</li> <li>▪ Terms of trade are now endogenous.</li> <li>▪ Incorporates the effects of valuation effects of exchange rate changes on NIIP.</li> <li>▪ Exercise assumes an elimination of the CA deficit; that is a reduction in 5% of GDP.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ratio of CA deficit to tradables is 25%; CA deficit is 5% of GDP.</li> <li>▪ Output is exogenously given in both countries.</li> <li>▪ NIIP is 20% of GDP.</li> <li>▪ Home country produces 22% of world tradables.</li> <li>▪ Simulation is done for alternative values of elasticities, and under different assumptions regarding changes in tradables output and military spending.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Assuming constant output, an elimination of the CA deficit implies RER depreciation between 14.7% and 33.6%.</li> <li>▪ If tradables output increases by 20%, the RER depreciation ranges from 9.8% to 22.5%.</li> <li>▪ If there is a permanent increase in military expenditure, the RER depreciation ranges from 16.0% to 36.1%.</li> </ul>

Table 6, continuation

<i>AUTHORS</i>	<i>METHODOLOGY</i>	<i>MAIN ASSUMPTIONS</i>	<i>MAIN RESULTS</i>
Roubini and Setser (2004)	<ul style="list-style-type: none"> <li>▪ Uses macro aggregate model to project the U.S. current account.</li> <li>▪ Imposes exogenous assumptions on RER, and analyzes CA path</li> </ul>	<ul style="list-style-type: none"> <li>▪ First scenario considers a constant RER dollar.</li> <li>▪ Second scenario considers a constant trade deficit at 5% of GDP, and a RER depreciation of approximately 7%.</li> <li>▪ Third scenario considers a faster rate of growth of exports, and substantial (50%) depreciation. This scenario also assumes a gradual elimination (by 2012) of the fiscal deficit.</li> </ul>	<ul style="list-style-type: none"> <li>▪ In first scenario, CA deficit 13% of GDP in 2012.</li> <li>▪ In second scenario, CA deficit 9% of GDP in 2012.</li> <li>▪ In third scenario, the NIIP stabilizes at approximately 55% of GDP, and the CA deficit declines gradually, reaching 4.3% of GDP in 2012.</li> </ul>
Blanchard, Giavazzi, Sa (2005)	<ul style="list-style-type: none"> <li>▪ Uses portfolio model to analyze U.S. current account behavior.</li> <li>▪ Assumes changes in portfolio preferences in world economy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Considers dynamics of adjustment.</li> <li>▪ Considers valuation effects of changes in the U.S. dollar.</li> <li>▪ Simulates model under certain assumptions for values of key parameters (elasticities, portfolio shares and other).</li> <li>▪ The question asked is: what is the required (real) depreciation of the U.S. dollar to eliminate the current account deficit?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Estimates range of required U.S. dollar real depreciation (today). After incorporating the role of valuation effects the range is estimated to be between 40% and 90% real depreciation.</li> </ul>

**Table 7**  
**Current Account Reversals and Sudden Stops**  
**(Selected Studies)**

<i>AUTHOR</i>	<i>DEFINITION</i>	<i>SAMPLE</i>	<i>METHODOLOGY</i>	<i>MAIN RESULTS</i>
<b>A. CURRENT ACCOUNT REVERSALS</b>				
Milesi-Ferretti and Razin (2000)	Reduction in the deficit of at least 3 (5) percentage points of GDP over a period of three years with respect to three years before the event Maximum deficit after the reversal must be no larger than the minimum deficit in the three years preceding the reversal The average deficit must be reduced by at least one-third	105 low-and middle income countries: 1970-1996	Carries out a before and after study for key economic variables Estimates a multivariate Probit model for determinants of the probability of occurrence of CAR Estimates a model for studying GDP and export growth three-year after a CAR occurs	Both domestic and external factors affect the probability of CAR Countries with less appreciated RER, higher investment and openness prior to the reversal tend to grow faster after a CAR. Reversals are not systematically associated with a growth slowdown
Edwards (2002)	Reduction in the deficit of at least 3 percentage points of GDP in one year Reduction in the deficit of at least 3 percentage points of GDP in a three-year period	149 countries: 1970-1997	Estimates a treatment effect model for studying the determinants of CARs and the impact of CARs on economic growth and investment	CAR have a negative effect on aggregate investment; and GDP per capita growth
Edwards (2005b)	Reduction in the deficit of at least 4 percentage points of GDP in one year Reduction in the deficit of at least 6 percentage points of GDP in a three-year period	157 countries: 1970-2001	Analyses empirically the determinants of CAR and its impact on economic growth using a two-step procedure. Distinguishes the impact of CAR on large countries to discuss implications for the recent U.S. current account imbalances.	Confirms previous results that CAR reduces economic growth. The negative impact of CAR on growth has been in the range of 2.1 to 1.4 percentage points in industrial countries (in the first year of the adjustment)

