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Argentina's Disinflation: An International and Historical Perspective

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## Argentina's Disinflation: An International and Historical Perspective\*

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#### Introduction

Argentina has a history of high inflation and loose monetary and fiscal policies (see Buera and Nicolini (2022) and the references therein). In November 2023, voters elected a new president, who promised a clean break with the country's tumultuous past. Javier Milei—an economist and political outsider—took office with a strong mandate to reform the economy and bring down inflation.

The initial conditions faced by Milei's economic team were extreme. Annual inflation had reached more than 100 percent, more than almost any country in the world at the time. Additionally, the economy, which was experiencing a contraction, was constrained by a multiple exchange rate regime, large fiscal deficit, virtually depleted international reserves, and very limited access to international capital markets (for an overview of these conditions, see Talvi and Harguindeguy (2024)). The rate of inflation fell considerably during Milei's first year in office and soon critics raised the question of the program's sustainability.

In this article, we study this episode and compare it with other disinflations around the world. Specifically, we empirically characterize the differences between Argentina's disinflation and other disinflation episodes observed over the past seven decades. We document that, qualitatively, the macroeconomic patterns observed in the first year of Argentina's disinflation broadly align with those of previous disinflation episodes. Quantitatively, Argentina's economic adjustment appears larger across most dimensions. Given the unusual context, it is of considerable interest to study how the historical macroeconomic patterns change when

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we focus on episodes with initial conditions that are more like those faced by Milei. We find, for example, that episodes that begin with higher initial inflation experience larger economic adjustments. Our evidence offers a comparative perspective on the main challenges emerging in disinflation episodes like Argentina's.

#### **Data and Methodology**

We analyze the dynamics of key macroeconomic variables in Argentina. These are the consumer price index (CPI), exchange rates, monetary aggregates, GDP growth, the unemployment rate, the investment rate, public consumption, and the fiscal balance. The data are obtained from Argentina's National Institute of Statistics and Censuses (INDEC), the Central Bank (BCRA), and the Ministry of the Economy (MECON). Further details on the construction and sources of these variables are provided in the appendix.

We compare the dynamics observed during Argentina's 2024 disinflation with the historical episodes studied in Di Tella and Ottonello (2025).<sup>1</sup> First, we briefly summarize their methodology. Using data on CPI inflation from the World Development Indicators (WDI) for a set of 56 countries over the period 1960–2019, the authors identify a disinflation episode as a period that meets two conditions:<sup>2</sup>

- 1. *Sharp inflation decline:* An annual change in inflation in the 10th percentile of the distribution of inflation changes for all countries and periods (i.e., below -4 percentage points). This condition is intended to capture episodes with steep disinflation and mirrors the one used by Blanco, Ottonello, and Ranosova (2022) to analyze large inflation surges.
- 2. *High initial inflation levels:* Annual inflation above 10 percent in each of the two years preceding the disinflation episode. This condition ensures a focus on episodes that begin from a high-inflation environment (rather than simply the price adjustment to a shock).

These criteria identify 114 disinflation episodes, detailed in the appendix. An episode is classified as "successful" if annual inflation falls below 10 percent in both the second and third years after the start of disinflation; all other episodes are classified as "unsuccessful."<sup>3</sup> As shown in Appendix Table A1, the set of 44 successful disinflation episodes includes some of the most studied in modern history, such as the disinflation in the United States in the 1980s and in Latin America during the 1990s (e.g., Argentina, Brazil, and Peru).

To compare historical disinflation episodes with the Argentine case, we use the dynamics of macroeconomic variables during historical disinflation episodes estimated in Di Tella and Ottonello (2025), based on an event time study. These dynamics are obtained following the two-step procedure in Blanco, Ottonello, and Ranosova (2022). First, by estimating the empirical model:

$$y_{i,t} = \alpha_i + \sum_{j=0}^{J} \beta_j y_{i,t-1-j} + \sum_{k=-K_1}^{K_2} \gamma_k D_{i,t-k} + \varepsilon_{i,t},$$
(1)

where  $y_{i,t}$  is a variable for country *i* in period *t*;  $\alpha_i$  is a country fixed effect;  $D_{i,t}$  is a dummy variable that takes the value 1 if country *i* experiences the beginning of a disinflation episode

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in period t, and 0 otherwise; and  $\varepsilon_{i,t}$  is a random error term. For the dependent variable  $y_{i,t}$ , we use the same set of variables analyzed for Argentina: CPI inflation, nominal currency depreciation, growth rate of broad money, growth rate of real GDP, unemployment rate, investment rate, public consumption as a share of GDP, growth rate of the real exchange rate, and both the total and primary fiscal balance as a share of GDP (for details, see the appendix). Equation (1) is estimated setting  $K_1 = 1$  and  $K_2 = J = 4$ , with standard errors clustered at the country level. To avoid the influence of hyperinflation, the variables are winsorized at ±100 percent. Additional analysis draws on data on exchange rate regime classifications and dual exchange rate markets from Ilzetzki, Reinhart, and Rogoff (2019, 2022).

