Hutchins Center Working Paper #99

October 2024

Inflation Dynamics in Latin America:

Lessons from the COVID and Other Episodes

Juan Pablo Medina

Universidad Adolfo Ibáñez, Chile

Juan Marcos Wlasiuk

Central Bank of Chile

Abstract

The recent surge in inflation has posed significant challenges to macroeconomic management in Latin America. This paper empirically analyzes the factors driving inflation dynamics in the region post-COVID, highlighting key differences from previous episodes and advanced economies. The main findings are as follows: Latin American inflation, traditionally higher and more volatile—except for energy—converged with that of advanced economies in terms of levels and volatility during the pandemic. The acceleration of inflation began earlier in major Latin American countries compared to advanced economies, driven by several factors. Despite differences across countries, common factors influencing the surge and subsequent evolution of inflation during 2021-2023 include demand pressures, global supply disruptions, exchange rate depreciation, and rising inflation expectations. Unlike advanced economies, monetary policy in Latin America reacts more strongly to inflation expectations and US monetary policy, which helps explain the more aggressive and rapid increase in the monetary policy rate in the region during 2021-2022 and the more gradual normalization afterward.

Acknowledgments: The authors thank Joseph Gagnon, Refet Gurkaynak, Steve Kamin, Ruy Lama, and Bernardo Lara for useful comments. Special thanks to Ayhan Kose, the discussant of this paper at the Inflation Conference at The Brookings Institution in April 2024, and Gian Maria Milesi-Ferretti for their insightful suggestions on how to better organize the results and analysis. Gustavo Pinto provided excellent research assistance. Opinions and conclusions expressed in this paper are those of the authors alone and do not necessarily represent the views of the Central Bank of Chile. All remaining errors are the authors' own.

Conflict of Interest Disclosure: Wlasiuk is Head of the International Research and Modeling Unit at the Central Bank of Chile. The authors did not receive financial support from any firm or person for this article or from any firm or person with a financial or political interest in this article. Other than the aforementioned, the authors are not currently an officer, director, or board member of any organization with a financial or political interest in this article.

Hutchins Center on Fiscal & Monetary Policy at BROOKINGS

THIS PAPER IS ONLINE AT

https://www.brookings.edu/articles/inflation-dynamics-in-latin-america

1 Introduction

Like many other countries and regions, Latin America has faced significant macroeconomic challenges due to the recent surge in inflation. This situation has necessitated policy measures to mitigate its impact while minimizing adverse effects on economic activity and employment. For Latin American countries, these challenges test their commitment to maintaining low inflation after decades of significant progress. The global decline in inflation observed over recent decades has been noted across various country groups and through multiple inflation measures (e.g., Ha et al. (2019)). As a result, policymakers have expressed concerns about the potential end of the low inflation period in Latin America. Historical records of high inflation and less well-anchored inflation expectations further underscore these concerns.

In this context, this work aims to deepen the understanding of the drivers of inflation and the corresponding monetary policy responses in Latin America, with a particular emphasis on the recent post-COVID episode. By conducting a comparative analysis of previous inflationary periods and the experiences of advanced economies, this study seeks to provide a comprehensive macroeconomic assessment and derive vital lessons. The goal is to contribute to strengthening monetary policy institutions and frameworks in Latin America, thereby aiding in the consolidation of inflation control at a low and stable level in the future.

The analysis aims to address the following questions: First, what are the recent empirical trends in inflation dynamics in Latin America, and how do they compare with those in advanced economies? Section 2 will address these questions by describing inflation patterns in Latin America over the last few decades, with a detailed examination of the COVID-19 episode.

Second, what factors drove inflation in Latin America during the recent episode, and how do these drivers compare with those in advanced economies? Specifically, what roles did inflation expectations, exchange rate depreciation, demand pressures, and global supply disruptions play in the rise of inflation in Latin America? Section 3 will address these questions through Phillips curve estimations for major Latin American economies and a set of five advanced economies: Canada, New Zealand, Norway, Sweden, and the UK.

Third, what role has monetary policy played during the COVID period and beyond? To what extent does the inflation response to economic policy in Latin American economies differ from that observed in advanced economies? Section 4 will address these questions by characterizing the monetary policy reactions in major Latin American countries.

The analysis leads to three main conclusions. First, it highlights a gradual convergence of inflation in Latin America over recent decades, shifting from historically higher rates and greater variability towards the more stable patterns observed in advanced economies. This trend, except for energy inflation—which has been notably more stable in Latin America—became increasingly evident leading up to and during the pandemic period. During 2021 and 2022, the increase in CPI components in Latin America mirrored trends in advanced economies, though with some differences. Notably, inflation in Latin America accelerated earlier than in advanced economies in 2021, with Chile, Brazil, and Colombia experiencing double-digit inflation rates. Despite this intensity, inflation has declined rapidly in Latin America since mid-2022.

Second, the magnitude of core inflation acceleration in Latin America was more intense after 2020 compared to advanced economies, and the composition of its underlying factors also differed. During 2021-2023, inflation in major Latin American countries was more influenced by demand pressures and global supply chain disruptions than in previous periods or in advanced economies. Exchange rate depreciation exacerbated core goods and services inflation during 2021-2023 in both advanced and Latin American economies. However, Latin American economies experienced more significant currency pressures during COVID-19, which may explain the earlier acceleration of inflation in the region. Additionally, inflation expectations became less well-anchored during 2021-2023, with Latin American expectations being more affected by demand pressures, exchange rate depreciation, and global supply disruptions than in the past. These results underscore the non-linear features of inflation dynamics during the COVID episode, suggesting that elevated inflation expectations amplify the propagation of various shocks.