Table 7, continuation

<i>AUTHOR</i>	<i>DEFINITION</i>	<i>SAMPLE</i>	<i>METHODOLOGY</i>	<i>MAIN RESULTS</i>
Debelle and Galati (2005)	Reduction in the deficit of at least 2 percentage points of GDP over three years	21 industrial countries: 1974-2003	Before and after study of 21 episodes of CAR incorporating as control group countries in which current account widened sharply but without reversing in the following years In contrast to similar studies for industrial countries, it analyzes the dynamics of financial account in CAR episodes. It examines the adjustment of the US current account in the late 1980's	Does not find systematic evidence of a relationship between current account adjustments and output growth and exchange rates changes. There is not a clear association between CAR and the behavior of capital flows. The experience of the US in 1987 has notable differences to similar episodes in other industrial countries, particularly in the role played by official flows.
Freund & Warnock (2005)	Deficit exceeded two percent of GDP before the reversal. Reduction in deficit of at least 2 percentage points of GDP over three years (from the minimum to the centered three year average) Maximum deficit in the five year after reversal was not larger than minimum in the three year before. Deficit was reduced by at least one third	High-Income OECD countries: 1980-2003	Estimates a multivariate model for 26 CAR episodes for studying its impact on relative GDP growth, real exchange rate, and the extent to which the deficit is resolved in the three years following the CAR. Incorporates the role for the size of the current trough, the persistence of the deficits, spending composition, openness and the net foreign asset position.	CAR tends to be associated with slow economic growth and a real depreciation. Finds little evidence that persistence of deficits, larger net foreign debt positions. Larger short-term capital flows, or lower openness increase the impact of CAR on growth and exchange rate adjustment.

Table 7, continuation

<i>AUTHOR</i>	<i>DEFINITION</i>	<i>SAMPLE</i>	<i>METHODOLOGY</i>	<i>MAIN RESULTS</i>
Adalet and Eichengreen (2005)	Reduction in deficit of at least 2 (3) percentage points of GDP between the first three and second three years Maximum deficit in second three year must be no larger than minimum deficit in first three years Average deficit must fall by at least a third (as a percentage of GDP) between the first three and second three years.	49 countries: 1880-1988	Measures frequency, magnitude and effects of CAR for different periods. Probit and treatment effects model for estimating the consequences of CAR on relative-to-world GDP growth in a three-year after period (included year of reversal)	Incidence of reversals has been unusually great in recent years. Gold standard era and the years since 1970 differs significantly from one another. CARs were smaller, less frequent and less disruptive in the gold standard period.
Croke, Kamin and Leduc (2005)	Deficit exceeded two percent of GDP before the reversal. Reduction in deficit of at least 2 percentage points of GDP over three years (from the minimum to the centered three year average) Maximum deficit in the five year after reversal was not larger than minimum in the three year before. Deficit was reduced by at least one third	23 episodes of CAR in industrial countries since 1980.	Carries out a before and after study for key economic variables Distinguishes between episodes according to whether GDP growth was increased or reduced.	Shortfall in growth for contraction episodes appears to reflect the playing out of standard cyclical developments rather than a response to CAR. Episodes of contraction were not associated with significant and sustained depreciations of real exchange rates, increases in real interest rates, or declines in real stock prices.