The second step is to trace the estimated dynamics of each variable during disinflation episodes, using the following recursive expression (akin to an estimated impulse response function):

$$\hat{y}_{\tau} = \sum_{j=0}^{J} \hat{\beta}_{j} \hat{y}_{i,\tau-1-j} + \sum_{k=-K_{1}}^{K_{2}} \hat{\gamma}_{k} D_{\tau-k} \text{ for } \tau \ge -K_{1},$$
(2)

where  $\{\hat{\beta}_j\}_{j=0}^J$  and  $\{\hat{\gamma}_k\}_{k=-K_1}^{K_2}$  are the estimated coefficients from (1);  $D_{\tau}$  takes the value 1 for  $\tau = 0$  and 0 otherwise; and  $\hat{y}_{\tau} = 0$  for  $\tau < -K_1$ .

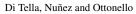
#### Argentina and the Typical Successful Disinflation

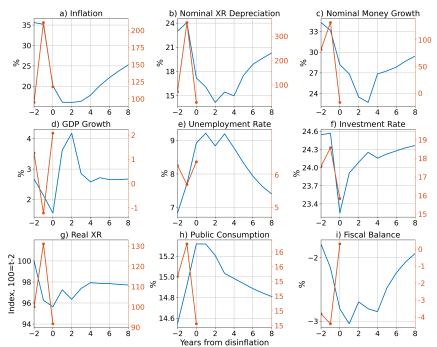
Figure 1 compares the macroeconomic dynamics during Argentina's 2024 disinflation with those of the average successful disinflation episode in our historical data.<sup>4</sup> The blue lines show the latter, with the horizontal axis indicating years since the start of disinflation, where t = 0 marks the first year in which inflation begins to decline. The orange lines (with markers) depict the dynamics observed in Argentina as of the end of 2024 (also represented as t = 0). To focus on the qualitative patterns in this comparison, we plot the two series using different axes: the dynamics of the average successful disinflation episodes appear on the left axis, while those for Argentina are plotted on the right axis.

Panels (a)-(c) of Figure 1 show that, in terms of monetary and exchange rate policy, Argentina's 2024 disinflation exhibits patterns qualitatively similar to those of the average successful disinflation: A decline in inflation, a reduction in nominal exchange rate depreciation, and a slowdown in the growth of monetary aggregates. Panels (d)-(g) indicate that Argentina's case also qualitatively resembles the average disinflation in real aspects of the economy (albeit with different timing): a decline in the GDP growth rate, a rise in unemployment, a fall in the investment rate, and a real exchange rate appreciation vis-à-vis the U.S. dollar.<sup>5</sup>

Our conclusion from this exercise is that, qualitatively, several key macroeconomic patterns observed in Argentina's 2024 disinflation are shared with past disinflation episodes around the world that successfully achieved a persistent reduction in inflation. Two remarks are in order. First, the magnitude of the changes observed in Argentina's disinflation is significantly larger than those associated with the average successful disinflation for most variables.<sup>6</sup> Second, panels (h) and (i) show that the contraction in public spending and the reduction in the fiscal deficit observed in Argentina during 2024 are not typical features of successful disinflation episodes.

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#### Figure 1 Macroeconomic Dynamics in Argentina's Disinflation and Historical Episodes of Successful Disinflations

*Notes:* This figure shows the dynamics of selected macroeconomic variables (inflation, nominal exchange rate depreciation relative to the U.S. dollar, nominal growth of monetary aggregates, real GDP growth, unemployment rate, investment as a share of GDP, real exchange rate relative to the U.S. dollar, public consumption as a share of GDP, and fiscal balance as a share of GDP) for Argentina's 2024 disinflation and the average historical "successful" disinflation episode analyzed by Di Tella and Ottonello (2025). The two series are plotted using different axes: the values for the average successful disinflation (solid blue lines) appear on the left axis, while the values for Argentina (orange lines with markers) are plotted on the right axis. The dynamics of historical disinflation episodes are computed using the estimated coefficients from equation (1) and the recursive expression in equation (2). All variables, except for the real exchange rate, are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The real exchange rate index is set to 100 at t = -2. The horizontal axis represents years since the start of disinflation; t = 0 marks the beginning of the episode. In the case of Argentina, t = 0 corresponds to the year 2024. Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix.

#### Heterogeneity across Disinflation Episodes

To better understand both the quantitative patterns and macroeconomic policies during Argentina's disinflation, we next exploit the heterogeneity observed across disinflation episodes. We begin by comparing episodes with different initial inflation levels, then contrast successful and unsuccessful disinflations, and finally examine episodes that feature exchange rate controls.

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**Initial Inflation Levels.** In our sample of successful disinflation episodes, the median initial level of inflation (measured at t - 1 in our figures) is 22 percent, substantially below the triple-digit level at which Argentina began its disinflation process. To analyze the role of initial inflation in shaping the magnitude of the macroeconomic adjustment observed in Argentina, we divide the sample into two groups: those with initial inflation above the median and those below.

Figure 2 depicts the average dynamics of selected real variables for episodes with initial inflation levels above the median (green lines with markers) and below median (black lines)– for other variables, see Appendix Figure B1. Panels (a)-(c) show that episodes with high initial inflation are characterized by lower initial GDP growth, higher unemployment, and lower investment rates. In addition, they tend to exhibit a larger macroeconomic adjustment. For instance, panel (b) shows that the increase in unemployment tends to be more prolonged, while panel (d) indicates a more pronounced real exchange rate appreciation.<sup>7</sup> On the fiscal side, panels (e) and (f) show that high-initial-inflation episodes also appear to be associated with greater initial fiscal austerity. In particular, these episodes are characterized by an increase in both the primary and overall fiscal balance between t = -2 and t = 0, whereas low-initial-inflation episodes, over the same period, exhibit a relatively stable primary balance and a decline in the overall balance.