Third, monetary policy in Latin America is more sensitive to inflation expectations and demand pressures (as captured by the output gap) compared to advanced economies. This sensitivity explains the faster and more intense increase in monetary policy rates observed in Latin America during 2021-2022. Additionally, the influence of the US Federal Funds rate on Latin American monetary policy is more pronounced than in advanced economies. Specifically, when the US adjusts its monetary policy, it becomes more challenging for Latin American countries to implement a coherent policy in the opposite direction. This dynamic contributes to the slower normalization of monetary policy rates in Latin America since mid-2022, relative to what would be dictated solely by internal macroeconomic conditions.

This paper complements several recent studies that analyze the surge in inflation since 2021 and its implications for monetary policy in both advanced and emerging economies. Notable contributions include Ball et al. (2022), Bajraj et al. (2023), Blanchard and Bernanke (2023), Ha et al. (2021, 2022, 2023a), Harding et al. (2023), International Monetary Fund (2022), and Jordà and Nechio (2023), among others.

This work adds to the literature by providing an updated perspective on the key lessons from this episode, with a particular focus on Latin America.

The rest of the paper is organized as follows. Section 2 uses various inflation indicators to describe the inflation patterns in Latin America over the past few decades. This section also examines the cases of the five major Latin American economies during the COVID-19 episode: Brazil, Chile, Colombia, Mexico, and Peru. Changes in inflation and their relationship with several macroeconomic variables in these five countries are analyzed. Section 3 estimates Phillips curve equations to further understand the distinct factors behind the surge in inflation during 2021-2023 in Latin America. The reaction of Latin American monetary policy is studied in Section 4. In all these sections, particular attention is given to comparing Latin America with advanced economies during the same period and with previous periods. Finally, Section 5 presents the concluding remarks.

2 Inflation Patterns in Latin America

This section examines inflation patterns in Latin America over the past decades, with a focus on the recent post-COVID episode. These patterns are compared with those observed in advanced economies. The first subsection explores the evolution of several inflation indicators in Latin America since the mid-1990s. The second subsection delves into the behavior of inflation and its determinants during the COVID episode in five Latin American countries: Brazil, Chile, Colombia, Mexico, and Peru.

Data from a variety of sources is used in this analysis. Panel data on CPI for a large sample of countries is sourced from Ha et al. (2023a). Inflation expectations are obtained from the Consensus Forecast. The IFS database provides the nominal exchange rate and GDP series for individual countries.

The behavior of prices for goods and services is explored using the database assembled by Bajraj et al. (2023), which provides harmonized disaggregated CPI for 55 countries, including both emerging markets and advanced economies.

The role of global supply chain disruptions is incorporated into the analysis using the Global Supply Chain Pressure Index (GSCPI), constructed by the Federal Reserve Bank of New York. This index integrates transportation cost data and manufacturing indicators, providing a comprehensive measure of global supply chain conditions.[1] Data for fiscal variables are sourced from the IMF (e.g., International Monetary Fund (2024)). Mobility restrictions during the COVID-19 episodes are

[1] The index is available at `https://www.newyorkfed.org/research/policy/gscpi#/overview`.

derived from updated information in Hale et al. (2021), while fuel subsidy data are taken from Black et al. (2023).

2.1 Inflation in Latin America over the Past Decades

This section delves into the inflation dynamics of Latin American countries compared to several advanced economies since 1997, utilizing the comprehensive inflation series from Ha et al. (2023a). This dataset includes headline, core, food, and energy CPI inflation across a broad spectrum of countries.

Figure 1(a) illustrates the trajectory of headline inflation rates across Latin American and advanced economies, featuring the median and the 25th and 75th percentiles of year-over-year data. The graph reveals greater volatility within the Latin American bloc, indicated by a wider interquartile range, signifying more pronounced swings around the median compared to advanced economies.[2] Over the analyzed period, Latin American countries consistently report higher median inflation rates; however, this disparity diminishes over time. An overarching downward trend in inflation is evident from 1997 until the advent of COVID-19 in 2020, with this trend being more pronounced in Latin American countries. Notably, apart from the years surrounding the Global Financial Crisis, the inflation gap between Latin American and advanced economies narrows and reverses in the latest observations. After 2022, Latin America's inflation rates decreased more rapidly, descending from historic highs not witnessed in many years. This recent reversal in the inflation differential highlights the disparity in the pace and magnitude of the responses by central banks to the post-COVID inflationary surge, as discussed in Section 4.

Utilizing the granular inflation data available in the database of Ha et al. (2023a), the analysis examines whether the disparities and observed trends in headline inflation are reflected in its main components. Figure 1(b) displays the energy inflation rates for both blocs of countries. Interestingly, the energy inflation rates between Latin American economies and developed economies do not significantly diverge on average. However, energy inflation is less volatile within Latin America. This may suggest the presence of more robust energy price regulations in the region's countries, as exemplified by the case of MEPCO in Chile.[3]

In contrast, food inflation in Latin American countries has been significantly higher and more volatile than in developed economies. Figure 1(c) shows that, his-

[2] The list of countries used for these computations is in table 8 in the appendix.

[3] Established in 2014, MEPCO was implemented to create a stabilization mechanism for the domestic sale prices of automotive gasoline, diesel fuel, liquefied petroleum gas, and compressed natural gas, the latter two being for vehicular use.