Table 7, continuation

<i>AUTHOR</i>	<i>DEFINITION</i>	<i>SAMPLE</i>	<i>METHODOLOGY</i>	<i>MAIN RESULTS</i>
<b><i>B. SUDDEN STOPS</i></b>				
Calvo, Izquierdo and Mejias (2004)	<p>Year-on-year fall in capital flows lies at least two standard deviations below its sample mean</p> <p>SS phase ends once the annual change in capital flows exceeds one standard deviation below its sample mean.</p> <p>Start of a SS phase is determined by the first time the annual change in capital flows falls one standard deviation below its sample mean</p> <p>Adds a criterion of costly disruption in economic activity, defined as a contraction in output</p>	32 countries, 15 emerging markets and 17 developed economies: 1990-2001	<p>Develops a model for determining the required change in real exchange rate to adjust the current account deficit.</p> <p>Using panel probit and linear probability models studies which factors determine the occurrence of a sudden stop.</p> <p>There is a particular emphasis on the impact of openness and domestic liability dollarization.</p> <p>Model is estimated for all countries and emerging markets.</p>	<p>Large real exchange rate (RER) fluctuations in SS episodes are an emerging market phenomenon.</p> <p>Openness coupled with domestic liability dollarization is key determinants of the probability of SS.</p> <p>Interaction of lower openness and high dollarization increase the negative impact of SS.</p>
Guidotti, Sturzenegger and Villar (2004)	<p>Year-on-year fall in capital account lies at least one standard deviations below its sample mean</p> <p>Capital account contraction exceeds 5 percent of GDP</p> <p>Do not restrict the cases to those in which output falls.</p>	All countries in the world: 1974-2002	<p>Studies incidence and main empirical regularities associated with sudden stops</p> <p>Distinguishes between SS that require or do not require a domestic current account adjustment.</p> <p>Pooled regressions for studying the impact of SS on economic growth.</p> <p>Look at what country characteristics might make a SS less costly.</p>	<p>The impact of SS on economic performance differs dramatically across countries.</p> <p>Open economies and those with floating exchange rate regimes recover fairly quickly, whereas liability dollarization slows the recovery.</p>

Table 7, continuation

<i>AUTHOR</i>	<i>DEFINITION</i>	<i>SAMPLE</i>	<i>METHODOLOGY</i>	<i>MAIN RESULTS</i>
Frankel & Cavallo (2004)	<p>Four different definitions of SS for large and unexpected fall in capital inflows accompanied by output contraction.</p> <p>Year-on-year fall in capital flows lies at least two standard deviations below its sample or decade mean</p> <p>SS ends once the annual change in capital flows exceeds one standard deviation below its sample mean.</p>	141 countries: 1970-2002	<p>Instrumental variables Probit and OLS regressions for studying determinants of SS and currency crises</p> <p>Predicted trade from a gravity equation is used as instruments for country trade openness</p>	Trade openness makes countries less vulnerable to sudden stops and currency crises, and the relationship is event stronger when correcting for the endogeneity of international trade.

**Table 8**  
**Incidence of Current Account Reversals: 1970-2001**  
 (Percentages)

<i>Region</i>	<i>Type of Reversal</i>	
	<i>Reversal 4%</i>	<i>Reversal 2%</i>
Industrial Countries	1.3	3.3
Latin American and Caribbean	5.5	9.4
Asia	8.2	10.7
Africa	8.8	11.9
Middle East	10.4	14.9
Eastern Europe	5.9	7.3
<i>Total</i>	6.5	9.4
Pearson		
Uncorrected chi2 (5)	33.8	33.7
Design-based F(5, 12500)	6.8	6.7
P-value	0.00	0.00

Source: Author's elaboration based on World Development Indicators



**Table 9**  
**Incidence of Current Account Reversals and Sudden Stops: 1970-2001**  
 (Percentages)

<i>Country Group</i>	<i>Reversal 4%</i>	<i>Reversal 2%</i>
<b><u>A. Large Countries</u></b>		
Reversal   Sudden	22.2	28.9
Sudden   Reversal	25.6	21.1
$\chi^2(1)$	43.7	44.4
P-value	0.00	0.00
<b><u>B. Industrial Countries</u></b>		
Reversal   Sudden	9.5	14.3
Sudden   Reversal	25.0	15.8
$\chi^2(1)$	10.3	8.05
P-value	0.00	0.00
<b><u>C. All Countries</u></b>		
Reversal   Sudden	37.7	45.0
Sudden   Reversal	34.9	30.5
$\chi^2(1)$	275.1	274.7
P-value	0.00	0.00

x|y denotes the probability of occurrence of x given the occurrence of y  
 Source: Author's elaboration based on World Development Indicators