This analysis suggests that the large economic and fiscal adjustment observed during Argentina's 2024 disinflation, relative to that of the average historical disinflation episode, may be linked to the higher level of initial inflation. In particular, while our evidence is descriptive—and we leave a full quantitative analysis of the relationship between initial inflation and the magnitude of the adjustment for future research—it suggests that it would have been unlikely to observe a mild economic or fiscal adjustment in Argentina given its initial inflation levels.

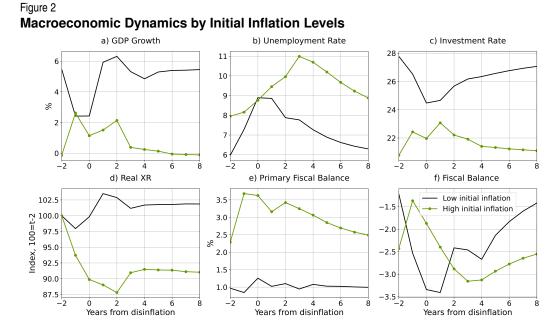
**Successful and Unsuccessful Episodes.** A central element of Argentina's 2024 disinflation plan was the adoption of a "crawling peg," which involved preannouncing a devaluation of the official exchange rate. To shed light on this policy choice, we compare macroeconomic policy in the successful disinflation episodes discussed so far with that in unsuccessful disinflation episodes—defined, as noted above, as those in which the initial decline in inflation is not followed by a sustained reduction to single-digit levels (detailed in Table A2).

Figure 3 presents the results of this comparison and highlights a key difference between successful and unsuccessful disinflation episodes: the nominal exchange rate depreciation rate (shown in Panel (b)).<sup>8</sup> Unsuccessful episodes tend to revert to the depreciation rates observed prior to the onset of disinflation—in stark contrast to successful episodes, which achieve a sustained reduction in depreciation rates. This pattern appears closely linked to exchange rate and monetary policy. Panel (d) shows that successful disinflation episodes are much more likely to adopt a fixed or crawling peg regime during the process: More than 60 percent of successful episodes feature a fixed or crawling exchange rate at the start of disinflation (t = 0), whereas less than 40 percent in unsuccessful episodes do (also measured at t = 0). Panel (c) further shows that, unlike successful episodes, unsuccessful episodes do not experience a reduction in the growth rate of money.

Why do governments in "unsuccessful" disinflation episodes allow for higher exchange rate depreciation? Panel (f) of Figure 3 shows that these episodes do not exhibit the rise

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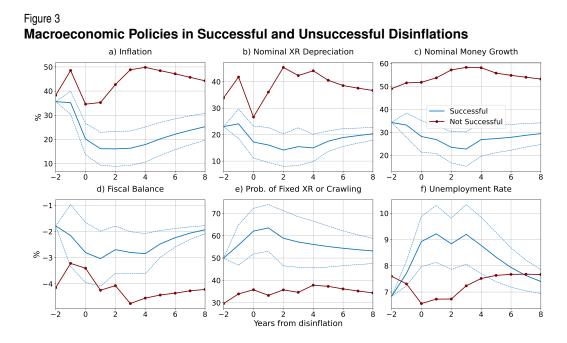
*Notes:* This figure shows the dynamics of selected macroeconomic variables (real GDP growth, the unemployment rate, investment as a share of GDP, the real exchange rate relative to the U.S. dollar, and fiscal balance as a share of GDP) for the set of historical "successful" disinflation episodes analyzed by Di Tella and Ottonello (2025). These dynamics are computed using the estimated coefficients from equation (1) and the recursive expression in equation (2). All variables, except for the real exchange rate, are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The real exchange rate index is set to 100 at t = -2. The horizontal axis represents years since the start of disinflation; t = 0 marks the beginning of the episode. Black and green lines (with markers) represent episodes with initial inflation levels (measured at t = -2) below and above the median, respectively, with the median calculated across all episodes using available data at t = -2. Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix. For additional variables, see Appendix Figure B1.

in unemployment observed in episodes that successfully achieve a sustained reduction in inflation. Therefore, one possible interpretation of this pattern is that, in these episodes, governments opt to avoid the unemployment costs that typically accompany "successful" disinflations. A strategy to achieve this, particularly in the presence of nominal wage rigidities, may be to allow for higher exchange rate depreciation, which can reduce the contractionary effects on employment.<sup>9</sup>

**Exchange Rate Controls.** Finally, we analyze the role of exchange rate controls, which were inherited by the Milei government and maintained throughout the first year of the disinflation. To this end, we focus on the subset of successful disinflation episodes that operated under multiple exchange rate regimes (for details, see the appendix). While this is a relatively small group—seven episodes in total—it offers a useful window into how disinflation unfolds in the presence of a dual exchange rate market.<sup>10</sup>

We highlight three findings, presented in Figure 4. First, panel (a) shows that the inflation dynamics during successful disinflation episodes with dual exchange rate markets closely resemble the average across all successful episodes. Second, panel (b) indicates