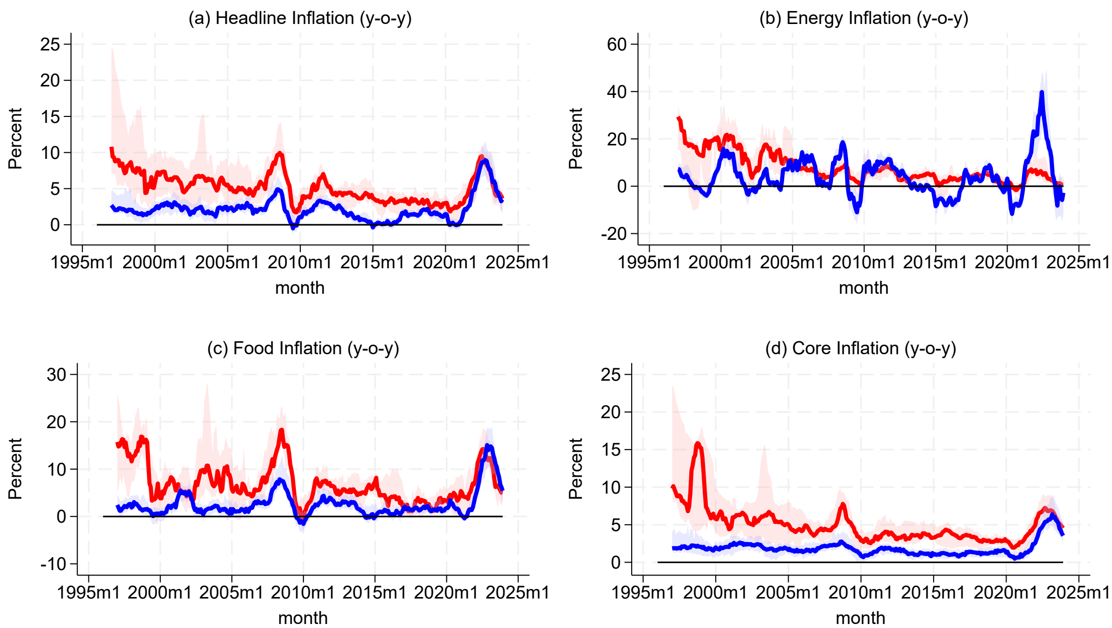


Figure 1: Inflation Patterns in Advanced and Latin American Economies

Notes: Key inflation indices in advanced (blue) and Latin American (red) countries. Monthly data, 12-month percentage change (logarithmic). Lines represent the median across countries within each group, while shaded areas indicate the 25th and 75th percentiles across countries. Source: Calculations based on data from Ha et al. (2023a).

torically, food inflation was systematically elevated and exhibited greater variability in Latin America, particularly leading up to 2016. More recently, however, food inflation rates in the region have aligned more closely with those observed in developed economies. Currently, food inflation is marginally higher in developed economies, indicating a convergence in the dynamics of food prices between these economic regions.

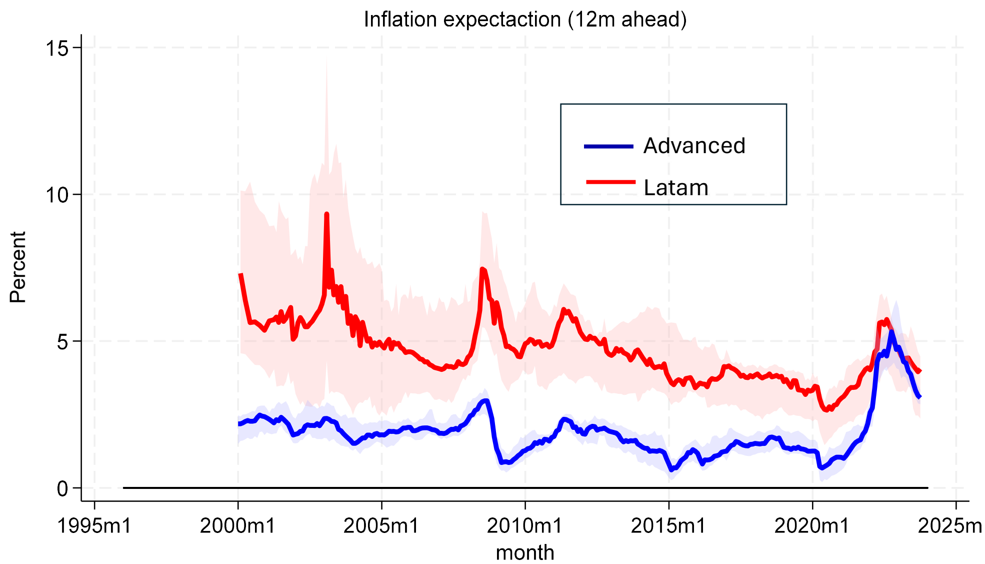
Figure 1(d) shows that core inflation has been consistently higher across Latin American economies throughout the period under review, including the years impacted by the COVID-19 pandemic. While a declining trend in core inflation is evident in both Latin American and advanced economies, the decrease is notably more substantial in the former. Additionally, core inflation in Latin America is characterized by greater volatility, though recent patterns indicate a convergence toward those observed in advanced economies, albeit at higher rates. This emerging alignment suggests a gradual convergence in underlying inflationary pressures, despite the ongoing challenge Latin American countries face in managing higher and less stable inflation rates.

During the COVID-19 period, a notable shift in inflationary trends emerged between Latin American (Latam) and advanced economies (AEs). Both inflation levels and volatility surged in advanced economies, characterized by a pronounced initial decline in 2020, followed by a sharper and more substantial inflationary increase in 2021 and 2022. This pattern is evident across the three main components of the Consumer Price Index (CPI)—core, food, and energy—with energy inflation showing the most significant variance. This disparity in energy inflation can be partially attributed to the substantial impact of the Russian invasion of Ukraine on European energy prices.

Using the detailed inflation data provided by Ha et al. (2023a), the analysis reveals nuanced insights into the comparative inflation dynamics between Latin American and advanced economies. Historically characterized by heightened volatility and elevated inflation rates, Latin American economies have, in recent periods, shown a trend toward convergence with the inflationary patterns observed in advanced economies, particularly in the aftermath of the COVID-19 pandemic. This convergence is complex; while average energy inflation rates show minimal disparity in levels, there is significant and increasing disparity in volatility across blocs. Similarly, food and core inflation, traditionally more volatile and higher in Latin America, have begun to align more closely with advanced economies, even though Latin America continues to maintain higher rates. The COVID-19 era and its ensuing years have marked a pivotal shift in inflationary trends, with advanced economies experiencing a surge in volatility. This shift in inflation dynamics, particularly the narrowing of inflation rate differences between Latin America and advanced economies during the pandemic, underscores the complex nature of inflation and the varied responses of central banks to global economic disruptions.

