Stabilization programs in chronic-inflation countries: Evidence from Latin America

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Abstract

Chronic inflation has affected Latin America for decades, leading to many stabilization attempts. We develop a novel database with 46 stabilization/disinflation programs across 13 Latin American countries between 1970-2020. We classify them as failures, temporary stabilizations, and lasting stabilizations to study their differences. Our main findings are: 1) programs have failed to stabilize very often; 2) the nominal exchange rate acts as a de facto anchor, decelerating faster than inflation; meaning that the real exchange rate appreciates during stabilization; 3) lasting stabilizations begin with stronger fiscal and balance of payments (BoP) positions; 4) lasting stabilizations are preceded by BoP and fiscal adjustments associated with high GDP contractions; 5) lasting stabilizations keep fiscal accounts balanced for several years after programs are launched; 6) stabilizations typically boost economic growth in the short run; 7) the current account of the BoP worsens during the stabilization process; 8) temporary stabilizations are interrupted by domestic currency depreciations; and 9) many stabilization experiences end up in currency crises despite their success in ending chronic inflation.

Keywords: inflation, stabilization programs, Latin America

1. Introduction

High inflation has been a recurring issue in Latin America, giving rise to the concept of *chronic inflation.* These are the cases where prices and contracts durations shorten, and formal and informal indexation mechanisms appear, making inflation persistent. Thus, inflation remains high for several years, even decades (Pazos, 1969; Frenkel, 1979; Heymann & Leijonhufvud, 1995). Stopping chronic inflation typically requires comprehensive policy approaches known as *stabilization programs.* These are sets of coordinated policies, including fiscal, monetary, exchange rate, and income policies aimed at abruptly stopping inflation. Stabilization programs also include significant communication efforts to break inflation expectations and inertia.

The literature on stabilization programs is extensive. Some studies have focused on a small group of well-known successful stabilization programs (e.g., Reinhart & Végh, 1994; Kiguel & Liviatan, 1992a; and Calvo & Végh, 1994 and 1999). By focusing only on successful cases, this approach lacks of a control group of failed programs to compare performance and derive robust results. Other studies identify disinflations episodes based on selection algorithms applied directly to the data, arguing that such a strategy avoids disputes on what constitutes a serious disinflation attempt and when to date the starting point (Bruno & Easterly, 1995; Easterly, 1996; Hamann, 2001; Hamann & Prati, 2002). The problem with this mechanical approach is that it only identifies events with at least some degree of success. If a program does not manage to reduce inflation from the very beginning, it will be overlooked, generating a survivorship bias.

In this paper, we study disinflation programs implemented in chronic-inflation countries from Latin America between 1970 and 2020. To do so, we construct our own database made of 46 programs across 13 countries. Our strategy yields a series of benefits. First, we focus on Latin America because it concentrates most stabilization experiences in the world and countries share characteristics that

allow us to compare them and detect common patterns. Second, to the best of our knowledge, our database is the most extensive in the specialized literature on the region.[1] Third, our database includes more recent disinflation attempts that have not been studied previously. Finally and more importantly, unlike previous work, we cover a broader group of programs with varying degrees of success at stopping chronic inflation, including those that failed from the very beginning. We classify stabilization programs of our database into three types: i) failures; ii) temporary stabilizations; and iii) lasting stabilizations.[2] Including failed attempts enables us to compare lasting stabilizations with a control group, something that only Veiga (1999, 2008) and Hamann & Prati (2002) did previously. Our classification improves on theirs because we do not only include failing attempts but also distinguish between immediate failures and temporary stabilizations. This classification represents better how stabilization attempts unfold and lets us focus on sustainability issues associated with programs that initially succeed at stabilizing. By incorporating failed and temporary stabilizations, we address a significant gap in the literature, as previous studies tended to ignore these cases. Our richer database allows us to contribute to the literature by revisiting previous findings, offering a clear stylization of how a stabilization program works and drawing lessons on what contributes to the likelihood of a successful and sustained disinflation.

Our main findings are: 1) stabilization attempts fail very often; 2) the nominal exchange rate (NER) acts as a *de facto* anchor, decelerating faster than prices, causing a real exchange rate (RER) appreciation, even when it is not the

[1] The studies that follow us in number of cases for the same geographical and temporal window are Veiga (2008), which includes 30 programs in Latin America since 1970, Aisen (2004), that uses a database with 24 programs in Latin America since 1970 and Hamann (2001), who identifies 22 events in Latin America since 1970.

[2] We sometimes treat lasting stabilizations as 'successful' ones. This involves a very limited notion of success, as it ignores the evolution of other relevant variables such as growth, unemployment, and income distribution.

instrumental anchor chosen by the authorities;[3] 3) lasting stabilization typically begin with stronger fiscal and balance of payments (BoP) positions; 4) lasting stabilizations are preceded by BoP and fiscal adjustments; 5) lasting stabilizations maintain fiscal accounts balanced for several years; 6) stabilizations boost economic growth; 7) the current account of the BoP worsens during stabilization; 8) temporary stabilizations are interrupted by NER and RER depreciations; and 9) many lasting stabilization experiences end up in currency, financial and sovereign debt crises. We present a rationale for the mechanisms that may explain these findings, emphasizing the key role of the NER as a nominal anchor and the importance of achieving and maintaining sound macroeconomic fundamentals for stopping chronic inflation.

The article is organized as follows. After this introduction, section 2 explains the database construction and the methodology used to classify the stabilization programs. In section 3, we exploit the database to derive the stylized behavior of a set of key variables for each of the three groups. In section 4, we offer an explanation of how the stabilization process works. In section 5, we analyze the conditions that increase the likelihood of a successful stabilization. In section 6, we discuss the factors influencing the choice of the *instrument* that acts as a *nominal anchor*. We conclude in section 7.

2. Database and classification

We build a database of stabilization programs in Latin America between 1970 and 2020. The period covers the second phase of financial globalization, which allow us to focus on financially open economies. We consider only stabilization

[3] We follow the Latin American convention of defining the NER as the domestic price of a foreign currency (i.e. units of domestic currency per unit of US dollar). Thus, a rise of the NER implies a nominal depreciation and a fall an appreciation. The same applies to the RER.

programs in chronic inflation countries, defined as an average year-over-year (YoY) inflation rate above 20% over the previous two years.

Identifying stabilization programs is challenging, particularly when the goal is to include those that failed. We select cases from prior research and incorporate additional ones identified through a thorough examination of historical documents from the International Monetary Fund (IMF), central bank reports, and press articles. Following this procedure, we identify 46 stabilization programs across 13 countries.[4] Table 1 lists the programs, with sources detailed in Table A.1 in Appendix 1.

[4] We did not include the disinflation experiences in Chile, Colombia, and Paraguay during the 1990s because no comprehensive program was announced, a feature we consider central of a stabilization program.

Table 1: Stabilization programs by country in Latin America, 1970-2020.

Country	Stabilization programs (date and name)	Number of programs
Argentina	**1)** June-1973 (*Pacto Social*); **2)** April-1976; **3)** January-1979 (*Tablita*); **4)** June-1985 (*Plan Austral*); **5)** March-1987; **6)** October-1987; **7)** August-1988 (*Plan Primavera*); **8)** July-1989 (*Plan Bunge-Born*); **9)** January-1990 (*Plan Bonex*); **10)** April-1991 (*Convertibilidad*); **11)** October-2016; **12)** October-2018	12
Bolivia	**13)** November-1982; **14)** November-1983; **15)** April-1984; **16)** February-1985; **17)** September-1985 (*Nueva Política Económica*)	5
Brazil	**18)** February-1983; **19)** March-1986 (*Plan Cruzado*); **20)** June-1987 (*Plan Bresser*); **21)** January-1989 (*Plan Verano*); **22)** March-1990 (*Collor I*); **23)** February-1991 (*Collor II*); **24)** July-1994 (*Plan Real*)	7
Chile	**25)** October-1973; **26)** April-1975 (*Programa de Recuperación Económica*); **27)** February-1978 (*Tablita*)	3
Costa Rica	**28)** May-1982	1
Ecuador	**29)** August-1988 (*Plan Nacional de Emergencia*); **30)** September-1992 (*Plan Macroeconómico de Estabilización*); **31)** March-2000 (*Dolarización*)	3
Guatemala	**32)** June-1986 (*Plan de Reordenamiento Económico y Social de Corto Plazo*)	1
Mexico	**33)** January-1983; **34)** December-1987 (*Pacto de Solidaridad Económica*)	2
Nicaragua	**35)** February-1988; **36)** June-1988; **37)** January-1989; **38)** July-1990 (*Plan Mayorga*); **39)** March-1991 (*Plan Lacayo*)	5
Peru	**40)** August-1985; **41)** August-1990	2
Dominican Rep.	**42)** August-1990	1
Uruguay	**43)** October-1978 (*Tablita*); **44)** December-1990	2
Venezuela	**45)** March-1989 (*El Gran Viraje*); **46)** July-1996 (*Agenda Venezuela*)	2
Total		**46**

Source: own elaboration.

To classify the cases, we evaluate their performance based on the YoY inflation rate of the consumer price index (CPI). As with any economic measure, there may be considerations related to our choice. We opted for YoY instead of monthly rates for two reasons. First, monthly inflation rates exhibit high variability in high inflation regimes making them difficult to interpret over short periods and potentially leading to misleading conclusions. Second, monthly inflation rates are influenced by seasonal factors which could introduce noise into the analysis.

To analyze the factors contributing to the probability of achieving a lasting stabilization, we study several variables: the Nominal Exchange Rate (NER), the Real Exchange Rate (RER), the money supply, the current account of the Balance of Payments (BoP), the trade balance, the stock of international reserves, the net financing flows from bilateral and international institutions, the primary and total fiscal balances, and the Gross Domestic Product (GDP) and its components. Data sources include International Financial Statistics and World Economic Outlook of the IMF, World Development Indicators of the World Bank, CEPALSTAT of the ECLAC, Bank for International Settlements (BIS), and Saint Louis Federal Reserve. We also use the databases of Darvas (2021), Ilzetzki, Reinhart & Rogoff (2021), Kehoe & Nicolini (2022), Laeven & Valencia (2020), Mauro, Romeu, Binder & Zaman (2013) and Monnet & Puy (2019). When necessary, we complement the series with data from national statistical institutes and central banks. Table A.2 in Appendix 1 details the data sources.

We classify the 46 programs into three categories:

(1) *Lasting stabilization*: the program achieves a *significant* and *lasting* disinflation.

(2) *Temporary stabilization*: it achieves a *significant* disinflation in the *short run* that does not *last* over time.

(3) Failure: it does not achieve a significant disinflation even in the *short run.*

We define *short run* as 18 months. This cut-off provides a time frame long enough to assess the degree of disinflation since each plan was launched without being affected by the inflation dynamics before the stabilization. Since we use year-over-year variations, a 12-month window would be misleading, as it would include price increases that occurred at the launching of the program, thus contaminating the measurement with the inflation dynamics prevailing in the pre-stabilization regime. We define a *significant disinflation* combining a *relative* and an *absolute*

criterion. We demand a reduction in the YoY inflation of at least a third (*relative criterion*) and that inflation does not exceed 100% after 18 months (*absolute criterion*), a threshold usually adopted to distinguish high inflation regimes (Fischer, Sahay & Végh, 2002).

We take $\pi^{i}_{t;t+n}$as the variation of the CPI between t and $t+n$; where t is the initial month of the stabilization program in country i. For example, $\pi^{i}_{t+6;t+18}$ is the YoY inflation rate a year and a half after the beginning of the program. We consider that a program has achieved either a *lasting* or *temporary stabilization* if it meets the following three conditions in *t+18*:

(1) The program has not been replaced. The government did not implement another stabilization program within the first 18 months.

(2) Disinflation is significant: the YoY inflation rate is less than 2/3 of the one recorded the month before the beginning of the stabilization program (relative criterion): $\pi^{i}_{t+6;t+18} < 0{,}67\,\pi^{i}_{t-13;t-1}$.[5]

(3) The inflation rate is not '*high*': the annualized inflation rate between months *t+14* and *t+18* is less than 100% (absolute criterion): $\left(1+\pi^{i}_{t+14;t+18}\right)^{3}-1<1$. We use the annualized inflation rate between *t+14* and *t+18* to prevent high monthly rates just after the beginning of the stabilization program from biasing the disinflation performance.