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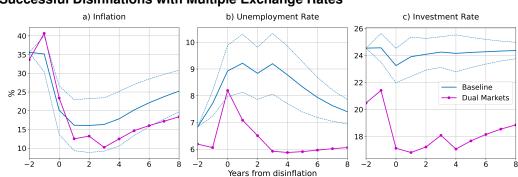
*Notes*: In each panel, blue and red lines (with markers) show the observed dynamics of a selected macroeconomic variable (inflation, nominal exchange rate depreciation relative to the U.S. dollar, nominal growth of monetary aggregates, fiscal balance as a share of GDP, probability of having a fixed or crawling exchange rate, and unemployment rate) for the "successful" and "unsuccessful" disinflation episodes analyzed by Di Tella and Ottonello (2025), respectively. These dynamics are computed using the estimated coefficients from equation (1) and the recursive expression in equation (2). All variables, except for the real exchange rate, are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The horizontal axis represents years since the start of disinflation; t = 0 marks the beginning of the episode. Blue dashed lines denote 90 percent error bands for successful disinflation outcomes: successful episodes are those in which inflation falls below 10 percent in both the second and third years after the start of disinflation; the remaining episodes are classified as unsuccessful. Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix. For additional variables, see Appendix Figure B2.

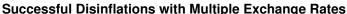
that unemployment in these episodes rises less than in other successful disinflations. Taken together, these two findings suggest that lifting exchange rate controls does not appear to be a necessary condition for the success of a disinflation program: There are concrete examples of countries that have achieved disinflation with multiple exchange rates, without compromising inflation reduction or economic recovery. Finally, it is worth noting that panel (c) shows that successful disinflations with multiple exchange rates tend to exhibit lower investment rates—possibly because exchange rate controls hinder external financing for firms. Thus, maintaining such controls does not appear to be without cost and may be associated with lower investment.<sup>11</sup>

#### Conclusions

We conclude with two final reflections on Argentina's disinflation. First, from a qualitative perspective, the macroeconomic adjustment pattern observed in Argentina during 2024 is

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*Notes:* In each panel, the blue line shows the observed dynamics of a selected macroeconomic variable (inflation, unemployment rate, or investment as a share of GDP) for the "successful" disinflation episodes analyzed by Di Tella and Ottonello (2025). These dynamics are computed using the estimated coefficients from equation (1) and the recursive expression in equation (1). All variables are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The horizontal axis represents years since the start of disinflation; t = 0 marks the beginning of the episode. Blue dashed lines denote 90 percent error bands, calculated using the delta method. The purple line (with markers) represents the subset of successful disinflation episodes that feature a dual, multiple, or parallel exchange rate market at the start of disinflation (as identified by Ilzetzki, Reinhart, and Rogoff (2019, 2022)) and maintain it during the following two years (i.e., between t = 0 and t = 2). Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix. For additional variables, see Appendix Figure B2.

broadly consistent with those seen in successful disinflation episodes. From a quantitative perspective, the initial conditions of Argentina's stabilization plan are unusually complex, making it difficult to identify many comparable cases. Nevertheless, our analysis suggests that high starting levels of inflation are typically associated with larger overall economic adjustments.

Second, achieving successful disinflation frequently hinges on the maintenance of exchange rate anchors. Argentina is only in the first year of its disinflation, whereas successful episodes tend to sustain exchange rate stability over multiple years. Given the persistence of unemployment and real exchange rate appreciation that typically accompany these processes, the political economy and social dimensions of disinflation are likely to be complex. It is worth highlighting that this paper has abstracted from these dimensions and has focused on the disinflation process from a macroeconomic perspective and in isolation. In addition, lack of data prevents us from studying the role of fiscal dominance, which likely characterized the situation at the start of Milei's administration. We leave these issues for future research on the ongoing Argentine disinflation.

#### Notes

Figure 4

1. There is a large literature on disinflations. Related works documenting empirical patterns include Dornbusch and Fischer (1993); Calvo and Végh (1994, 1999); Reinhart and Végh (1994); Kiguel and Liviatan (1995); Fischer, Sahay, and Végh (2002); Sargent, Williams, and Zha (2009); Palazzo, Rapetti, and Waldman (2022); Blanco, Ottonello, and Ranosova (2022); and Kehoe and Nicolini (2022).

2. The analysis uses the same country sample as in Blanco, Ottonello, and Ranosova (2022), and consists of Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Malaysia, Mexico, the Netherlands, New Zealand, Nigeria, Norway, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, the Slovak Republic, Slovenia, Spain, South Africa, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, the United Kingdom, and the United States.

3. The 10 percent inflation level requirement is aimed at creating a group of countries that reach inflation levels akin to those observed in inflation-targeting regimes in modern economies (see, for example, Walsh (2009) and Jácome et al. (2025), among others). We thereby adopt a fairly strict criterion, which means that some episodes classified here as "unsuccessful" are often studied as successful stabilization experiences under higher cutoffs (e.g., Israel in the 1980s).