As mentioned above, the inflation expectation data are sourced from the Consensus Forecast, which provides forecasts for annual inflation for December of the survey year and the following year. To generate a series for inflation expectations 12 months ahead, the method used by Brito et al. (2018) is followed, which involves calculating a weighted average between the forecast for December of the current year and the forecast for the next year. The weight assigned to the current year's forecast corresponds to the number of months remaining in the year at the time of the survey, divided by twelve. Figure 2 shows the evolution of inflation expectations across advanced economies and compares them with those of Latin American economies.

Inflation expectations have historically been higher in Latin America than in



Note: Own calculation based on Consensus Forecast data. Lines corresponds to the median across countries and shaded areas denote the 25 and 75 percentiles across countries.

Figure 2: Inflation Expectations (12 Months Ahead)

advanced economies, but between 2000 and 2020, the gap between these groups narrowed. Latin American countries also exhibit greater cross-country variation in inflation rates, as indicated by the area marked by the 25th-75th percentiles in figure 2. Advanced economies experienced a sharper increase in inflation expectations in 2021-22, rising from lower levels to converge with those observed in Latin America. Inflation expectations moderated from their peaks in the latter part of 2022.[4] Thus, the gradual control of inflation expectations in Latin America was tested in the aftermath of COVID-19.

The primary observation over the past few decades is a gradual convergence of inflation in Latin America toward the more stable patterns seen in advanced economies. Except for energy inflation, which has been notably more stable in Latin America, this trend became increasingly evident and was fully realized during the pandemic. Appendix A confirms the robustness of this convergence pattern using harmonized CPI components from Bajraj et al. (2023). The appendix also shows

[4] Data for inflation expectations extend until September 2023 in figure 2.

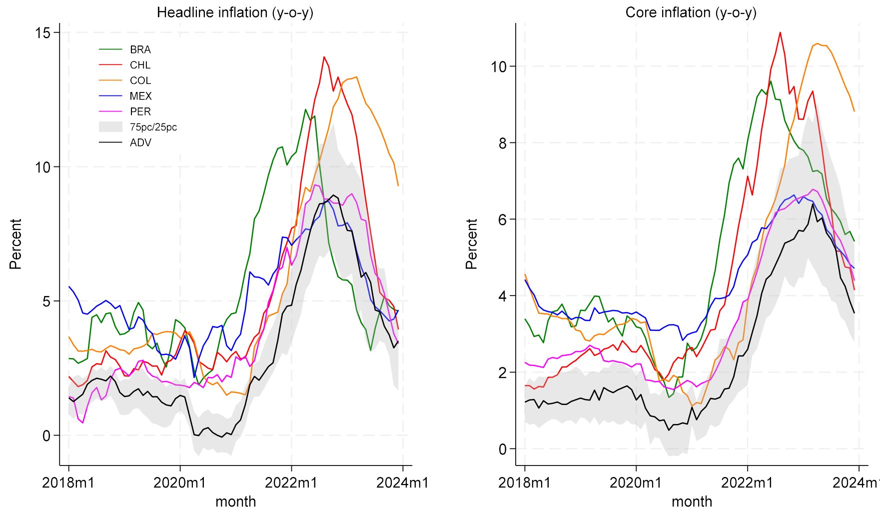


Figure 3: Headline and Core Inflation since 2018

that the CPI basket composition in Latin America reflects this convergence, displaying more similarities to those of advanced economies than to other emerging markets. Nevertheless, it retains a higher weight on food and a lower weight on energy and services compared to advanced economies. The increase in inflation across various CPI components during 2021 and 2022 mirrored trends in advanced economies. Furthermore, Latin America initiated a disinflation process earlier than other regions, so that by early 2024, in most areas, only services inflation remained slightly above pre-pandemic levels.

2.2 Major Latin American countries during COVID

This subsection focuses on the cases of Brazil, Chile, Colombia, Mexico, and Peru in the more recent period, analyzing the surge of inflation and its subsequent evolution in more detail. These five Latin American countries are compared with advanced economies throughout the analysis.

Figure 3 presents the evolution of their headline and core inflation since 2018. The figure also includes the median value of these variables along with the 25th and 75th percentiles for advanced economies. During the COVID episode, the surge in inflation was more intense in Brazil, Chile, and Colombia, where it exceeded that in advanced economies. In contrast, Mexico and Peru experienced a rise in inflation that was more aligned with the pattern observed in advanced economies.

The dynamics of inflation were undoubtedly influenced, at least partially, by the fiscal responses of various countries during the COVID crisis and its aftermath. Between 2020 and 2022, Latin American countries, particularly Brazil, Chile, and to a lesser extent Peru, implemented significant fiscal measures. These responses included direct spending, such as transfers to households, subsidies to businesses, and increased health expenditures; loans and guarantees to ensure liquidity for businesses and citizens; and tax deferrals and reductions aimed at alleviating the fiscal burden on both individuals and companies. Brazil enacted one of the largest fiscal packages in the region, characterized by massive transfers to households, subsidies to businesses, and substantial increases in health spending[5]. Chile also allocated a significant portion of its GDP to support measures, including direct transfers and business subsidies. Peru provided considerable fiscal support as well, focusing on household transfers, employment retention measures, and support for small and medium-sized enterprises. The scale of these fiscal packages approached those of developed countries, with cumulative amounts ranging from 10% to 15% of GDP. Additionally, in Chile and Peru, early withdrawals from pension funds contributed further, amounting to approximately 20% of GDP in Chile and 11% of GDP in Peru (Olivera and Valderrama, 2022; Fuentes et al., 2024; Madeira, 2024).