**Table 10: Kruskal-Wallis Test**

<i>Country Group</i>	<i>One-year before and reversal year</i>		<i>Three-year before and three year after reversal</i>	
	Reversal 4%	Reversal 2%	Reversal 4%	Reversal 2%
	<b><i>Nominal Exchange Rate</i></b>			
Large Countries	6.58 (0.01)*	9.45 (0.00)*	15.60 (0.00)*	14.79 (0.01)*
Industrial Countries	2.03 (0.15)	2.98 (0.08)*	3.53 (0.06)*	2.38 (0.12)
All Countries	26.17 (0.00)*	44.61 (0.00)*	56.50 (0.00)*	28.20 (0.00)*
	<b><i>Effective real Exchange Rate</i></b>			
Large Countries	5.73 (0.01)*	6.01 (0.01)*	9.56 (0.00)*	5.62 (0.02)*
Industrial Countries	1.56 (0.21)	0.21 (0.65)	0.11 (0.74)	1.90 (0.17)
All Countries	7.26 (0.00)*	13.30 (0.00)*	13.84 (0.00)*	6.36 (0.01)*
	<b><i>Inflation Rate</i></b>			
Large Countries	4.88 (0.03)*	1.29 (0.26)	0.05 (0.82)	14.19 (0.00)*
Industrial Countries	5.45 (0.02)*	1.59 (0.21)	0.29 (0.59)	8.18 (0.00)*
All Countries	18.73 (0.00)*	0.99 (0.32)	5.13 (0.02)*	16.67 (0.00)*
	<b><i>Nominal Interest Rate</i></b>			
Large Countries	14.72 (0.00)*	4.37 (0.04)*	2.83 (0.09)*	3.94 (0.05)*
Industrial Countries	1.03 (0.31)	0.07 (0.80)	6.61 (0.01)*	6.97 (0.00)*
All Countries	36.87 (0.00)*	21.05 (0.00)*	14.94 (0.00)*	15.02 (0.00)*
	<b><i>Per Capita GDP Growth</i></b>			
Large Countries	15.11 (0.00)*	9.87 (0.00)*	2.08 (0.15)	20.74 (0.00)*
Industrial Countries	1.90 (0.17)	0.15 (0.70)	3.26 (0.07)*	2.95 (0.09)
All Countries	13.71 (0.00)*	6.14 (0.01)*	10.37 (0.00)*	19.74 (0.00)*

Null Hypothesis: Data from treatment and control countries have been drawn from the same population.

\* Significant at least at 10%.

**Table 11**  
**Current Account Reversals: Random Effects Probit Model – Unbalanced Panel**

**Large Countries**

Variable	(11.1)	(11.2)	(11.3)	(11.4)
	<u>Reversal 4%</u>		<u>Reversal 2%</u>	
Current-Account deficit to GDP	0.22 (4.46)*	0.22 (4.51)*	0.23 (5.18)*	0.24 (5.20)*
Sudden stop	0.93 (1.97)**	0.98 (2.09)**	0.63 (1.39)	0.65 (1.44)
Sudden stops in region	1.82 (1.47)	1.77 (1.45)	3.08 (2.72)*	3.10 (2.77)*
External debt to GDP	0.01 (1.16)	0.01 (1.19)	0.01 (1.22)	0.01 (1.30)
Domestic credit growth	-0.00 (0.10)	-0.00 (0.15)	-0.00 (0.13)	-0.00 (0.14)
Fiscal deficit to GDP	-0.003 (0.64)	- -	-0.007 (0.21)	- -
Initial GDP per capita	-0.10 (0.60)	-0.09 (0.56)	-0.03 (0.17)	-0.03 (0.18)
Observations	555	595	555	595
Countries	36	37	36	37

Absolute value of z statistics are reported in parentheses; explanatory variables are one-period lagged variable; country-specific dummies are included, but not reported.

\* significant at 1%; \*\* significant at 5%; \*\*\* significant at 10%

**Table 12**  
**Current Account Reversals and Growth**

(Random Effects GLS Estimates)

	(12.1)	(12.2)	(12.3)	(12.4)
	<i><b>Large Countries</b></i>		<i><b>Industrial Countries</b></i>	
Growth gap	0.69 (24.28)*	0.70 (24.33)*	0.77 (20.22)*	0.79 (20.50)*
Change in terms of trade	0.09 (9.35)*	0.10 (9.60)*	0.13 (6.69)*	0.13 (6.66)*
Reversal 4%	-5.25 (9.11)*	-	-3.80 (4.43)*	-
Reversal 2%	-	-4.34 (9.21)*	-	-2.49 (4.45)*
Constant	-0.25 (1.99)**	-0.21 (1.67)***	-0.70 (4.22)*	-0.70 (4.34)*
Observations	842	842	413	413
Countries	41	41	21	21
R-squared	0.45	0.46	0.53	0.53

Absolute value of t statistics are reported in parentheses; country-specific dummies are included, but not reported; \*significant at 1%, \*\*significant at 5%, \*\*\* significant at 10%.