4. One important caveat in this comparison is that, as detailed in the appendix, we report endof-year values for Argentina, whereas—owing to data availability—the estimates for historical disinflation episodes are based on annual averages. Focusing on end-of-year values for Argentina allows for a more precise measurement of the 2024 disinflation using the data available at the time of writing. If we used annual averages, the first year of disinflation in Argentina would likely be recorded as 2025 rather than 2024. It is also worth noting that, since the government assumed office in December 2023, data corresponding to its first month in office are included in period t - 1. For example, the year-on-year inflation rate in November 2023 was 161 percent, rather than the 211 percent value for December 2023 reported in Figure 1.

5. Argentina exhibits an earlier decline in GDP growth (at t = -1), followed by a rebound at t = 0, and a more delayed real exchange rate appreciation compared to the average disinflation episode. A caveat in the timing of this comparison is that, as mentioned earlier, we report end-of-year values for Argentina, whereas the estimates for historical disinflation episodes are based on annual averages.

6. An exception to the larger quantitative macroeconomic adjustment in Argentina is observed for unemployment, which exhibits a smaller increase in the first year of Argentina's disinflation relative to the average disinflation episode.

7. In Figure 2, in contrast to other variables, the real exchange rate index is normalized to 100 at t = -2 for both high- and low-inflation episodes. This choice aims at avoiding taking a stance on the level of the real exchange rate before disinflation. The observed pattern for high-initial-inflation episodes could, in principle, be consistent either with an initially "over-depreciated" exchange rate that later corrects, or with an exchange rate that remains appreciated following the disinflation. We leave further analysis of this distinction for separate work.

8. Panel (g) of Appendix Figure B2 shows that both successful and unsuccessful disinflation episodes exhibit a real exchange rate appreciation. Therefore, from a qualitative perspective, the real exchange rate appreciation observed during the first year of Argentina's disinflation cannot be taken as a sign that the disinflation process will turn out to be either successful or unsuccessful. On the fiscal side, Panel (d) of Figure 3 shows that successful disinflation episodes are also characterized by a larger initial fiscal balance as a share of GDP at t = -2 than unsuccessful episodes, although this difference narrows between t = -2 and t = 0. In contrast, successful episodes begin with a lower initial primary balance and exhibit a larger increase between t = -2 and t = 0 (this variable is not shown in the figure, but is available upon request). For studies that examine the role of fiscal policy in disinflation processes in Latin America, see Sargent, Williams, and Zha (2009) and Kehoe and Nicolini (2022). It is also worth noting that the use of aggregate fiscal data does not allow for an assessment of the "quality" of the fiscal adjustment—an aspect that has been actively debated in the context of Argentina's 2024 disinflation processe.

9. See Schmitt-Grohé and Uribe (2016) and Blanco, Drenik, and Zaratiegui (2024) for studies on the role of nominal rigidities in the labor market during Argentina's 2002 devaluation.

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10. See Werning (2023a, 2023b) for studies on financial repression and inflation. For analyses of the macroeconomic implications of multiple exchange rate systems—particularly in the context of Argentina—see Espino, Gauna, and Neumeyer (2023) and Schmitt-Grohé and Uribe (2023).

11. Appendix Figure B3 reports the dynamics of other macroeconomic variables during successful disinflation episodes with dual exchange rate markets. It is worth noting that these episodes tend to exhibit both nominal and real exchange rate depreciation at t = 3, when our classification no longer conditions on the presence of a dual exchange rate market.

#### References

- Blanco, Andrés, Andrés Drenik, and Emilio Zaratiegui. 2024. "Nominal Devaluations, Inflation and Inequality." Working Paper 32494, National Bureau of Economic Research.
- Blanco, Andrés, Pablo Ottonello, and Tereza Ranosova. 2022. "The Dynamics of Large Inflation Surges." Working Paper 30555, National Bureau of Economic Research.
- Buera, Francisco, and Juan Pablo Nicolini. 2022. "The History of Argentina." In A Monetary and Fiscal History of Latin America, 1960–2017, edited by Timothy J. Kehoe and Juan Pablo Nicolini, 45–69. University of Minnesota Press.
- Calvo, Guillermo A, and Carlos A Végh. 1994. "Inflation Stabilization and Nominal Anchors." Contemporary Economic Policy 12 (2): 35–45.
- ——. 1999. "Inflation Stabilization and BOP Crises in Developing Countries." In *Handbook of Macroeconomics, volume 1c*, edited by John B. Taylor and Michael Woodford, 1531–1614. Amsterdam: North-Holland.
- Di Tella, Rafael, and Pablo Ottonello. 2025. "The Making of a Disinflation." Unpublished.
- Dornbusch, Rudiger, and Stanley Fischer. 1993. "Moderate Inflation." *World Bank Economic Review* 7 (1): 1–44.
- Espino, Emilio, Alfonso Gauna, and P. Andrés Neumeyer. 2023. "Models of Balance of Payments Crises with Capital Controls." Unpublished.
- Fischer, Stanley, Ratna Sahay, and Carlos A Végh. 2002. "Modern Hyper- and High Inflations." *Journal of Economic Literature* 40 (3): 837–880.
- Ilzetzki, Ethan, Carmen M Reinhart, and Kenneth S Rogoff. 2019. "Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?" *Quarterly Journal of Economics* 134 (2): 599–646.
- ———. 2022. "Rethinking Exchange Rate Regimes." In *Handbook of International Economics*, edited by Gita Gopinath, Elhanan Helpman, and Kenneth Rogoff, 91–145. Amsterdam: North-Holland.
- Jácome, Luis I., Nicolás E. Magud, Samuel Pienknagura, and Martín Uribe. 2025. "Inflation Targeting and the Legacy of High Inflation." Working Paper 25/79, International Monetary Fund.
- Kehoe, Timothy J, and Juan Pablo Nicolini, eds. 2022. A Monetary and Fiscal History of Latin America, 1960–2017. University of Minnesota Press.
- Kiguel, Miguel A, and Nissan Liviatan. 1995. "Stopping Three Big Inflations: Argentina, Brazil, and Peru." In *Reform, Recovery, and Growth: Latin America and the Middle East*, edited by Rudiger Dornbusch and Sebastian Edwards, 369–414. University of Chicago Press.
- Palazzo, Gabriel Martín, Martín Gervasio Rapetti, and Joaquin Waldman. 2022. "Planes de estabilización en América Latina: Qué distingue a los casos exitosos?" Voces en el Fénix, no. 88, 78–83.
- Reinhart, Carmen, and Carlos Végh. 1994. "Inflation Stabilization in Chronic Inflation Countries: The Empirical Evidence." Unpublished.
- Sargent, Thomas, Noah Williams, and Tao Zha. 2009. "The Conquest of South American Inflation." Journal of Political Economy 117 (2): 211–256.
- Schmitt-Grohé, Stephanie, and Martín Uribe. 2016. "Downward Nominal Wage Rigidity, Currency Pegs, and Involuntary Unemployment." *Journal of Political Economy* 124 (5): 1466–1514.