Since headline inflation tends to be more volatile in Latin America than in advanced economies, analyzing the evolution of core inflation in figure 3 is particularly useful. Notably, core inflation in Brazil, Chile, and Mexico began to accelerate earlier than in advanced economies, as well as in Colombia and Peru. However, the subsequent evolution of core inflation varied across countries. The acceleration was more intense in Brazil and Chile, but in Brazil the peak occurred slightly earlier and was smaller than in Chile. Core inflation in Mexico accelerated more gradually, reaching a peak similar to that observed in advanced economies.

Figure 4 (left panel) shows the evolution of inflation expectations one year ahead for the same set of countries as in figure 3. While inflation expectations rose in both advanced economies and the five Latin American countries considered, the increase was more pronounced in Chile initially, and later in Colombia, where by the end of 2023, the level remained well above the pre-pandemic level. In contrast, Brazil saw a sharp decline in inflation expectations starting in mid-2022, bringing them close to pre-2020 levels. Mexico experienced a more moderate rise in inflation expectations, followed by a gradual reduction to pre-pandemic levels. In Peru, the increase in inflation expectations was more modest than in advanced economies. Although inflation expectations in these five countries reached levels higher than

[5]See the Database of Fiscal Policy Responses to COVID-19 from the IMF (IMF, 2021c). For Brazil, see additionally IMF (2021a); for Chile, see IMF (2021b); and for Peru, IMF (2021d).

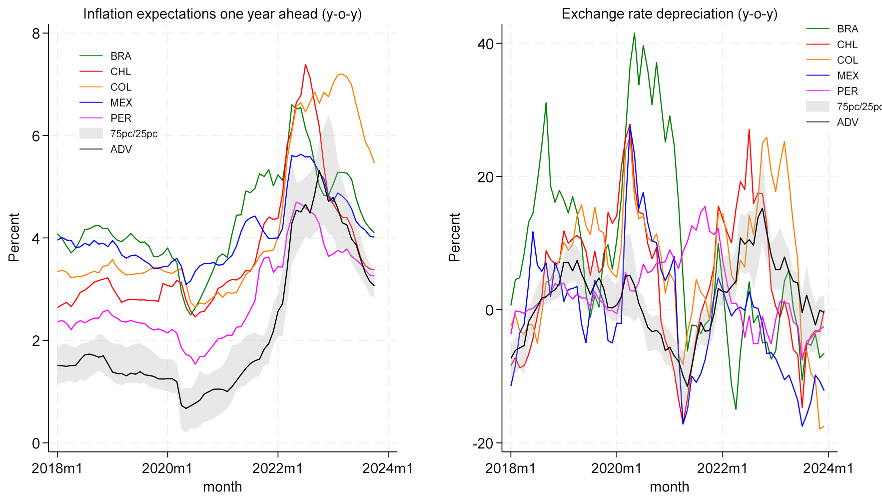


Figure 4: Inflation Expectations and Exchange Rate Depreciation Since 2018

those in most advanced economies, the relative increase from their 2019 levels was not significantly different. This is partly due to the differences in inflation targets set by each country.

Figure 4 (right panel) shows the annual exchange rate depreciation against the dollar. The chart highlights the significant role of exchange rate depreciation in driving the early acceleration of inflation in Latin America. While advanced economies experienced smaller movements in their exchange rates during 2020, Latin America faced annual exchange rate depreciations of 30 to 40 percent at the onset of the COVID-19 pandemic, particularly in Brazil. This depreciation eased during 2020 but likely exerted inflationary pressure in 2021, as noted by major central banks in the region. Interestingly, exchange rate depreciation in Peru was more muted and gradual, coinciding with a smaller inflation surge in that country.

A final piece of information on the evolution of inflation is presented in figure 5, which displays more disaggregated components of the CPI. This figure consists of four panels. Panels A and B present annual inflation in energy and food, respectively, with data sourced from Ha et al. (2023a). Panels C and D show inflation in core goods and services, respectively, using annual inflation rates obtained from the harmonized database in Bajraj et al. (2023).[6] Energy inflation increased in Brazil, Mexico,

[6]Peru is excluded from this figure due to irregularities in the series of energy and food prices,

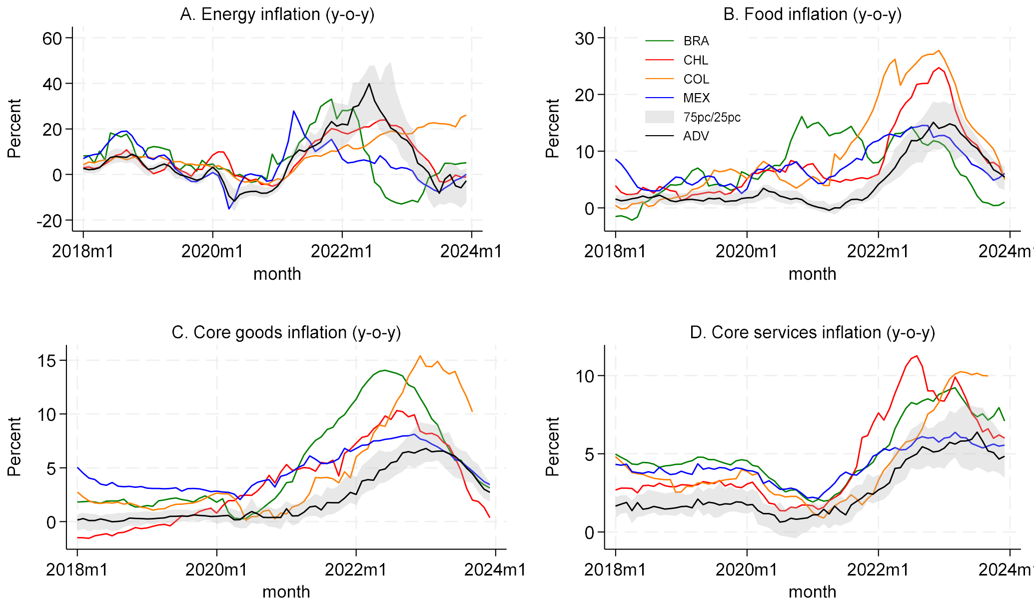


Figure 5: Other Disaggregated Components of CPIs

Chile, and Colombia. However, the surge in energy inflation in Latin America was smaller than that experienced in advanced economies. This difference can potentially be attributed to two factors: (i) the surge in energy prices in European countries following the Russian invasion of Ukraine and (ii) higher subsidies to energy prices in Latin America. Additional evidence on the second factor is provided below.