**Table 13**  
**Current Account Reversals, Trade Openness, Capital Mobility, and Growth**

(Random Effects GLS Estimates)

	(13.1)	(13.2)	(13.3)	(13.4)
	<i>Large Countries</i>		<i>Industrial Countries</i>	
Growth gap	0.75 (25.22)*	0.76 (25.48)*	0.75 (25.22)*	0.76 (25.48)*
Change in terms of trade	0.09 (8.31)*	0.09 (8.48)*	0.09 (8.31)*	0.09 (8.48)*
Reversal 4%	-2.88 (1.86)***	- -	-2.88 (1.86)***	- -
Reversal 4% * Trade Openness	-0.01 (0.47)		-0.01 (0.47)	
Reversal 4% * Capital Mobility	-0.05 (1.57)		-0.05 (1.57)	
Reversal 2%	- -	-4.11 (3.20)*	- -	-4.11 (3.20)*
Reversal 2% * Trade Openness		-0.04 (1.31)		-0.04 (1.31)
Reversal 2% * Capital Mobility		-0.01 (0.19)		-0.01 (0.19)
Constant	-0.20 (1.62)	-0.14 (1.16)	-0.20 (1.62)	-0.14 (1.16)
Observations	836	836	413	413
Countries	41	41	21	21
R-squared	0.45	0.45	0.53	0.53

Absolute value of t statistics are reported in parentheses; country-specific dummies are included, but not reported; \*significant at 1%, \*\*significant at 5%, \*\*\* significant at 10%.

**Table 14**  
**Alternative Indicators of Current Account Reversals and Growth**

(Random Effects GLS Estimates)

	(14.1)	(14.2)	(14.3)	(14.4)
	<i><u>Large Countries</u></i>		<i><u>Industrial Countries</u></i>	
Growth gap	0.72 (25.33)*	0.72 (25.36)*	0.78 (20.72)*	0.79 (20.80)*
Change in terms of trade	0.10 (10.30)*	0.11 (10.63)*	0.12 (6.64)*	0.14 (7.31)*
Reversal 14	-4.12 (9.34)*	-	-3.58 (5.46)*	-
Reversal 12	-	-2.85 (9.08)*	-	-1.70 (5.11)*
Constant	-0.21 (1.70)**	-0.09 (0.67)	-0.65 (4.02)*	-0.63 (3.89)*
Observations	846	846	416	416
Countries	41	41	21	21
R-squared	0.47	0.46	0.54	0.54

Absolute value of t statistics are reported in parentheses; country-specific dummies are included, but not reported; \*significant at 1%, \*\*significant at 5%, \*\*\* significant at 10%.

**Appendix**  
**Description of the Data**

<i>Variable</i>	<i>Definition</i>	<i>Source</i>
Current-Account Reversal 4%	Reduction in the current account deficit of at least 4% of GDP in one year and 5% accumulated in three years. Initial balance has to be a deficit	Author's elaboration based on data of current account deficit (World Development Indicators)
Current-Account Reversal 2%	Reduction in the current account deficit of at least 4% of GDP in one year and 5% accumulated in three years. Initial balance has to be a deficit	Author's elaboration based on data of current account deficit (World Development Indicators)
Current-Account Reversal 14	Reduction in the current account deficit of at least 4% of GDP in one year. Initial balance has to be a deficit	Author's elaboration based on data of current account deficit (World Development Indicators)
Current-Account Reversal 12	Reduction in the current account deficit of at least 2% of GDP in one year. Initial balance has to be a deficit	Author's elaboration based on data of current account deficit (World Development Indicators)
Sudden Stop	Reduction of net capital inflows of at least 5% of GDP in one year. The country in question must have received an inflow of capital larger to its region's third quartile during the previous two years prior to the "sudden stop."	Author's elaboration based on data of financial account (World Development Indicators)
Nominal exchange rate	Local currency units per dollar	International Financial Statistics, IMF
Effective real exchange rate	Trade weighted real exchange rate	International Financial Statistics, IMF.
Terms of trade	Change in terms of trade-exports as capacity to import (constant LCU)	World Development Indicators
Reserves to GDP	Net international reserves over GDP	World Development Indicators
Domestic credit growth	Annual growth rate of domestic credit	World Development Indicators

**Appendix**  
**Description of the Data**  
(Continuation)

<i>Variable</i>	<i>Definition</i>	<i>Source</i>
External debt to GDP	Total external debt over GDP	World Development Indicators
Fiscal deficit to GDP	Overall budget to GDP	World Development Indicators
GDP per capita	GDP per capita in 1995 US\$ dollars	World Development Indicators
Index of capital mobility	Index: (low mobility) to 100 (high mobility)	Edwards (2005b)
Trade Openness	Predicted trade from bilateral gravity equation	Author's elaboration



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