If one of the three criteria is not met, the program is classified as a failure. A program is a *lasting stabilization* if, five years after its implementation, it fulfills the following requirements: [6]

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[5] Our threshold is more demanding than the one proposed by Hamann (2001), who requires a reduction of 1/4 of previous inflation.

[6] We chose a five-year window following previous research. See Veiga (2008) and Calvo & Végh (1994).

(4) The program was not replaced: the government did not implement another stabilization program within the first five years.

(5) The economy has entered a low inflation regime or is moving towards it. This condition is verified if it meets any of the following two requirements:

a) The inflation is low: the average annual inflation is less than 20%: $\frac{\sum_{j=49}^{60} \pi^{i}_{t+j-12;t+j}}{12} < 20\%$.

b) The economy is converging to a low-inflation regime: the average annual inflation is 1/3 lower than the rate evaluated at a year and a half ($\frac{\sum_{j=49}^{60} \pi^{i}_{t+j-12;t+j}}{12} < 0{,}67\, \pi^{i}_{t+6;t+18}$), and inflation gets under 20% within three years after the fifth.

Condition 5.a. identifies as *lasting stabilizations* those programs that managed to bring inflation below the threshold that we use to define a chronic inflation regime. Condition 5.b. makes Uruguay-1990 a *lasting stabilization* because, despite having an average annual inflation of 43% at the fifth year after stabilization (1995), the country continued with a monotonic disinflation, moving below 20% in 1997 and under 5% by 1999.

Programs meeting requirements 1-3 but failing to meet any of 4-5 are classified as *temporary stabilizations*. Table 2 lists the programs by category. [7]

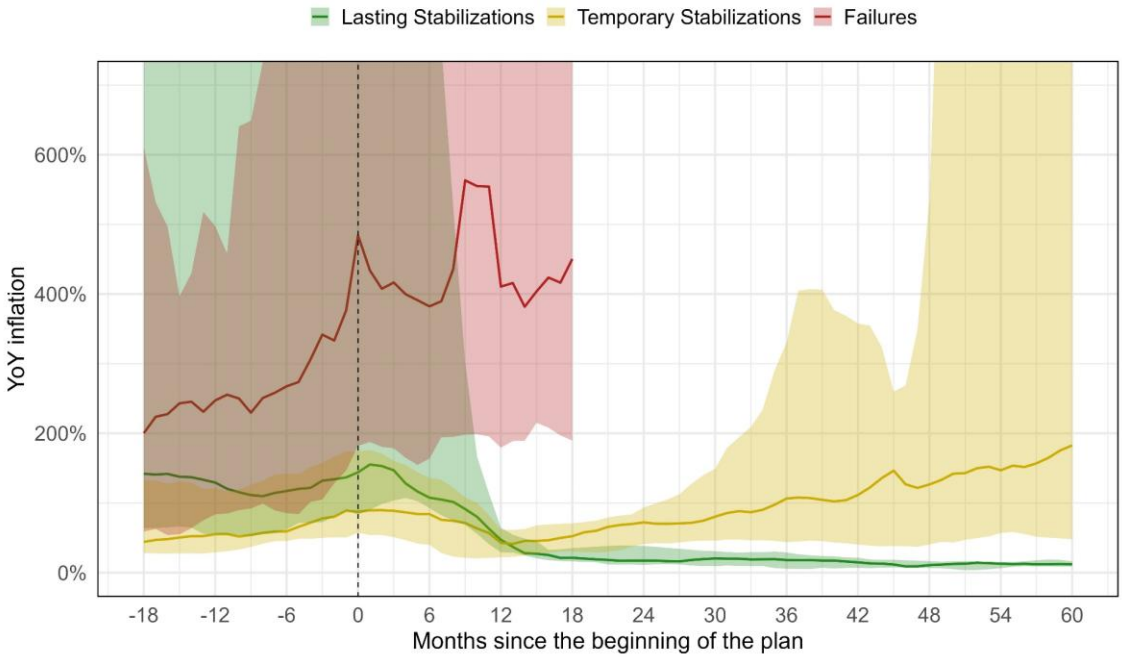
[7]Our criteria, like any other, involve some degree of arbitrariness. However, the main results of our study are robust to changes in these criteria. We conducted eight robustness checks on our classification. These included: (1) changing the t+18 cut-off to t+20; (2) changing it to t+16; (3) adjusting the inflation threshold from 100% to 200%; (4) lowering it to 70%; (5) modifying the threshold for 'lasting stabilization' from 20% to 25%; and assessing long-term performance at (6) the sixth year, (7) the seventh year, and (8) the fourth year. These alternative criteria did not affect the

Table 2: Stabilization programs according to their degree of success.

Group	**Programs**
Lasting stabilizations	Argentina-1991; Bolivia-1985; Brazil-1994; Chile-1978; Costa Rica-1982; Ecuador-2000; Mexico-1987; Nicaragua-1991; Peru-1990; Dominican Rep.-1990; Uruguay-1990; Venezuela-1996
Temporary stabilizations	Argentina-1973; Argentina-1979; Argentina-1985; Argentina-2016; Ecuador-1992; Mexico-1983; Peru-1985; Guatemala-1986
Failures	Argentina-1976; Argentina-1987; Argentina-1987; Argentina-1988; Argentina-1989; Argentina-1990; Argentina-2018; Bolivia-1982; Bolivia-1983; Bolivia-1984; Bolivia-1985; Brazil-1983; Brazil-1986; Brazil-1987; Brazil-1989; Brazil-1990; Brazil-1991; Chile-1973; Chile-1975; Ecuador-1988; Nicaragua-1988; Nicaragua-1988; Nicaragua-1989; Nicaragua-1990; Uruguay-1978; Venezuela-1989

Source: own elaboration.

Figure 1: Evolution of annual inflation rate according to the degree of success of the stabilization programs. In %.



Source: own elaboration (see Table A.2). The lines represent medians and the colored areas show the 25th to 75th percentiles.

stylized facts or conclusions of our study. The robustness check results are available upon request.

Figure 1 shows the YoY inflation rate of the different categories from a year and a half before to the fifth year, and zero corresponds to the month of implementation. The lines in the figure show, as will be repeated throughout the document, the median value for the stabilization programs of each category, while the colored areas indicate the 25^{th} to 75^{th} percentiles, showing group heterogeneity.[8] Failures are no longer analyzed after the 18^{th} month, as they are generally replaced by another program that is also evaluated and classified.

The figure shows the stylized disinflation performance of each group. Failing programs only manage to lower inflation for a few months; then inflation accelerates again to even higher levels than before. Temporary stabilizations lower inflation for about a year, from a median rate of 87% to 43%, but it rebounds afterward. Lasting stabilization shows a strong initial slowdown; from a median of 144% to 47% in the first year. Disinflation continues, gradually moving the economy to a low-inflation regime.

3. Stylized facts

This section outlines seven empirical observations regarding the stylized behavior of key macroeconomic variables in stabilization programs and the initial conditions that influence the likelihood of achieving a lasting stabilization. We present the findings and relate them to the existing literature but refrain from interpreting them, which will be addressed in section 4.

3.1 Failure is frequent

Only 12 of 46 cases (26%) in our database achieve a long-lasting disinflation, a lower success rate than that found in previous research like Hamann (2001), Hamann & Prati (2002), and Veiga (2008), in which success rates ranged from

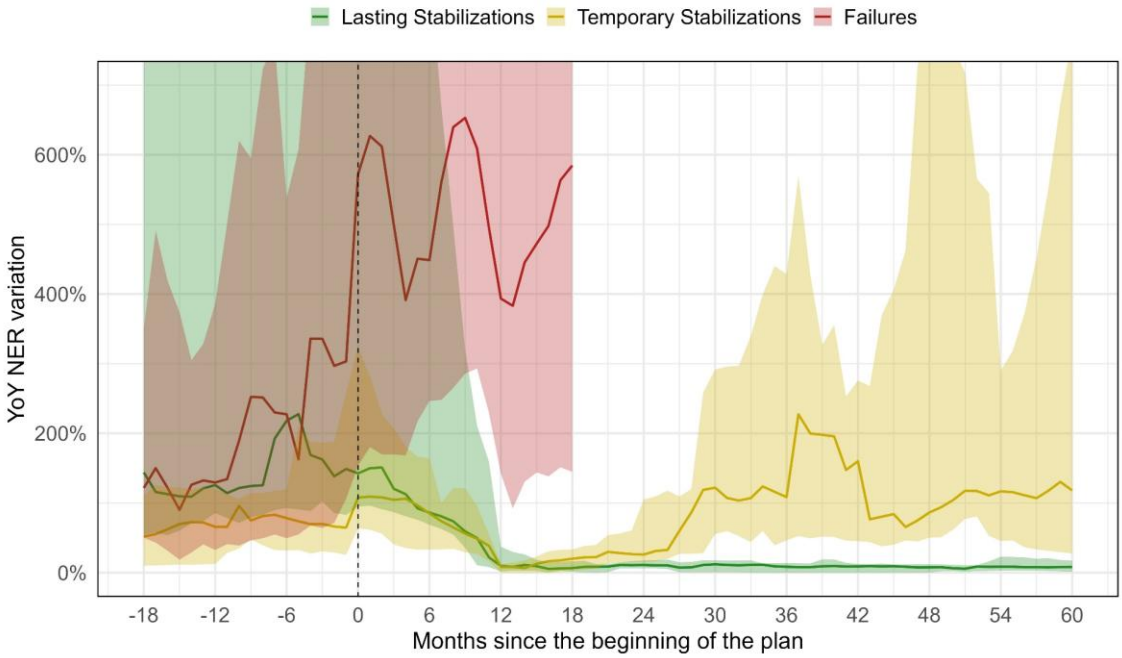
[8] We use the medians because extreme episodes, like hyperinflations, skew the averages, making them a less representative statistic.

21% to 67%. The remaining 74% either achieve a temporary stabilization or fail, highlighting the complexities of breaking a chronic inflation process.

3.2 Stabilization of the nominal exchange rate

Figure 2 show that, in both temporary and lasting stabilizations, the NER depreciation rate slows down sharply after the program starts, dropping from an average annual rate of 113% in *t-1* to 8% in *t+13*. For temporary stabilizations, the median NER starts depreciating again after a year, with discrete jumps after two years. In lasting stabilizations, the NER variation rate remains low even five years after the program's beginning, with some cases maintaining the same fixed exchange rate, such as Argentina-1991 and Ecuador-2000. In failed stabilization attempts, on the contrary, NER's stabilization lasts only four months and the accelerates again.

Figure 2: evolution of the NER according to degree of success. In %.



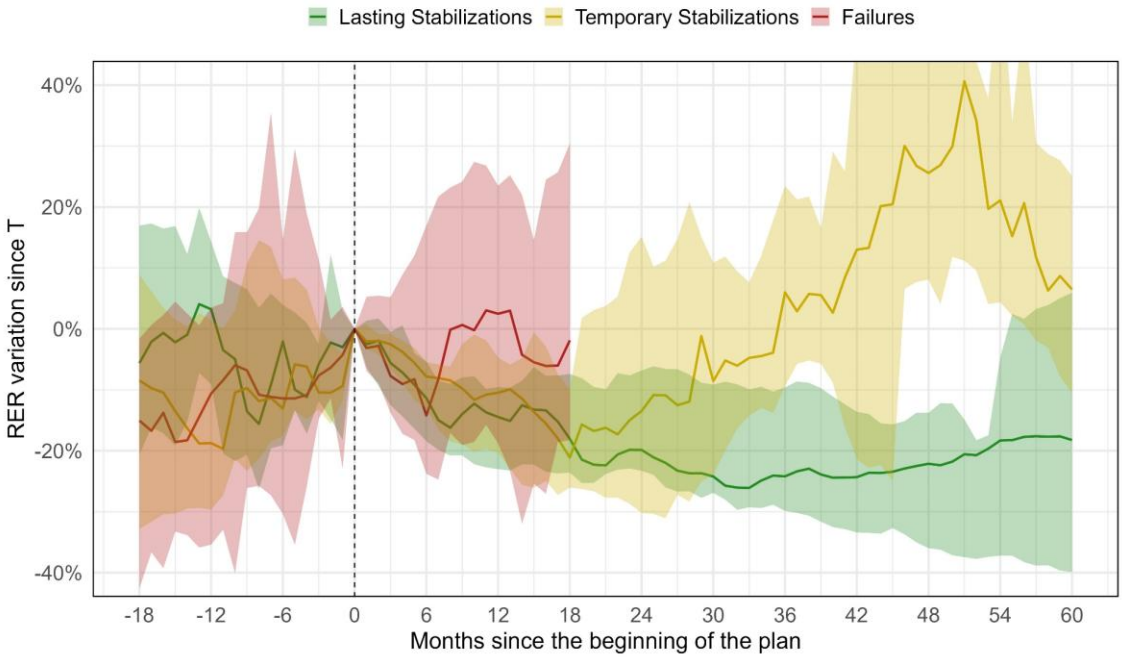
Source: own elaboration (see Table A.2). The lines represent medians, and the colored areas show the 25th to 75th percentiles.