Panel B in figure 5 indicates that food inflation in Latin America began to increase during 2020, whereas in advanced economies, it remained more stable until 2022. Notably, food inflation rose substantially in Brazil in 2020. Panel C further shows that inflation in core goods also increased earlier in Latin American countries, likely due to exchange rate depreciation. While inflation in core goods remained relatively stable in advanced economies and even tended to decrease during 2020 in Colombia and Brazil, it steadily rose in Chile and Mexico since the onset of the pandemic. In contrast, panel D provides evidence that inflation in core services in Latin America followed a pattern more similar to that observed in advanced economies during the initial phase of COVID. However, the acceleration of inflation in core services began sooner in Latin America than in advanced economies, as highlighted earlier.

To understand the factors behind the earlier surge in inflation and its subsequent

which are present in both databases.

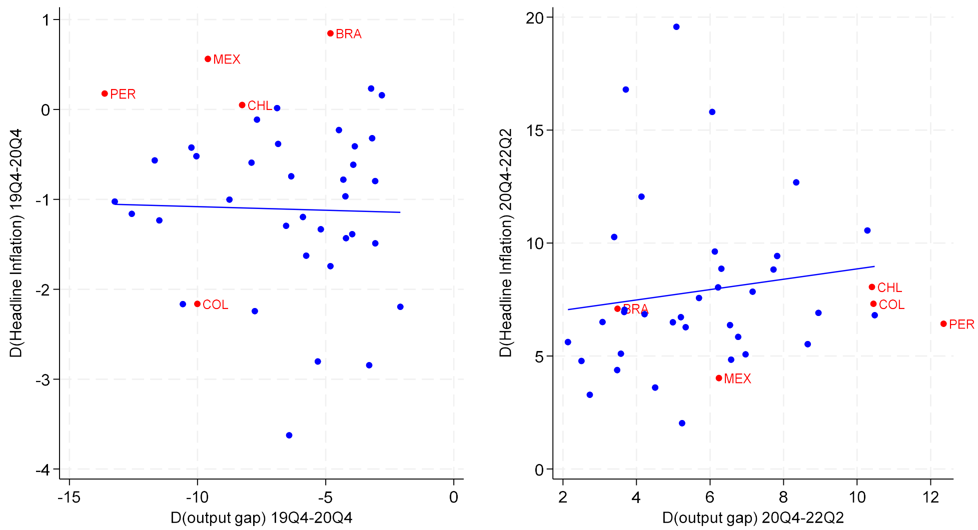
evolution, changes in inflation in the five Latin American countries between 2019 and 2020 and between 2020 and mid-2022 are analyzed. Several scatter plots of these changes are created, relating them to variations in the output gap, exchange rate depreciation, energy inflation, and other relevant variables during the same period. These scatter plots include advanced economies and the inferred-fitted relationships. Figure 6 illustrates the relationship between changes in headline inflation and changes in the output gap.[7] The chart on the left (right) plots the differences between 2020Q4 and 2019Q4 (2022Q2 and 2020Q4). Blue points correspond to advanced economies, and the blue line represents the fitted relationship for their sample. This figure demonstrates that the reduction in aggregate demand in 2020 did not reduce inflation in Latin America as it did in advanced economies, with Colombia being an exception. However, there was a tendency for a reduction of around 1 percent in headline inflation between 2019 and 2020 in advanced economies, a pattern not observed in Latin American countries. After 2020, the rise in inflation relative to the expansion in aggregate demand appears more aligned with what was observed in advanced economies. Notably, the change in the output gap from 2020Q4 to 2022Q2 in Chile, Colombia, and Peru was at the upper bound of the values observed in advanced economies, suggesting a significant increase in demand pressures in these three countries after 2020.

Figure 7 presents a similar chart but with exchange rate depreciation on the horizontal axis. This figure highlights the role of exchange rate depreciation in explaining the greater increase in inflation observed in Latin America compared to advanced economies.

Figure 8 connects changes in inflation with changes in inflation expectations. With the exception of Colombia, inflation appears higher in Latin America during the first year of the pandemic when considering the evolution of inflation expectations and the pattern observed in advanced economies. In contrast, the rise in inflation after 2020 aligns with the increase in inflation expectations and the pattern seen in advanced economies.