## FEDERAL RESERVE BANK OF MINNEAPOLIS OR

- Schmitt-Grohé, Stephanie, and Martín Uribe. 2023. "Exchange Controls as A Fiscal Instrument." Working Paper 31294, National Bureau of Economic Research.
- Talvi, Ernesto, and Sofía Harguindeguy. 2024. "Unravelling Argentina's Economic Maze: Raising Prices to Stop Inflation." Real Instituto Elcano. https://www.realinstitutoelcano.org/en/analyses/unravelling-argentinas-economic-maze-raising-prices-to-stop-inflation/.
- Walsh, Carl E. 2009. "Inflation Targeting: What Have We Learned?" *International Finance* 12 (2): 195–233.
- Werning, Iván. 2023a. "From Cagan to Ramsey: Optimal Financial Repression." Unpublished.
   2023b. "Notes on the Central Bank Interest Payments and its Effect on Inflation." Unpublished.

#### Data Appendix

Argentina. Figure 1 uses the following data for Argentina:

- 1. Inflation: Percentage change in the CPI, December over December of the previous year. Source: INDEC.
- 2. Exchange rate depreciation: Percentage change in the official exchange rate, December over December of the previous year. Source: BCRA.
- 3. Growth of monetary aggregates: Percentage change in the "expanded monetary base," defined as the monetary base plus the BCRA's interest-bearing liabilities, which include passive repos (net of active repos), as well as LELIQ, LEBAC, NOBAC (in pesos), LEGAR, and LEMIN.
- 4. GDP growth: Percentage change over the same quarter of the previous year. Source: INDEC.
- 5. Unemployment rate: Percentage of unemployed individuals in the active population during the fourth quarter. Sources: MECON and INDEC.
- 6. Investment rate: Investment-to-GDP ratio at current prices. Source: INDEC.
- 7. Public consumption: Public consumption-to-GDP ratio at current prices. Source: INDEC.
- 8. Fiscal balance: Data on financial results for the national public sector (cash basis). Sources: MECON and INDEC.
- 9. Real Exchange Rate: Bilateral real exchange rate index with the United States, computed using the official exchange rate. Source: BCRA.

**Historical disinflation episodes**. The analysis of historical disinflation episodes in Di Tella and Ottonello (2025) uses the following data:

- 1. Inflation: Annual average variation in the consumer price index. Sources: WDI and FRED.
- 2. Nominal depreciation of the official exchange rate: Measured as local currency units per U.S. dollar, annual average. Source: WDI. For countries in the Euro Area, the value of the euro relative to the U.S. dollar is used. For countries that transitioned to another currency—such as El Salvador and Ecuador during dollarization, or European countries upon adopting the Euro—missing values are assigned in the year of the transition.
- 3. Annual growth rate of broad money, in nominal terms. Source: WDI.
- 4. Annual growth rate of real GDP, in constant local currency. Sources: WDI and FRED.

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- 5. Unemployment rate. Sources: WDI and GEM.
- 6. Investment as a percentage of GDP, in current local currency. Source: WDI.
- 7. Public consumption as a percentage of GDP, in current local currency. Source: WDI.
- 8. Real exchange rate: Measured as the ratio of the consumer price index in the United States, converted to local currency using the nominal exchange rate, to the consumer price index of the local economy.
- 9. Fiscal balance, total and primary, as a percentage of GDP. Sources: WDI and WEO.
- 10. Dual market classification. Source: Ilzetzki, Reinhart, and Rogoff (2019, 2022). A system is classified as "dual" if there are dual, multiple, or parallel exchange markets (as opposed to a unified market).
- 11. Exchange rate regime classification. Source: Ilzetzki, Reinhart, and Rogoff (2019, 2022). Exchange rate regimes are classified as fixed or crawling peg if they have a value of 1 or 2 under the "coarse" classification, which includes regimes ranging from those without a legal tender currency to pre-announced crawling bands that are narrower than or equal to 2 percent.