3.3. Real exchange rate appreciation

Figure 3 illustrates the rate of variation of the RER compared to its level at the beginning of the program; a decline indicates real appreciation. Prior to the program, the RER depreciates across all three groups, starting on average 8% higher than the previous semester.

All programs begin with a real appreciation trend. In failed programs, the real appreciation halts between the sixth and eighth month, when the RER rises 16%. In temporary and lasting stabilizations real appreciation continues, with declines in the RER of 21% and 18%, respectively, during the first 18 months. Afterward, the trajectories diverge. Temporary stabilizations exhibit depreciations that result in higher RER levels than those prevailing at the program's launch; by *t+51*, their median RER is 41% higher than its starting level. In contrast, the RER in lasting stabilizations stabilizes around a level 20% below the initial one, indicating that sustained real appreciations are a distinguishing feature of lasting disinflations.

Figure 3: Evolution of the RER according to degree of success. As a percentage of deviation from the value in t.



Source: own elaboration (see Table A.2). When data on the multiple RER was not available, the bilateral RER with the US dollar was constructed. The lines represent medians and the colored areas show the 25^{th} to 75^{th} percentile.

The fact that the NER always lags behind the CPI, making domestic products more expensive when measured in foreign currency, is a stylized behavior found in the existing literature (Kiguel & Liviatan, 1992a; Calvo & Végh, 1994; Reinhart & Végh, 1994; Veiga, 2008). This behavior is observed not only in programs that explicitly use the NER as the instrumental anchor but also in those that adopt other instrumental anchors. Within this group, we find programs that primarily relied on monetary policy (e.g., the money supply or interest rate), although some have used other complementary anchors like inflation targets (Argentina-2016), non-explicit exchange rate pegs (Bolivia-1985) or fiscal adjustments without a transparent nominal anchor (Brazil-1983).[9] As this group is more heterogenous,

[9] Traditionally, the literature distinguishes between Exchange Rate-Based Stabilizations and Money-Based Stabilizations. Easterly (1996) argues that the latter are much more difficult to date. Uribe (1999) notes that pure money-based stabilizations are rare, adding a third category (monetary-based with initial reliquefication). Hamann (2001)

we use the label 'other anchors', following the precedent set by recent literature (e.g., Hamman, 2001).[10]

Based on information from the 46 stabilization programs of our sample, Table 3 compares the degree of RER appreciation between the two groups at months 6, 12, and 60. At *t+6*, exchange rate-based programs show a median RER decline of 13%, while programs using 'other anchors' experience a similar decrease of 9%. Annual inflation for both groups increases in the first 6 months.[11] For the 12-month cut, failed programs are excluded. Within this smaller sample, 15 (75%) are exchange rate-based programs and 5 (25%) use 'other anchors'. Both groups maintain a median RER appreciation similar to that of the previous cut. At 60 months, only lasting stabilizations remain. There are 8 cases with exchange rate anchor and 4 with other anchors. The annual inflation rate is 5% of what it was in the first group and 12% in the second. Both have experienced additional real appreciation; exchange rate-based programs somewhat higher than the other group: -29% and -18%, respectively.

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proposes that the best comparison for the exchange rate-based stabilizations is all non-exchange rate-based stabilizations. We follow this classification.

[10] This group includes Argentina-1976, Argentina-1990, Argentina-2016, Argentina-2018, Bolivia-1985, Brazil-1983, Brazil-1987, Brazil-1990, Brazil-1991, Chile-1973, Chile-1975, Costa Rica-1982, Nicaragua-1988, Nicaragua-1989, Peru-1990, Dominican Republic-1990, and Venezuela-1989. We explain them in more detail in Section 4.

[11] The disinflation variable measures YoY inflation relative to that at the time of the program's launch. A value of 1 indicates that both are equal, implying no disinflation. A value of 0.5 indicates that inflation has halved compared to its initial level. Conversely, a value above 1 indicates that inflation has accelerated.

Table 3: Disinflation and exchange rate appreciation. Differences according to instrumental anchor

		Exchange rate anchor	Other anchors
6 months	**# of cases**	29	17
	Δ RER (median)	-13%	-9%
	Disinflation	1.07	1.09
12 months	**# of cases**	15	5
	Δ RER (median)	-12%	-8%
	Disinflation	0.36	0.50
60 months	**# of cases**	8	4
	Δ RER (median)	-29%	-18%
	Disinflation	0.05	0.12

Source: own elaboration (see Table A.2). When data on the multiple RER was not available, the bilateral RER with the US dollar was constructed. The disinflation variable was constructed as $\pi^{i}_{t+p-12;t+p}/\pi^{i}_{t-13;t-1}$ where p is the number of months indicated in each row. The variation of the RER is measured in relation to that of t, reporting the median of each group.

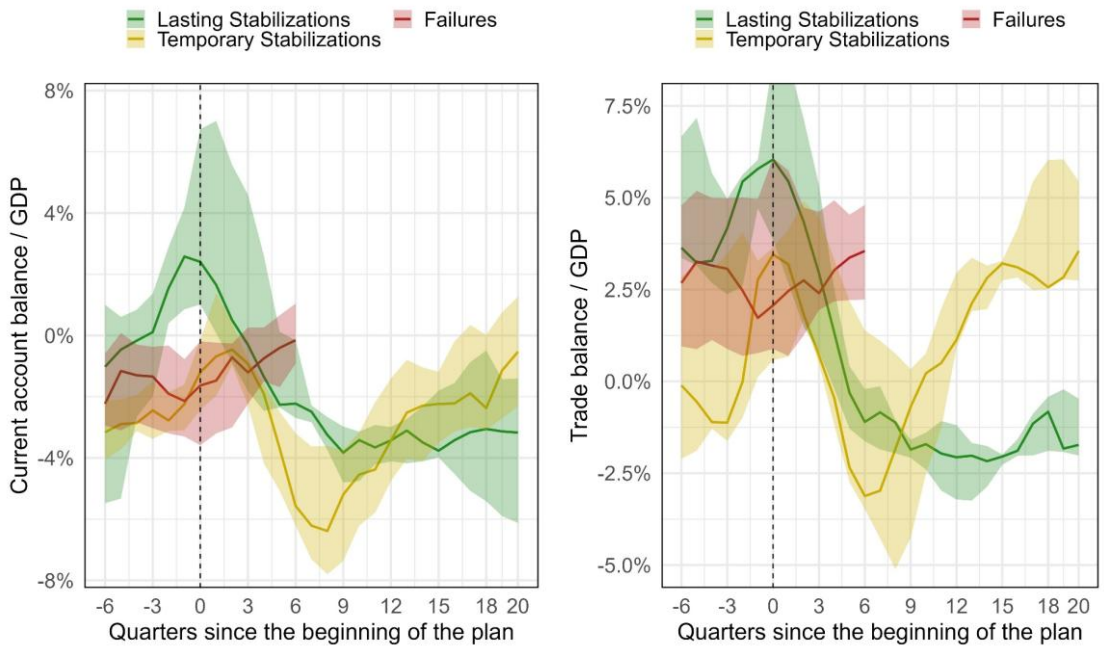
This section reports an important finding. The fact that in all cases the NER decelerates before and faster than overall inflation implies that it acts as a *de facto* nominal anchor. This result holds for cases of failures, temporary and lasting stabilizations and regardless of the instrumental anchor chosen (see Figure A.2 in the Appendix 1).

3.4 The current account and trade balance

Temporary and lasting stabilizations experience a deterioration in the current account of the BoP during the first two years, as seen in Figure 4 (a). Previous research have identified this fact (e.g., Kiguel & Liviatan, 1992a; Calvo & Végh, 1994; Reinhart & Végh, 1999; and Veiga, 2008). This is strongly linked to the trade balance performance (Figure 4 (b) and Figure A.1 in Appendix 1).

Figure 4: Evolution of external accounts as a percentage of GDP according to degree of success. As % of GDP.

(a) Current account (b) Trade balance



Source: own elaboration (see Table A.2). The data corresponds to the sum of the current account or trade balance as a percentage of GDP for the last 4 quarters to avoid seasonality. The lines represent medians, and the colored areas show the 25th to 75th percentiles.

However, lasting stabilizations begin with stronger external positions, featuring a median current account surplus of 2.4% of GDP and a trade surplus of 6% of GDP, compared to temporary stabilizations, which start with a current account deficit of -1.2 % of GDP and a trade surplus of 3.5% of GDP. In temporary stabilizations, the current account deteriorates until the second year, when it begins to revert. This is roughly the same time when the NER and the RER start to depreciate and inflation accelerates (Figures 1 to 3). In contrast, lasting stabilizations experience a sustained deterioration of the current account that does not revert. During the first two years, the magnitude of the deterioration is similar for both groups, with variations of 5 to 6 percentage points of GDP. However, lasting stabilizations never exceed a median deficit of 4% of GDP due to their healthier initial position, whereas temporary stabilizations reach median deficits

exceeding 6% of GDP. Failed stabilizations begin with even worse external accounts, characterized by a median current account deficit of 1.6% of GDP and a median trade surplus of 2.7% of GDP.

3.5 Fiscal balance

Fiscal behavior varies significantly across categories. Lasting stabilizations start with a median primary balance in equilibrium (-0.1% of GDP) and move to a surplus of 1.2% of GDP within a year.[12] Among the 12 cases in this group, five of them begin with a primary surplus and six achieve it in the first year.[13]

Temporary stabilizations start from weaker fiscal positions, with a median primary deficit of -2.4% of GDP, while failed programs begin with even a larger deficit (-3.4% of GDP). The colored areas show no overlap between failed cases and lasting stabilizations, and minimal overlap between the latter and temporary stabilizations. This suggests that the higher the primary balance, the greater the probability of success. This pattern also holds for the total fiscal balance.

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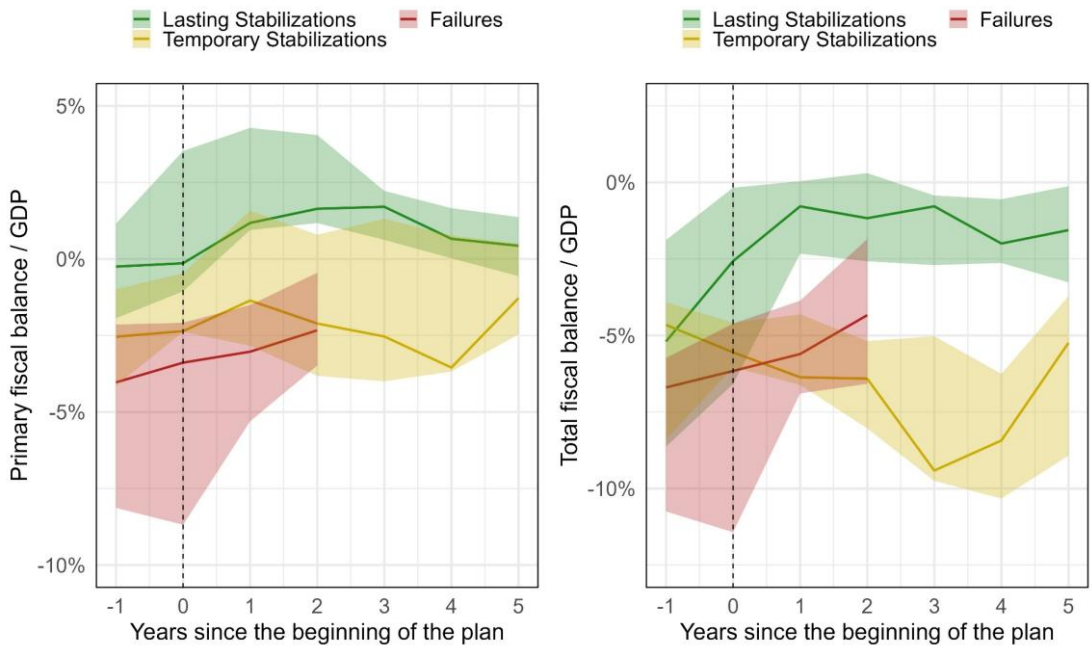
[12] For fiscal data, the databases of Kehoe & Nicolini (2022) and Mauro, Romeu, Binder, & Zaman (2013) were used. When both bases had missing data, the IMF's World Economic Outlook was used . The values expressed do not correspond to those of the calendar year of the program, but rather a linear combination as done with the current account balance.