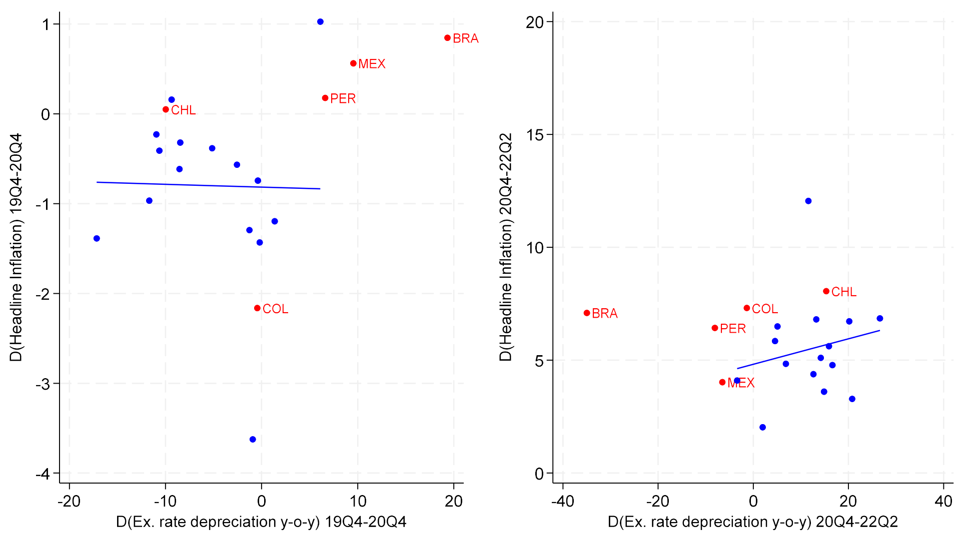
Figure 9 presents four relationships to analyze changes in inflation between the end of 2020 and mid-2022. The first chart relates the rise in inflation since 2020 with the increase in energy inflation during the same period. The second chart shows the same relationship for food inflation. The third chart explores the connection between the increase in inflation and the change in the fiscal structural balance as a percentage of GDP, where a greater reduction in the structural fiscal balance implies a higher

[7] The output gap is calculated as the log-linear deviation from its Hodrick-Prescott filter, with a four-quarter moving average applied. Since GDP data is available through the end of 2023, the end-period problem is less severe when analyzing the output gap up to 2022.



Red: LAC5; blue: Advanced economies.

Figure 6: Changes in Output Gap and Headline Inflation: 2020Q4–2019Q4 and 2022Q2–2020Q4



Red: LAC5; blue: Advanced economies.

Figure 7: Changes in Exchange Rate Depreciation and Headline Inflation: 2020Q4–2019Q4 and 2022Q2–2020Q4

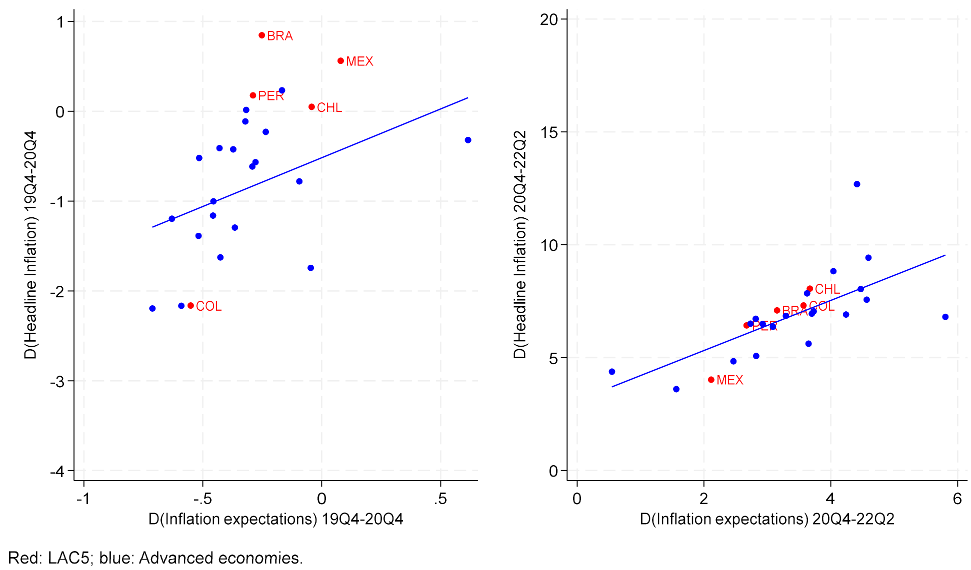
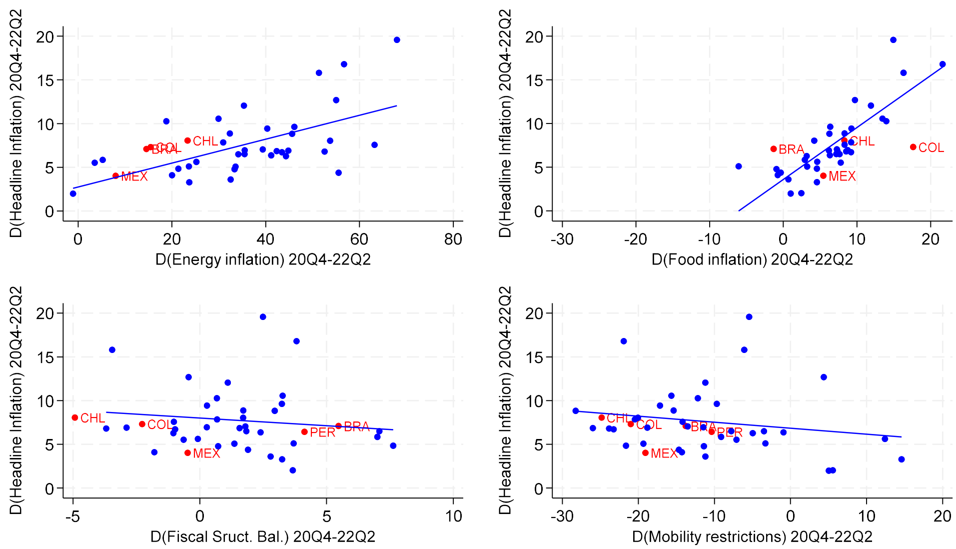


Figure 8: Changes in Inflation Expectations and Headline Inflation: 2020Q4–2019Q4 and 2022Q2–2020Q4