Tables A1 and A2 list the sets of successful and unsuccessful disinflation episodes in Di Tella and Ottonello (2025), along with the year in which the disinflation process began.

Within the set of successful disinflation episodes, we identify a subset characterized by the presence of a dual, multiple, or parallel exchange rate market at the start of disinflation. This classification is based on the data set from Ilzetzki, Reinhart, and Rogoff (2019, 2022), aggregated to the annual frequency using the mode across months, and includes episodes in which one of these regimes persists throughout the period from t = 0 to t = 2. This subset of episodes, analyzed in Figure 4, includes Brazil, 1995; Colombia, 1965; India, 1968; India, 1975; India, 1982; Nigeria, 1996; and Ukraine, 2009.

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## Table A1 Successful Disinflation Episodes

Country	Year	Country	Year
Argentina	1992	Latvia	2009
Australia	1984	Lithuania	1995
Brazil	1995	Malaysia	1975
Bulgaria	1999	Mexico	1998
Canada	1983	New Zealand	1988
China	1995	Nigeria	1996
Colombia	1965	Peru	1995
Colombia	1999	Philippines	1975
Croatia	1995	Poland	1997
Czechia	1994	Romania	2003
Estonia	1996	Russia	2010
Hungary	1997	Saudi Arabia	1977
India	1968	Singapore	1975
India	1975	Slovak Rep.	2001
India	1982	Slovenia	1994
Indonesia	1969	Thailand	1975
Indonesia	1985	Thailand	1982
Indonesia	2007	Turkey	2002
Ireland	1983	Ukraine	2001
Japan	1975	Ukraine	2009
Korea, Rep.	1981	United Kingdom	1981
Latvia	1995	United States	1982

*Notes:* This table lists the set of disinflation episodes classified as "successful" used in the empirical analysis, along with the first year of disinflation (marked as t = 0 in the figures). Further details on the methodology used to define these episodes are provided in the "Data and Methodology" section.

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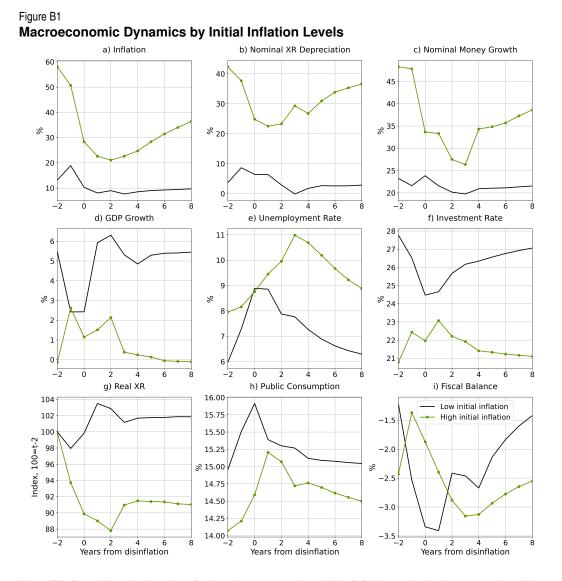
Unsuccessful Disinflation Episodes				
Country	Year	Country	Year	
Argentina	1961	Mexico	1975	
Argentina	1968	Mexico	1978	
Argentina	1974	Mexico	1984	
Argentina	1986	Mexico	1989	
Argentina	2004	Mexico	1993	
Argentina	2009	New Zealand	1983	
Argentina	2013	Nigeria	1972	
Bulgaria	1992	Nigeria	1976	
Chile	1977	Nigeria	1985	
Chile	1981	Nigeria	1990	
Chile	1986	Nigeria	2006	
Chile	1991	Nigeria	2018	
Colombia	1978	Peru	1980	
Colombia	1983	Peru	1986	
Colombia	1986	Peru	1992	
Colombia	1993	Philippines	1981	
Egypt	1985	Philippines	1986	
Egypt	1990	Poland	1983	
Egypt	2018	Poland	1991	
Estonia	1994	Portugal	1975	
Greece	1975	Portugal	1978	
Greece	1987	Portugal	1986	
Hungary	1992	Romania	1995	
Indonesia	1961	Romania	1998	
Indonesia	1971	Russia	1996	
Indonesia	1977	Russia	2000	
Indonesia	1981	Slovenia	1982	
Indonesia	2003	Spain	1978	
Ireland	1977	Turkey	1981	
Israel	1976	Turkey	1986	
Israel	1986	Turkey	1989	
Italy	1978	Turkey	1995	
Korea, Rep.	1965	Turkey	1999	
Korea, Rep.	1973	Ukraine	1996	
Korea, Rep.	1976	United Kingdom	1978	

Table A2

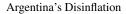
*Notes:* This table lists the set of disinflation episodes classified as "unsuccessful" used in the empirical analysis, along with the first year of disinflation (marked as t = 0 in the figures). Further details on the methodology used to define these episodes are provided in the "Data and Methodology" section.