[13] We omitted Nicaragua-1991 because there is no information for the entire time-span. However, it reduced its deficit from 15% of GDP in the year before stabilization to 2% in the starting year.

Figure 5: Evolution of the fiscal balance in percentage of GDP according to the degree of success. As % of GDP.

(a) Primary balance (b) Total balance



Source: own elaboration (see Table A.2). The lines represent medians, and the colored areas show the 25^{th} to 75^{th} percentiles.

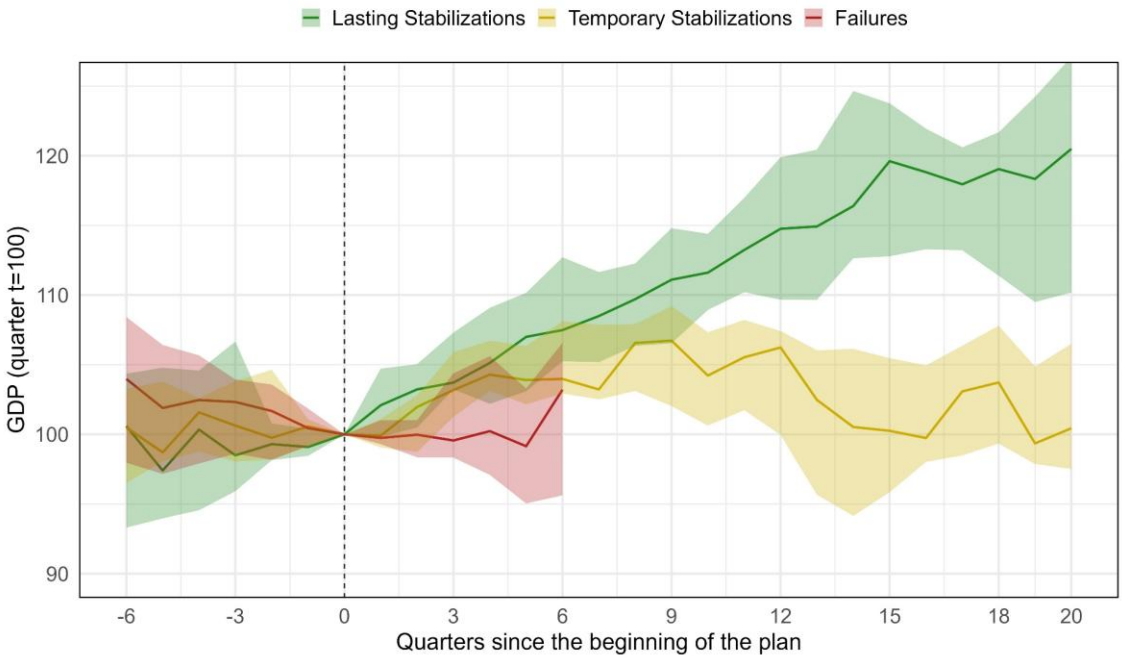
Figures 5 (a) and (b) show the evolution of the primary and total balance. The fiscal robustness of lasting stabilizations is not restricted to the first year of the program but tends to improve in the following years. Temporary stabilizations, on the other hand, see a continuous deterioration in the total fiscal balance but not in the primary balance, implying that the increase in debt interest payments is bigger than the reduction in the primary deficit, worsening the overall situation. Failed stabilizations tend to improve their fiscal position after the beginning of the program, closing the gap with the lasting stabilizations, similar to what happens with their current account balances.

3.6 Fiscal and external adjustment, stabilization, and activity level

Economic performance before the program does not differ significantly between the three groups, with economic activity being stagnant or in recession. The median GDP in the previous year drops 0.3% for lasting stabilizations, 1.6% for temporary stabilizations, and 2.4% for failures.

Post-implementation, GDP trajectories diverge. Countries with lasting stabilizations grow at a sustained median rate of 3.8% in the following five years, while countries with temporary stabilizations initially experience a median growth rate of 4.3%, but stagnate and decline after the tenth quarter. This occurs by the same time that the RER depreciates and inflation accelerates, as previously described. After five years, these experiences reach a GDP level similar to the one at the program's start. Lastly, failed stabilizations remain stagnant or even in a slight recession after the program's announcement.

Figure 6: Evolution of GDP according to degree of success. The quarter of implementation is indexed to 100.



Source: own elaboration (see Table A.2). The lines represent medians, and the colored areas show the 25^{th} to 75^{th} percentiles.

Figure 6 suggests substantial immediate growth gains from stabilization, which may seem counterintuitive as the disinflation experiences in developed countries have typically led to short-term recessions, as seen in the US and UK in the early 1980s. However, evidence from emerging markets' experience differ. The expansive effects of exchange-rate-based stabilizations is a well-stablished finding in the literature, highlighted by Kiguel & Liviatan (1992a), Reinhart & Végh (1994), and Calvo & Végh (1999), among others. This literature shows that, conversely, money-based stabilizations tend to result in initial GDP contractions. More recent studies, such as those by Gould (1996), Easterly (1996), Hamann (2001), and Hamann & Prati (2002), have provided evidence that stabilization always leads to short-term economic growth.

Although stabilizations are expansionary in our sample, governments frequently struggle to find political support to launch a stabilization program. This challenge may be linked to the widely held belief that stabilization causes short-term pain before delivering long-term gains. This belief and the lack of political support may be associated with the evidence presented in Table 4, which shows that successful stabilizations are typically preceded by painful macroeconomic adjustments. The table reports three indicators evaluated during the five years before the implementation of programs that led to lasting stabilizations: 1) GDP contraction (between the maximum and minimum in the business cycle previous to the launch); 2) External adjustment (variation in GDP percentage points of the BoP current account between the strongest position —the lowest deficit or the highest surplus— and the weakest in the business cycle previous to the

launch); and 3) Fiscal adjustment (measured in the same way as the previous indicator).[14]

Table 4: Previous adjustments of successful stabilization programs.

	Average	Median	Maximum	Minimum
1) GDP fall	-10.3%	-7.3%	-25.5%	-0.4%
2) External adjustment	6.5%	4.9%	16.1%	0.7%
3) Fiscal adjustment	6.4%	4.2%	16.9%	0.4%

Source: own elaboration (see Table A.2). The GDP adjustment is shown as a percentage change. Fiscal and external adjustments are measured in GDP points. See details in Appendix 2.

On average (median), GDP drops 10% (7.3%) before launching a lasting stabilization. The contraction in economic activity is consistent with sizable adjustments in fiscal and external imbalances. Countries that achieve lasting stabilizations undergo fiscal and external adjustments averaging over 6 percentage points of GDP.

3.7 Stabilization and crisis

Previous research has widely documented a relationship between stabilizations and currency and financial crises (e.g., Reinhart & Végh, 1999; Calvo & Végh, 1999; Frenkel, 2020; Kiguel & Liviatan, 1992a; Obstfeld & Rogoff, 1995; Frenkel & Rapetti, 2009). This finding may be linked to some stylized behaviors described above. As shown, in temporary stabilizations, NER and RER depreciations broadly coincide with the (re)acceleration of inflations, GDP contractions and the reversal of current account deficits. Table 5 lists the temporary stabilizations of our database that suffer currency crises, according to the Laeven & Valencia (2020) criteria.[15] When a program has gone through a currency crisis, we also

[14] Appendix 2 details the calculation methodology and the values for each program.

[15] They authors built a database of three types of crises: currency, banking, and sovereign debt. They define a currency crisis as an episode in which the exchange rate shows a

include —if applicable— the date on which it suffered a debt and/or banking crisis. Six of the eight cases of temporary stabilizations from our database suffered currency approximately less than three years after the program was implemented.[16] In four cases, there was also a sovereign debt crisis and in three of them also a bank debt crisis, constituting a triple-crisis. Crises are also reflected in significant GDP contractions, as shown in the last column

Table 5: Temporary stabilizations and crises.

Country	Program	Currency crisis	Banking crisis	Sovereign debt crisis	GDP variation
Argentina	Jun-1973	Mar-1975	-	-	-1%
Argentina	Jan-1979	Apr-1981	Mar-1980	1982	-7%
Argentina	Jun-1985	May-1987	Dec-1989	Dec-1989	-1%
Argentina	Oct-2016	Feb-2018	-	Aug-2019	-6%
Ecuador	Sep-1992	Jan-1999	Aug-1998	Sep-1999	-2%
Peru	Aug-1985	Jan-1988	-	-	-21%

Source: own elaboration based on Laeven & Valencia (2020), Monnet & Puy (2019), and national sources. Only cases with a subsequent currency crisis are included. The GDP variation is measured year-over-year for the fourth quarter since the start of the crisis.

Crises are not only associated with temporary stabilizations. Table 6 shows that six out of the twelve lasting stabilizations eventually experienced currency crises. The average time between the launch of the program and the crisis is greater than that observed for temporary stabilizations (more than seven years compared to less than three). Some of them occured simultaneously with a banking crisis

depreciation of at least 30% year-over-year that is at least 10 p.p. greater than the depreciation rate of the previous year. See the article for details.

[16] The crisis associated with Argentina-2016 does not appear in the database because it occurred after the period studied by the authors. By applying their criteria, we detected a currency crisis in February 2018 and a debt crisis the following year.

(Mexico-1987), while other were triple crisis (Argentina-1991, Chile-1978, and Uruguay-1990).[17]

Table 6: Lasting stabilizations and crises.

Country	Program	Currency crisis	Banking crisis	Sovereign debt crisis	GDP variation
Argentina	Apr-1991	Jan-2002	Nov-2001	Nov-2001	8%
Brazil	Jul-1994	Jan-1999	-	-	4%
Chile	Feb-1978	Sep-1982	Nov-1981	Nov-1983	-1%
Mexico	Dec-1987	Jan-1995	Dec-1994	-	1%
Uruguay	Dec-1990	Jun-2002	Jan-2002	Sep-2002	-3%
Venezuela	Jul-1996	Feb-2002	-	-	-27%

Source: own elaboration based on Laeven & Valencia (2020), Monnet & Puy (2019), and national sources. Only cases with a subsequent currency crisis are included. The GDP variation is measured year-over-year for the fourth quarter since the start of the crisis.

4. A rationale for the stylized facts

In this section, we provide an explanation of the causal mechanisms behind the stylized facts presented in the previous section. Based on our analysis of the evidence we emphasize the significant role of the NER: if a country with chronic inflation manages to stabilize the NER over a relevant period of time, it also manages to stop inflation.[18]

By definition, in a disinflation process, the rate of price variation decelerates, including that of one specific price: the NER. One could argue that the

[17] The crises that followed many lasting stabilizations make the adjective successful questionable and force us to re-emphasize that our classification only focus on inflation.

[18] We do not imply that authorities always use the NER directly as a stabilization tool (what we refer to as the *instrumental anchor*). In uncertain environments, policymakers may not even anticipate the relevance of this mechanism. Rather, we argue that in all cases inflation reduction is highly influenced by a decline in NER variation, whether directly managed by authorities or indirectly influenced by other factors such as monetary policy.

stabilization of the NER during disinflation is a consequence rather than the cause. A simultaneous disinflation and NER stabilization may be driven by the influence of another nominal anchor, such as the money supply or some other monetary policy instrument. However, not all prices decelerate at the same pace during the disinflation process; some do so faster (or slower) than others. Thus, this hypothesis does not predict whether specific prices, such as the NER, should decelerate faster or slower than others.

In contrast, our study identifies a distinctive pattern of price deceleration along with a specific evolution of relative prices. As shown in section 3.3, we find that, *in all cases*, the NER decelerates before and faster than the overall price level (as measured by the CPI), leading to an increase in the relative price of foreign currency; i.e., a decline in the RER. This behavior is observed not only in exchange rate-based programs but also in programs using other *instrumental* nominal anchors, like the money supply. This finding rules out the possibility that the NER deceleration is merely part of the general disinflation process. Just as an anchor slows a ship by lagging behind it, the NER acts as a *de facto* nominal anchor, decelerating the pace of prices by stopping before and more quickly than they do.

The NER is stabilized in both programs that employ it explicitly as their *instrumental* nominal anchor and also in those that select another policy variable for this role. In our database there have been different strategies of exchange rate anchoring, such as conventional pegs (e.g., Nicaragua-1991), currency boards (e.g., Argentina-1991), narrow bands for a floating exchange rate (e.g., Mexico-1987), ex-ante announced crawling pegs (e.g., Chile-1978) or even dollarization (e.g., Ecuador-2000). The group that uses other instrumental nominal anchors includes programs with a pre-announced evolution of a monetary aggregate (e.g., Argentina-2018), other forms of money supply management without a specific numerical target (e.g., Peru-1990), programs that reduce liquidity through asset immobilizations (e.g., Argentina-1990, Brazil-1990 and Nicaragua-1988),

inflation-targeting programs in which the main instrument is the interest rate (e.g., Argentina-2016) and others relaying mainly on fiscal adjustments without an explicit nominal anchor (e.g., Brazil-1983). Within the second group, the strategy involves reducing liquidity in the economy and increasing the yield of domestic currency assets. The rise in domestic interest rates leads to higher demand for these assets, which in turn reduce the demand for foreign currency assets. This process slows the variation of the NER, stabilizing it, or even lowering its value.

Whether directly through some kind of pegging or indirectly via the effect of monetary policy, the stabilization of the NER impacts on prices through two main channels. First, being the price of a foreign currency, it directly affects the prices of tradable goods and services in small open economies, slowing tradable inflation.[19] Second, in chronic inflation economies, agents adapt to living with inflation and understand that the NER anticipates the dynamics of other prices. For this reason, if the NER is credibly stabilized —meaning that people believe the domestic currency will not experience a sharp depreciation within a relevant timeframe—, non-tradable inflation will also slow.[20]

Stabilizations do not generate homogeneous dynamics for all prices, as non-tradables and wages decelerate more slowly. Given the existence of staggered contracts, pre-existing price agreements and because expectations have a relevant adaptive component, wages and other contracts take longer to adjust to the NER

[19] This channel has been analyzed in both the theoretical and empirical literature. Evidence shows that the influence of the NER on the level and variation of tradable prices is very significant. See, for example, Burstein, Eichenbaum, & Rebelo (2005) and Cavallo, Neiman & Rigobon (2019).

[20] For the role of NER in the process of inflation expectations in small open economies see Dornbusch (1976), Frenkel (1977) and Heymann & Leijonhufvud (1995), among others.

pace than tradable prices. This results in an appreciation of the RER, as observed in section 3.3.

As the RER is the relative price of tradables to non-tradables and the nominal wage is the most significant non-tradable price in the economy, the real appreciation results in an improvement in real wages, thereby increasing the purchasing power of workers and boosting private consumption.[21] This mechanism is crucial for understanding how stabilizations can be expansionary, as shown in Figure 6.[22]

Other mechanisms may contribute to the expansive effect of stabilizations. One is the wealth effect generated by the decrease in the inflation tax, both for families and firms.[23] Another one is the reduction in transaction costs associated with high inflation regimes. A third one is the real interest rate decrease that may happen in exchange rate-based programs if the nominal interest rate decreases as much as the NER depreciation expectations. Finally, the disinflation also promotes bank credit, easing financial constraints on families and firms. These aspects of stabilization can help explain both the increase in consumption and investment.[24] Although we lack data to compare the relative relevance of these channels, we provide suggestive evidence of the increase in credit to the non-financial private sector, the fall of the inflation tax, and the greater holdings of money in real terms in Figures A.4 (a), A.4 (b) and A.4 (c) in Appendix 1.

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[21] The lack data on nominal wages prevented us from documenting this phenomenon directly. However, we observe an increase in consumption as a proportion of GDP, see Figure A.3 in Appendix 1.

[22] This is related to the recessive (expansive) nature of depreciations (appreciations), which has analytically been studied by Krugman & Taylor (1978) and empirically documented by Bebczuk, Galindo & Panizza (2010), among others.

[23] For this to generate an expansionary impulse in the economy, private consumption and investment must have a higher multiplier effect than the public spending that was financed with the inflation tax.

[24] Some of these channels were studied by Rodríguez (1982), Calvo & Végh (1999), De Gregorio, Guidotti & Végh (1998) and Uribe (2000).

Due to both substitution and income effects, the combination of RER appreciation and domestic demand expansion leads to a significant increase in imports, deteriorating the trade and current account balances, as observed in section 3.4. Given that stabilization requires a stable NER (or a lower depreciation rate), the current account deficit must be financed through external debt and/or a loss of international reserves. This process eventually raises concerns regarding the sustainability of the stabilization, increasing devaluation expectations, which may end up triggering capital outflows (Reinhart & Végh, 1999; Frenkel, 1983; Aromí, 2021). Therefore, stabilization is achieved at the cost of increasing the probability of a future currency depreciation.

Whether an exchange rate devaluation occurs a few months after the program or several years later makes a significant difference. Early devaluation/depreciation leads to program failure, with inflation likely to accelerate again. In contrast, if devaluation is delayed, the economy may have succeeded in eradicating inflation inertia and consolidating a low-inflation regime —characterized by infrequently price reviews, the absence of indexed contracts and the prevalence of low inflation expectations—. In this scenario, a currency depreciation may result in only a short-lived price spike, as observed in lasting stabilizations that subsequently experienced a currency crisis (e.g., Brazil-1994).

Currency crises in lasting stabilizations may also lead to banking and sovereign debt crises. Prolonged NER stability may encourage contracts in foreign currency, which can harm the balance sheet of debtors when a currency crisis occurs, leading to widespread insolvency (Krugman, 1999). If this impacts bank debtors, it can trigger a banking crisis. Sovereign debt crises can arise when governments are indebted in foreign currency, when they bail out firms and banks with foreign debt to avoid massive bankruptcies, or a combination of both factors. Such balance sheet 3effects leading to crisis have occurred in many episodes in our sample, as documented in tables 5 and 6.

5. What factors facilitate a lasting stabilization?

We argued that sustained NER stability is a key element for a successful stabilization. In this section, we discuss the context and factors that increase the probability of keeping the NER stable to transition to a low-inflation regime.

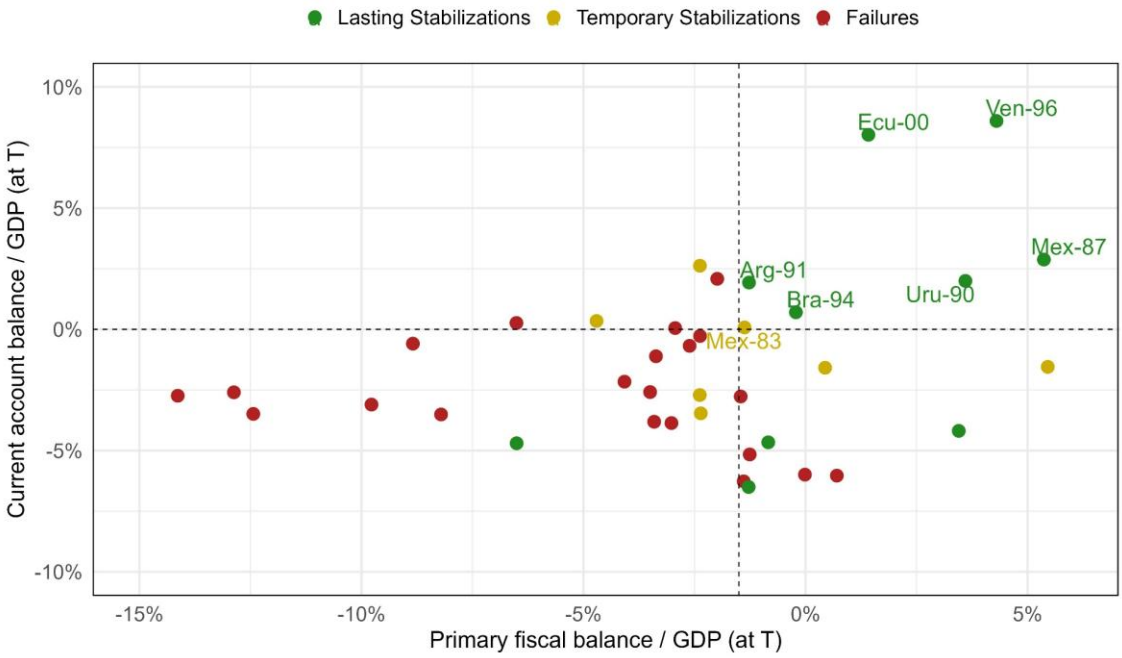
Both government's ability to avoid exchange rate depreciation and public's perception of this ability play a key role in the success of a program, and they depend on the degree of macroeconomic imbalance at the time of implementation. The perception of a fiscal imbalance undermines the program's credibility, as deficits may lead to expectations of monetary financing, which in turn could result in a NER depreciation. While relying on debt financing might temporarily stabilize the NER and, consequently, the prices through capital inflows, a failure to improve the fiscal situation may lead to widespread perception that voluntary financing will dry up, decreasing the demand for sovereign debt. This shift in portfolios towards external assets would place additional pressure on the NER, eroding the stabilization. Evidence presented in section 3.5 shows that successful stabilizations begin with stronger fiscal positions and maintain them, whereas failed programs start with larger deficits.

Something similar can be stated regarding the current account of the BoP. Evidence points to an inevitable real appreciation and deterioration of the current account during the stabilization process, as shown in sections 3.3 and 3.4. Therefore, the initial level of the current account is highly relevant. Starting with stronger positions contributes to the perception of sustainability, facilitating government's ability to stabilize the NER for several reasons. First, a current account surplus implies that the economy does not require external financing to maintain the GDP level with the existing RER. Second, a current account surplus suggests that the RER is not overvalued. Third, a strong current account position might encourage capital inflows, especially when combined with a sound fiscal

position. Finally, if a program begins with a high current account surplus, it has a greater margin to deteriorate before reaching risky levels.

However, countries that seek to stabilize do not always start from comfortable external and fiscal positions. Some achieve these pre-conditions through devaluations and fiscal and external adjustments before the implementation of a program, as shown in sections 3.3 and 3.7. Others finance small fiscal and external deficits, a situation more likely when international liquidity is favorable. Finance of bilateral and multilateral credit agencies can also make a difference, especially in small economies, such as in the cases of Costa Rica-1982, Nicaragua-1991, and Bolivia-1985.

Figure 7: External and fiscal starting conditions according to degree of success. As % of GDP.



Source: own elaboration (see Table A.2). The fiscal results are linearized annual data; the current account results correspond to the sum of the last 4 quarters when data is available or linearized annual results otherwise. It is limited to -10% of current account as a percentage of GDP for ease of reading.

Figure 7 maps the relationship between initial macroeconomic conditions —represented by the current account of the BoP and primary fiscal balances as a share of GDP— and disinflationary performance. The figure is divided into four quadrants, using a balanced current account and a primary deficit of 1.5% of GDP as reference points (dashed lines). The northeast quadrant, indicating stronger initial macroeconomic fundamentals, contains six lasting stabilizations and one temporary stabilization (Mexico-1983). The southwest quadrant —initial twin deficits— primarily features cases of failed stabilizations along with two temporary stabilizations.[25] The figure is quite illustrative of the relevant role of initial macroeconomic conditions on disinflationary performance.

6. The choice of the instrumental nominal anchor

If the NER acts as the main nominal anchor, why isn't it always the *instrumental anchor* chosen by the policymakers? This section explores the factors that may influence this choice.

We begin with Table 7, which divides our database in terms of disinflation performance and the type of instrumental nominal anchor used. Most programs (63%) explicitly manage the NER to stabilize, and two-thirds of the lasting stabilizations correspond to exchange rate-based programs. The success rate is similar between programs when analyzing only lasting stabilizations (28% versus 24%). When temporary stabilizations are also included, the success rate is higher for those that select exchange rate anchors (52% versus 29%).

[25] The lasting stabilizations of Bolivia-1985 and Nicaragua-1991 (off-scale) are also in this quadrant, but they are exceptional as they got a very large amount of multilateral financing.