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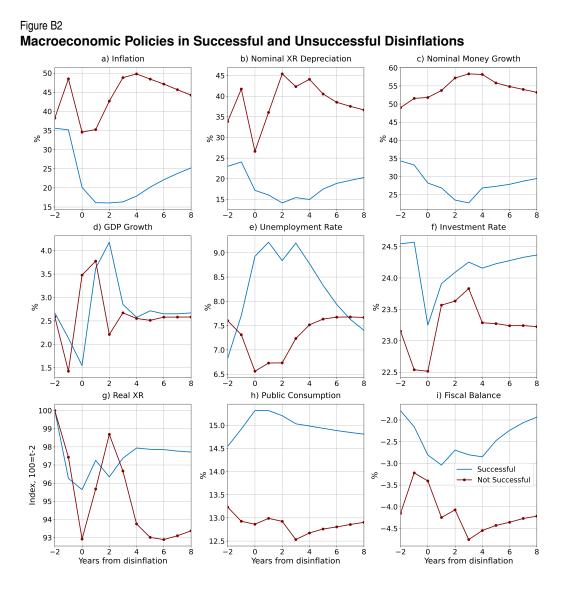
#### **Additional Figures**



*Notes:* This figure shows the dynamics of selected macroeconomic variables (inflation, nominal exchange rate depreciation relative to the U.S. dollar, nominal growth of monetary aggregates, real GDP growth, unemployment rate, investment as a share of GDP, real exchange rate relative to the U.S. dollar, public consumption as a share of GDP, and fiscal balance as a share of GDP) for the set of historical "successful" disinflation episodes analyzed by Di Tella and Ottonello (2025). These dynamics are computed using the estimated coefficients from equation (1) and the recursive expression in equation (2). All variables, except for the real exchange rate, are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The real exchange rate index is set to 100 at t = -2. The horizontal axis represents years since the start of disinflation levels (measured at t = -2) below and above the median, respectively, with the median calculated across all episodes using available data at t = -2. Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix.

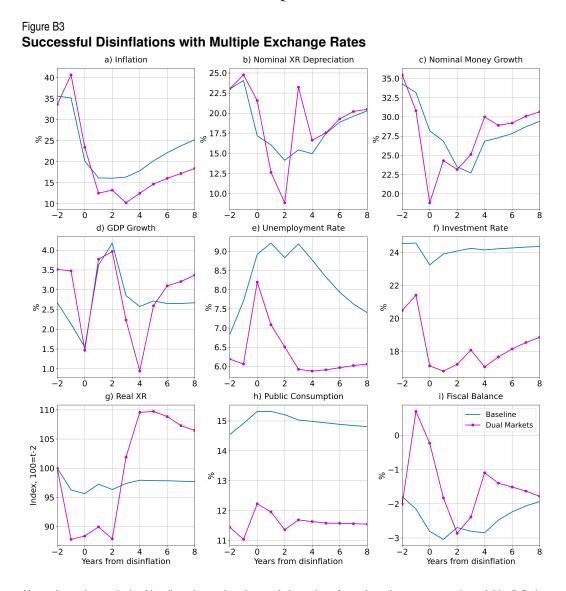


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*Notes:* In each panel, blue and red lines (with markers) show the observed dynamics of a selected macroeconomic variable (inflation, nominal exchange rate depreciation relative to the U.S. dollar, nominal growth of monetary aggregates, real GDP growth, unemployment rate, investment as a share of GDP, real exchange rate relative to the U.S. dollar, public consumption as a share of GDP, and fiscal balance as a share of GDP) for the "successful" and "unsuccessful" disinflation episodes analyzed by Di Tella and Ottonello (2025), respectively. These dynamics are computed using the estimated coefficients from equation (1) and the recursive expression in equation (2). All variables, except for the real exchange rate, are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The horizontal axis represents years since the start of disinflation; t = 0 marks the beginning of the episode. Blue dashed lines denote 90 percent error bands for successful disinflation episodes, calculated using the delta method. The classification of disinflation episodes is based on post-disinflation inflation outcomes: successful episodes are those in which inflation falls below 10 percent in both the second and third years after the start of disinflation; the remaining episodes are classified as unsuccessful. Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix.

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*Notes*: In each panel, the blue line shows the observed dynamics of a selected macroeconomic variable (inflation, nominal exchange rate depreciation relative to the U.S. dollar, nominal growth of monetary aggregates, real GDP growth, unemployment rate, investment as a share of GDP, real exchange rate relative to the U.S. dollar, public consumption as a share of GDP, and fiscal balance as a share of GDP) for the "successful" disinflation episodes analyzed by Di Tella and Ottonello (2025). These dynamics are computed using the estimated coefficients from equation (1) and the recursive expression in equation (1). All variables are expressed in percentages; to improve interpretability, we add back their mean across episodes at t = -2. The horizontal axis represents years since the start of disinflation; t = 0 marks the beginning of the episode. Blue dashed lines denote 90 percent error bands, calculated using the delta method. The purple line (with markers) represents the subset of successful disinflation episodes that feature a dual, multiple, or parallel exchange rate market at the start of disinflation (as identified by Ilzetzki, Reinhart, and Rogoff (2019, 2022)) and maintain it during the following two years (i.e., between t = 0 and t = 2). Further details on the variables and methodology are provided in the "Data and Methodology" section and in the appendix.