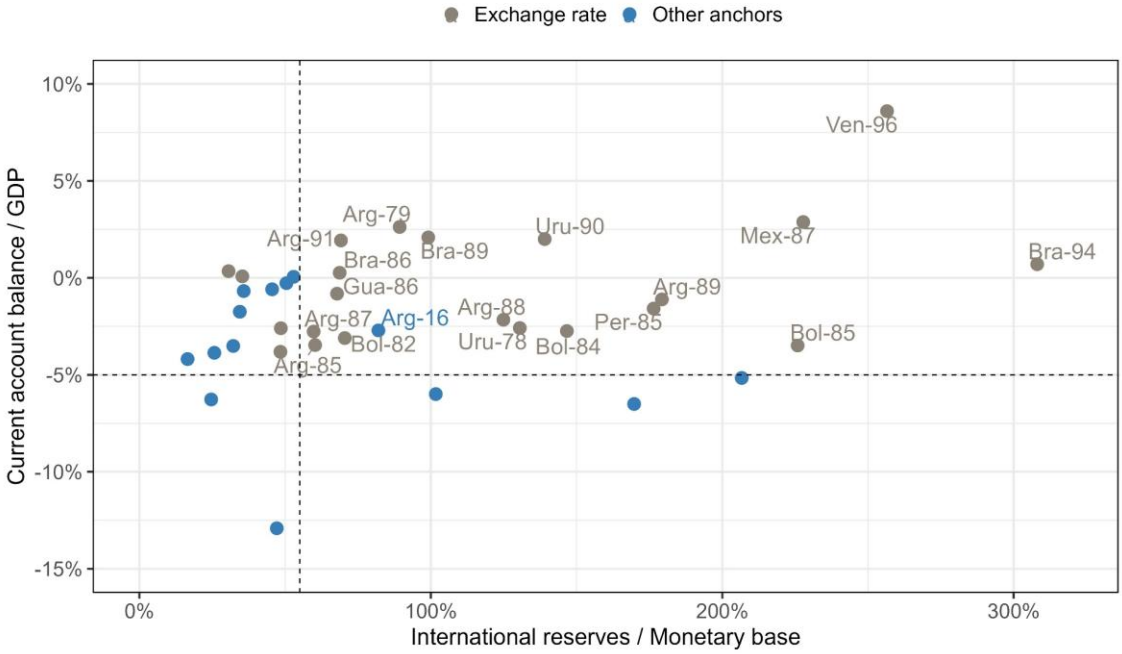
Table 7: Results of stabilization attempts by type of anchor in Latin America (1970-2020).

Result	Instrumental anchor		Total
	Exchange rate	Other	
Lasting Stabilizations	8	4	**12**
Temporary Stabilizations	7	1	**8**
Failures	14	12	**26**
Total	**29**	**17**	**46**

Source: own elaboration.

Adopting a peg requires central bank intervention in the foreign exchange market, which can be challenging in situations characterized by low levels of international reserves, large current account deficits, or limited access to foreign credit. If central bank's ability to determine the NER is constrained, the government may be compelled to adopt an alternative instrumental anchor. Figure 8 shows that exchange rate-based programs are more prevalent when international reserves (as a proportion of the monetary base) are higher and when there is a stronger current account balance.

Figure 8: Current account result and initial level of reserves according to the chosen anchor. As % of GDP and monetary base.



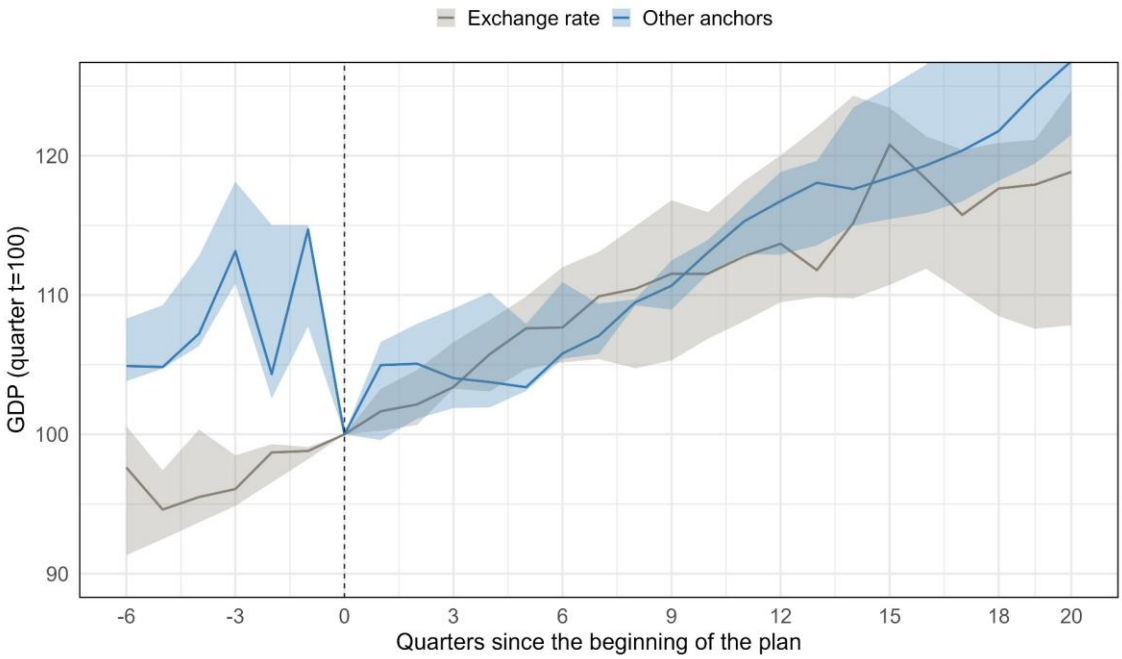
Source: own elaboration (see Table A.2). Current account results and correspond to the sum of the last 4 quarters when data is available or linearized annual results otherwise.

Another factor influencing the choice of the anchor is the expected growth performance: Governments could prefer the strategy that maximizes short-term growth due to electoral considerations. The effect of the anchor choice on the GDP performance has been extensively studied. A first wave of studies agreed that exchange rate-based programs describe a boom-and-bust dynamic, while monetary-based programs follow an inverse cycle (Reinhart & Végh, 1994; Kiguel & Liviatan, 1992a; Calvo & Végh, 1994). More recently, some studies have found that stabilizations are always expansionary (Gould, 1996; Easterly, 1996; Hamann, 2001; Hamann & Prati, 2002).

We do not find a near answer based on our database. Figure 9 suggests that non-peg programs suffered a contraction in the quarter that the program was implemented (we have quarterly data for three of them), probably due to the

monetary contraction and real depreciation that occurred in this quarter.[26] On the other hand, exchange rate-based programs were implemented in economies that had been growing before the beginning of the program. Considering the subsequent performance, both groups grow at a similar rate in the first 4 years. Only in the fifth year, the GDP of countries with exchange rate anchors seem to lag behind the others, although there is still overlap in the colored areas.

Figure 9: Evolution of economic activity according to chosen anchor. The quarter of implementation is indexed to 100.



Source: own elaboration (see Table A.2). The lines represent medians, and the colored areas show the 25th to 75th percentiles. Only programs categorized as lasting successes were included.

In conclusion, several factors may influence the choice of the instrumental anchor, although there is no compelling evidence favoring one over the other. Our findings clearly indicate that Latin American countries have shown a preference for exchange rate-based programs. Although two-thirds of the lasting stabilizations relied on some form of peg, the success rate does not differ significantly between

[26] The fourth is Costa Rica-1982, for which we do not have quarterly data. Its annual GDP contracted by 7% in the first year.

anchors. It appears that the use of exchange rate anchors is less frequent in economies with lower levels of international reserves and larger external imbalances. Additionally, we do not find strong evidence of differences in GDP performance attributable to the choice of the anchor, prompting us to be cautious about the conclusions drawn in previous studies.

7. Conclusions

The analysis of 46 stabilization programs in Latin America between 1970 and 2020 highlights the key role of the NER in the stabilization process, regardless of the *instrumental anchor* adopted. Successful NER stabilization, in turn, heavily depends on the initial state and evolution of *macroeconomic fundamentals*, with fiscal and external balances serving as key determinants. While NER stabilization is the most proximate driver of the disinflation success, it cannot be achieved if policymakers do not address macroeconomic fundamentals imbalances before or at the beginning of a program. In other words, the macroeconomic fundamentals are the ultimate cause of successful disinflation.

Sound macroeconomic fundamentals and NER stabilization are not the only elements influencing the slowdown in inflation. Other important elements not addressed in this article, like the degree of competition in domestic markets and trade openness, also play important roles. Additionally, price and wage coordination mechanisms —commonly referred to as income policies— may contribute at dismantling the inflationary inertia characteric of chronic inflation, as discussed in Dornbusch & Simonsen (1987) and Kiguel & Liviatan (1989, 1992b).

It appears that RER appreciation is an inevitable result of disinflation. This poses a significant challenge for policy-makers, as it increases the likelihood of a sudden exchange rate adjustment that could reintroduce inflation and/or trigger a severe crisis. The design of a stabilization program must carefully balance the trade-off

between an exchange rate strategy that is sufficiently rigid to stabilize inflation and one that is flexible enough to prevent a future currency crisis.

Despite our empirical strategy's efforts to standardize historical events and identify stylized behaviours, the idiosyncratic nature of stabilization programs imposes certain limitations on this study. Furthermore, data constrains prevented us from addressing several relevant aspects of the stabilization programs, such as monetary overhang, quasi-fiscal deficits, public debt and its potential restructuring, the role of income policy —wage-price agreements—, contract deindexation mechanisms, and political economy factors. Nonetheless, our findings provide solid evidence that supports and strengthens previous hypotheses in the literature.

We also consider our contributions relevant in the current context of rising inflation worldwide. In 2022-23, twenty countries had a two-year average inflation above 20% and they could benefit from the findings outlined in this article.

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Appendix 1

Table A.1: Stabilization programs and bibliographic sources.

Country	Bibliographic references
Argentina	Aisen (2004); Beltrani (2019); BCRA (2016, 2018); Calvo & Végh (1999); Canitrot (1992); Clarín Newspaper (several editions, 1988-1990); Damill & Frenkel (1990); Fanelli & Frenkel (1987, 1989); Gerchunoff & Llach (1998); Heymann (1986); Gerchunoff, Heymann, & Jáuregui (2022) ; Kiguel & Liviatan (1988, 1990, 1992a, 1992b); Law No. 23,928/91; Libman & Palazzo (2020); Machinea (1989); Reinhart & Savastano (2003); Reinhart & Végh (1994); Rodríguez (1982); Ter-Minassian & Schwartz (1997); Torre (2021); Veiga (2008)
Bolivia	Aisen (2004); Bruno (1993); Supreme Decree N° 21,060/85; Kehoe, Machicado & Peres-Cajías (2022); Kiguel & Liviatan (1988); Krause (1987); Morales (1989a, 1989b); Morales & Sachs (1987); Sachs (1986); Ter-Minassian & Schwartz (1997); Reinhart & Savastano (2003); Veiga (2008)
Brazil	Aisen (2004); Ayres, Garcia, Guillen, & Kehoe (2022); Bacha (2003); Boughton (2001); Bruno (1993); Calvo & Végh (1999); Cardim de Carvalho (1998); Carneiro (1987); Da Fonseca (1998); de Oliveira (1993); Decree-Law N° 2,283/86; Dornbusch & Cline (1997); Dornbusch, Sturzenegger, & Wolf (1990); Franco (1996); Kiguel & Liviatan (1988, 1990, 1992a, 1992b); Provisional Measure 168/90; Meller (1987); Modiano (1987); Nazmi (1995); Reinhart & Savastano (2003); Reinhart & Végh (1994); Ter-Minassian & Schwartz (1997); Veiga (2008)
Chile	Bruno (1993); Calvo & Végh (1999); Corbo & Solimano (1991); Kiguel & Liviatan (1988, 1992a, 1992b); Reinhart & Végh (1994); Veiga (2008)
Costa Rica	Kiguel & Liviatan (1992a); Lizano (1999); Saborio Muñoz (1997); Villasuso (2000)

Ecuador	Benítez & Montalvo (2004); Cueva & Díaz (2022); Jácome Hidalgo (1994a, 1994b, 2004); Law N° 4/00; Özyurt & Cueva (2020)
Guatemala	Campang Chang, Levenson, & Mack (1990); ECLAC (1987); Molina Calderón (2011)
Mexico	Aisen (2004); Bruno (1993); Calvo & Végh (1999); Cornelius (1985); El País Newspaper (1982); Kiguel & Liviatan (1988, 1992a, 1992b); Reinhart & Végh (1994); Ter-Minassian & Schwartz (1997); Veiga (2008)
Nicaragua	Aisen (2004); Aravena (1996, 2000); Cabrera (2015); ECLAC (1994); Dijkstra (1996); Indart (2000); Law N° 306/88; Ocampo (1991); Ocampo & Taylor (1989); Revista Envío (several editions, 1988-1991); Stahler-Sholk (1990); Stahler-Sholk & Camacho (1994)
Peru	Aisen (2004); BCRP (1985, 1990, 1991); Calvo & Végh (1999); Feenstra & Taylor (2011); Kiguel & Liviatan (1992b); Lago (1991); Martinelli & Vega (2022); Paredes & Sachs (1991); Reinhart & Savastano (2003); Reinhart & Végh (1994); Schydlowsky (1990); Ter-Minassian & Schwartz (1997); Veiga (2008); Velarde & Rodríguez (1992a, 1992b)
Dominican Republic	Aisen (2004); Calvo & Végh (1999); Reinhart & Végh (1994); Veiga (2008)
Uruguay	Aboal & Oddone (2003); Aisen (2004); Calvo & Végh (1999); Fernández Castro (1997); Hanson & de Melo (1983); Hoffmaister & Végh (1996); Kiguel & Liviatan (1992a); Oddone & Marandino (2022); Reinhart & Végh (1994); Ter-Minassian & Schwartz (1997); Veiga (2008)
Venezuela	Fajardo & Ortiz (2015); Lander & Fierro (1996); Ter-Minassian & Schwartz (1997)

Source: own elaboration

Table A.2: Data sources.

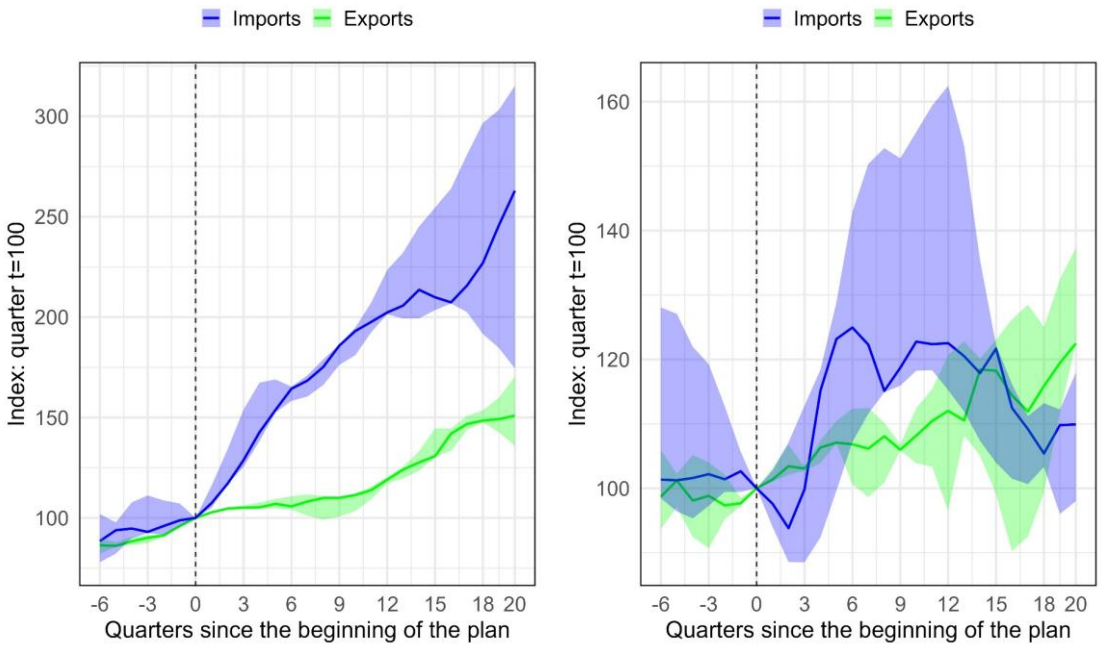
Variable	Sources
Inflation	International Financial Statistics - International Monetary Fund, CEPALSTATS, INDEC and other domestic sources for Argentina and BCV
Nominal exchange rate	Bank for International Settlements and Ilzetzki, Reinhart, & Rogoff (2021)
Real exchange rate	Darvas (2021) and BCRA. The Bilateral RER with the United States was built for Nicaragua and Venezuela
Monetary base	International Financial Statistics - International Monetary Fund and BCRA
Quarterly GDP	Monnet & Puy (2019), INDEC, UDAPE, INE, BCE, BCRP, BCRD and BCV
Bank credit	Bank for International Settlements and Monnet & Puy (2019)
Quarterly current account	International Financial Statistics - International Monetary Fund, Bank of Mexico and BCRP
Annual current account	World Bank, Instituto Interdisciplinario de Economía Política IIEP-BAIRES, BCC, Banco de México and BCU
International reserves	International Financial Statistics - International Monetary Fund
Trade balance	International Financial Statistics - International Monetary Fund and World Bank
GDP (current USD)	World Bank
GDP (current local currency)	World Bank
Primary fiscal balance	Kehoe & Nicolini (2022), Mauro, Romeu, Binder, & Zaman (2013), Ministry of Economy of the Argentine Republic and INDEC

Total fiscal balance	Kehoe & Nicolini (2022), Mauro, Romeu, Binder, & Zaman (2013), Ministry of Economy of the Argentine Republic and INDEC
Bilateral/multilateral financing	World Bank

Source: own elaboration

Figure A.1: Evolution of exports and imports of goods and services. Quarter of launching indexed to 100.

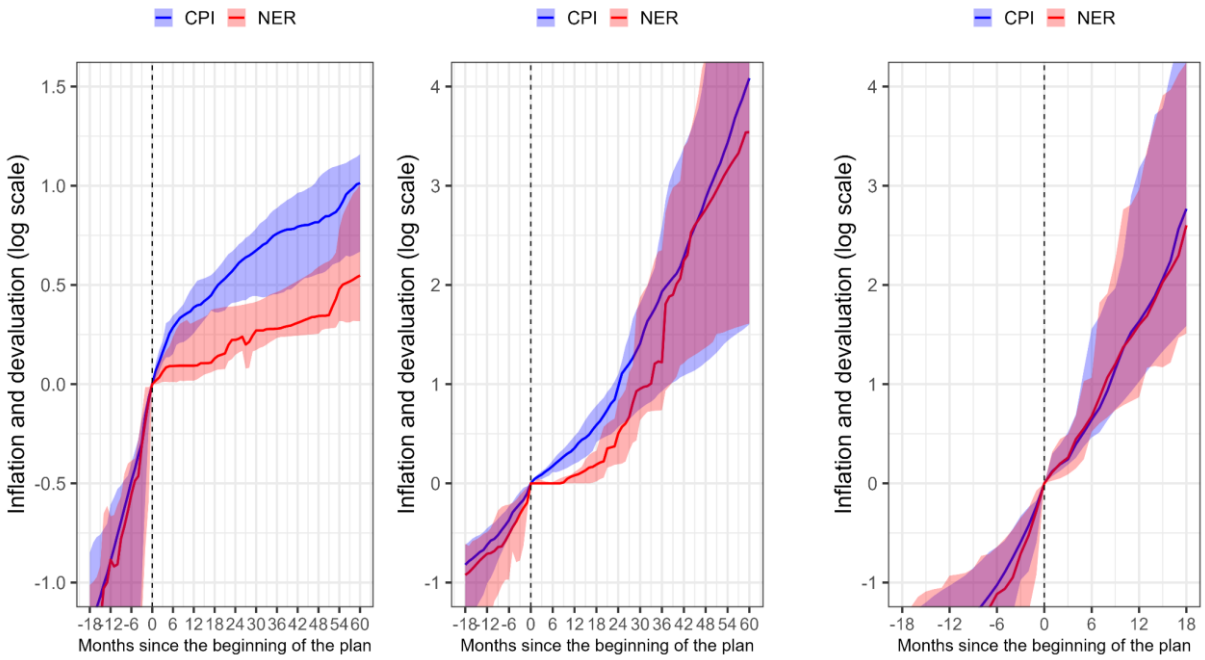
(a) Lasting Stabilizations (b) Temporary Stabilizations



Source: own elaboration (see Table A.2). The data corresponds to the sum of exports and imports of the last 4 quarters to avoid seasonality. The lines represent medians, and the colored areas shows the 25^{th} to 75^{th} percentiles.

Figure A.2: Evolution of CPI and NER according to the degree of success. Indexed to 1 in the first month of stabilization and in logarithms.

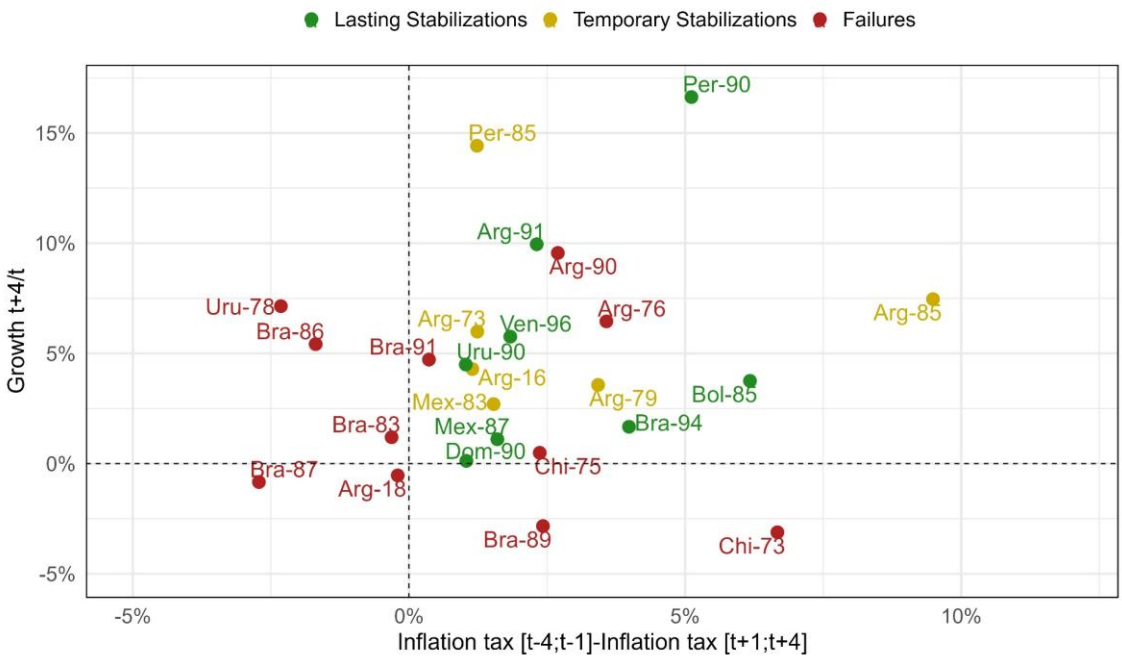
a) Lasting stabilizations b) Temporary stabilizations c) Failures



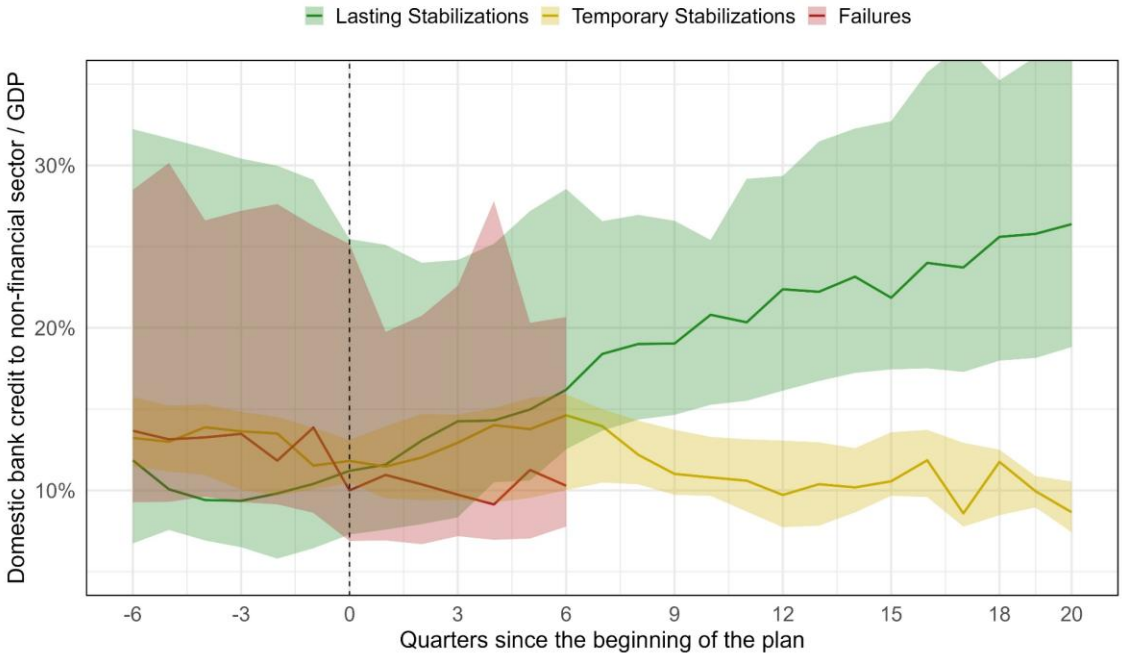
Source: own elaboration (see Table A.2)

Figure A.4: Explanatory factors of economic growth.

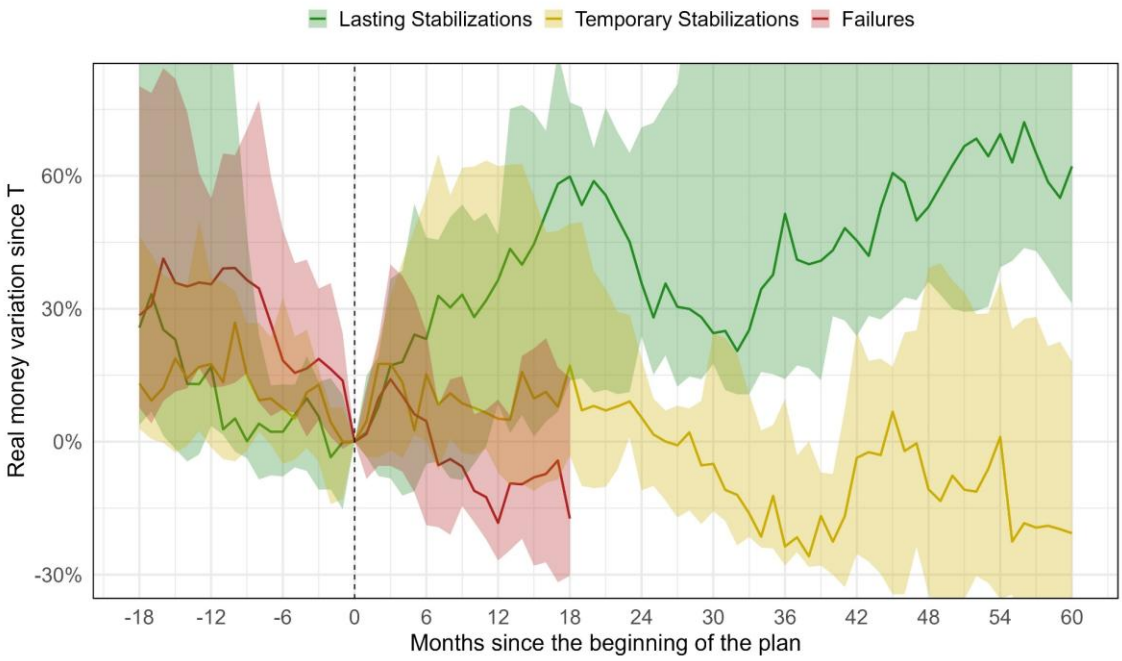
(a) Reduction of inflation tax and economic growth during the first year of stabilization. In % and points of GDP



(b) Increase in credit to the non-financial private sector. As % of GDP.



(c) Amount of money in real terms. In %.



Source: own elaboration (see Table A.2). The inflation tax was calculated by multiplying the nominal monthly amount of money from the previous month (tax base of the tax) by the rate $\frac{\pi}{1+\pi}$. Then, the inflation tax for each month was converted to annual average prices, dividing it by the price index of the month and multiplying it by the average of indexes for the calendar year. Third, the quarterly sum of each month inflation tax (in annual average prices) was divided by the annual nominal GDP. Finally, a rolling sum of the tax as a percentage of GDP was calculated for quarters t-4 to t-1 and the tax calculated for quarters t+1 to t+4 (omitting the quarter in which the program starts) was subtracted. This difference is the gain for money holders from stabilization. Only programs that did not have another attempt in the immediately following 12 months were considered, eliminating 4 events from Argentina, 4 from Bolivia, 1 from Brazil and 3 from Nicaragua. There are 6 additional events that are not included due to lack of quarterly growth data. Furthermore, the programs for Ecuador and Chile-1978 are not included because they do not have data on the amount of money. The lines represent medians, and the colored areas shows the 25^{th} to 75^{th} percentiles.

Appendix 2: Costs prior to the stabilization program

In this appendix, we describe the methodology used to calculate the ex-ante costs incurred by countries that achieve lasting stabilizations. These cases start from more solid fiscal and external accounts. However, achieving the conditions that favor the chances of obtaining a lasting stabilization may require reductions in public spending (or a tax increase) and devaluations of the RER. Both measures have negative consequences for the economic activity level in the short term. As each program has idiosyncratic particularities that make the events differ from each other, both with respect to the measures taken and their temporality, we decided to study the previous economic performance, looking case by case at the cost faced to have sound macroeconomic fundamentals.

To do this, we define the business cycle prior to the beginning of each country's stabilization program as the period from a peak to a trough. The recession that marks the difference between the two would be associated with the measures carried out to balance the external and fiscal levels. The peak is defined as the quarter in which the highest level of GDP was reached from quarter *t-20* (5 years before the launch of the lasting stabilization program) to *t-3*. The trough is the time when the lowest GDP is reached between the time of the peak and quarter *t-1*. In this period, we define 3 measures:

- $\boldsymbol{\Delta GDP_{peak;trough}^{t-20;t-1}}$ It is the percentage variation in economic activity between the two moments in time.

- $\boldsymbol{\Delta CA^{peak;trough} = CA_{max}^{t-2;t+2} - CA_{min}^{peak;t-1}}$ refers to the difference between the highest value reached by the current account as a percentage of GDP in the two quarters before or after the launch of the stabilization program and its lowest

value between the peak and the moment before the beginning of the program. [27] With this measure, we intend to capture the external adjustment that is observed from the moment activity begins to fall and until the beginning of the program.

- $\boldsymbol{\Delta PB^{peak;trough} = PB_{max}^{t-2;t+2} - PB_{min}^{peak;t-1}}$ refers to the difference between the highest value reached by the primary balance as a percentage of GDP in the two quarters before or after the launch of the stabilization program and its lowest value between the peak and the moment before the beginning of the program.[28] With this measure we intend to capture the fiscal adjustment from the moment activity begins to fall and until the beginning of the program.

These indicators attempt to approximate the costs in terms of economic activity suffered by countries that correct fundamental variables before launching a successful program. This process, whether deliberately or not, allows the policymaker to improve their chances of success. However, it also entails considerable costs in terms of economic activity. In Table A.3, we show the dates on which each adjustment occurs for the lasting successful programs and the quarter in which each economy manages to exceed the previous cyclical maximum. The dates on which the adjustments occur do not necessarily coincide with the recession, so a causal interpretation of the above should not be made (alternative explanations are that a recession -caused by other reasons- could improve the external result or that some shock exogenous could be simultaneously affecting all the variables at the same time).

[27] When we have quarterly data, the moving sum of the last 4 quarters was used; when there is no data at a quarterly frequency, the annual data was linearized.

[28] The annual data was linearized.

Table A.3: Previous costs of stabilization programs with lasting success.

		Arg-	Bol-85	Bra-94	Chi-78	CRi-82	Dom-90
GDP	Cyclical peak	102	121	94	99	-	109
	Peak Quarter	-15	-16	-4	-15	-	-3
	Minimum	89.0	100.8	93.9	80.4	-	100.8
	Quarter Min	-4	-2	-3	-10	-	-1
	$\Delta GDP^{t-20;t-1}_{peak/trough}$	-	-17.0%	-0.4%	-18.9%	-	-7.1%
	Recover in	2	>20	-2	-2	-	8
Current account	Minimum	-3.8%	-7.9%	0.0%	-6.4%	-15.6%	-4.9%
	Quarter Min	-14	-15	-3	-9	-2	-3
	Max(t-2,t+2)	3.2%	-3.5%	0.7%	-2.6%	-10.2%	-3.4%
	Max Quarter	-2	-2	0	-2	2	2
	$\Delta CA^{peak;trough}$	7.0%	4.4%	0.7%	3.8%	5.4%	1.5%
Primary Balance	Minimum	-4.3%	-15.4%	-1.1%	-14.0%	-4.5%	3.2%
	Quarter Min	-10	-3	-4	-15	-10	-3
	Max(t-2,t+2)	0.0%	-2.0%	0.2%	-0.3%	1.0%	3.5%
	Max Quarter	2	2	2	2	2	1
	$\Delta PB^{peak;trough}$	4.3%	13.4%	1.3%	13.7%	5.5%	0.4%
		Ecu-	Mex-87	Nic-91	Per-90	Uru-90	Ven-96
GDP	Cyclical peak	107	100	-	150	101	101
	Peak Quarter	-5	-9	-	-12	-6	-4
	Minimum	98.9	95.5	-	111.7	94.6	98.3
	Quarter Min	-2	-4	-	-6	-5	-1
	$\Delta GDP^{t-20;t-1}_{peak/trough}$	-7.5%	-4.7%	-	-25.5%	-6.4%	-2.8%
	Recover in	5	4	-	>20	3	Volatile
Current account	Minimum	-7.5%	-1.0%	-35.7%	-12.8%	0.9%	2.6%
	Quarter Min	-5	-4	-5	-8	-6	-3
	Max(t-2,t+2)	8.6%	2.9%	-20.9%	-4.0%	2.0%	12.6%
	Max Quarter	1	0	2	2	0	1
	$\Delta CA^{peak;trough}$	16.1%	3.9%	14.8%	8.8%	1.1%	10.0%
Primary Balance	Minimum	0.0%	2.9%	-22.4%	-	0.2%	1.6%
	Quarter Min	-1	-4	-9	-	-4	-4
	Max(t-2,t+2)	4.2%	6.5%	-5.5%	-	3.9%	4.7%
	Max Quarter	2	2	2	-	2	1
	$\Delta PB^{peak;trough}$	4.2%	3.6%	16.9%	-	3.7%	3.0%

Source: own elaboration (see Table A.2). The cyclical peak corresponds to the period t-20;t-5, which leaves out the year prior to the launch of the program. The minimums of the current account and the primary fiscal balance correspond to the period after the economy has reached the cyclical peak.

It is clear from the table that the economies that manage to stabilize overcome major crises and severe macroeconomic adjustments. The cost that their societies face can be seen in the evolution of their GDP, which shows drops of up to 26%. Stabilization recovers the growth and the possibility to improve social well-being. However, the time it takes to recover the previous level of activity shows significant heterogeneity. Chile-1978 and Brazil-1994 were already growing when the stabilization began. On the contrary, Bolivia-1985 and Peru-1990 took more than 5 years from the beginning of the program to recover the previous maximum. The rest of the countries take between 2 and 8 quarters to recover.

The magnitude of the adjustments is also not homogeneous. The current account adjustment reaches 3 digits in 3 cases and exceeds 16 percentage points of GDP in the case of Ecuador-2000, a country that went from a deficit of 7.5% of GDP to a surplus of 8.6%. The other two countries with the greatest external adjustments were Nicaragua-1991 and Venezuela-1996. On the fiscal side, the cuts in the primary balance are also very significant. Particularly noteworthy are those carried out prior to the programs of Nicaragua-1991, Chile-1978 and Bolivia-1985, whose primary fiscal balance improved by 16.9, 13.7 and 13.4 percentage points of GDP, respectively. These are three of the programs that most depended on external financing to sustain large current account imbalances. It is plausible that to receive a high amount of financing they needed to show greater fiscal adjustments.

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