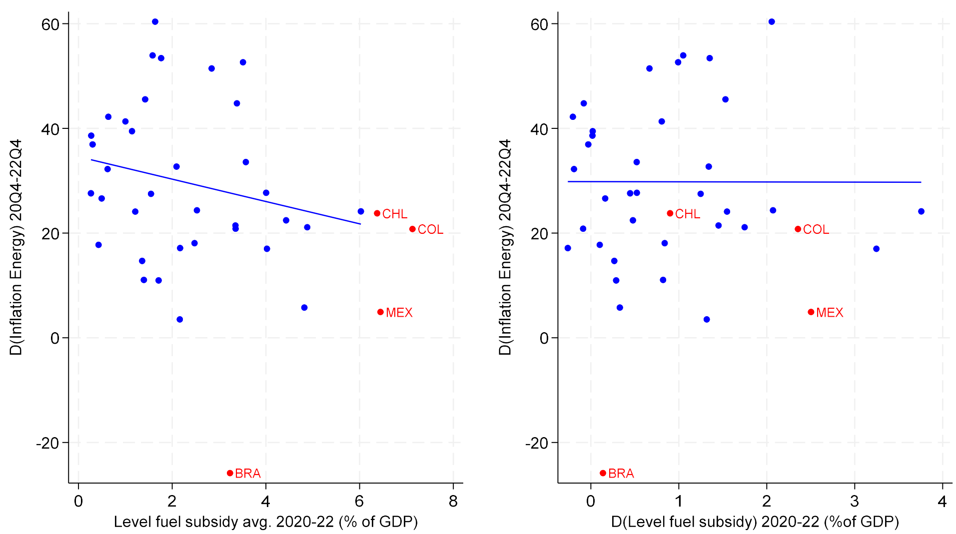
demand impulse in the economy. The final chart examines whether the relaxation of mobility restrictions between 2020 and mid-2022 exerted inflationary pressure. In the case of advanced economies, a strong correlation between changes in food and headline inflation is observed. It is evident that energy inflation increased much less in Latin America than in advanced economies after 2020. The fiscal impulse, as captured by the change in the structural fiscal balance as a percentage of GDP, was particularly substantial in Chile, exceeding that of most advanced economies. In contrast, fiscal policy was restrictive after 2020 in Brazil and Peru. Regarding mobility restrictions, as collected by Hale et al. (2021), Chile is again among the countries with the greatest reduction in these restrictions, which may coincide with the higher increase in inflation after 2020.

Regarding the role of fuel subsidies, figure 10 presents two scatter plots with the change in energy inflation between 2020 and 2022 on the vertical axis. On the horizontal axis, the chart on the left displays the average level of implicit and explicit fuel subsidies (as a percentage of GDP) during 2020-2022, while the chart on the right shows the change in these subsidies between 2020 and 2022. The chart on the left indicates that fuel subsidies tend to be higher in Latin American countries than in advanced economies, which may be associated with a less severe increase in energy



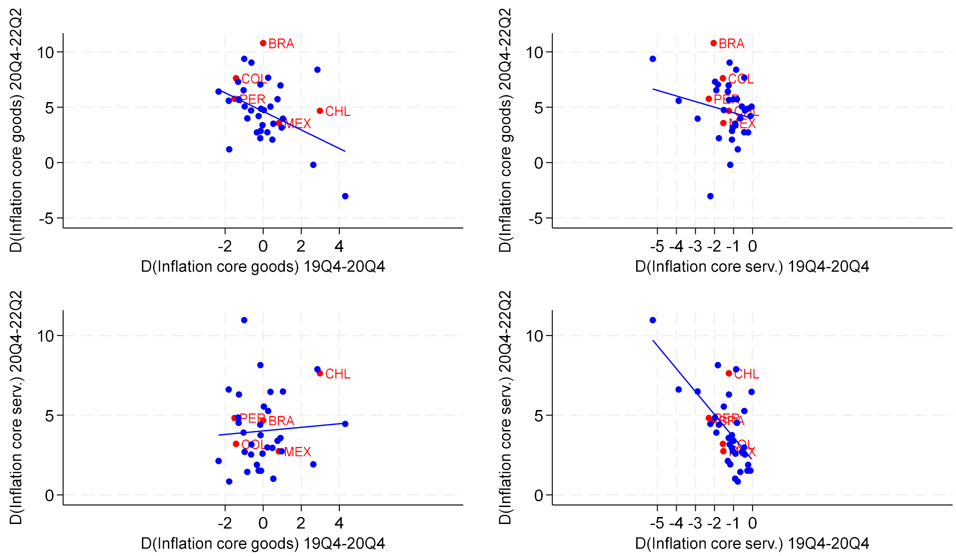
Red: LAC5; blue: Advanced economies.

Figure 9: Changes in Headline Inflation and Other Factors: 2020Q4–2019Q4 and 2022Q2–2020Q4



Red: LAC5; blue: Advanced economies.

Figure 10: Fuel Subsidies and Changes in Energy Inflation: 2020Q4–2019Q4 and 2022Q2–2020Q4



Red: LAC5; blue: Advanced economies.

Figure 11: Changes in Core Inflation in Goods and Services: 2020Q4–2019Q4 and 2022Q2–2020Q4

inflation, as suggested by the observed pattern among advanced economies.

An interesting question is whether the inflation dynamics of goods and services during 2020 can shed light on the subsequent evolution of these different components of core inflation after 2020. Figure 11 illustrates these relationships. The first chart shows that a greater increase in core goods inflation during 2020 correlates with a smaller rise in this inflation component afterward. Brazil, Chile, and Colombia experienced a sharper rise in core goods inflation during 2020 compared to the pattern observed in advanced economies, while Mexico and Peru were more aligned with this pattern. Similar insights can be drawn from the other charts. For example, a greater reduction in core services inflation in 2020 tends to predict a larger increase in core services inflation in the following years. Brazil appears to have had a higher rate of core goods inflation after 2020, consistent with the pattern observed in advanced economies (panels A and B in figure 11). Regarding services, Chile stands out with a more pronounced increase in services inflation since 2020 compared to advanced economies, whereas the other Latin American countries follow a pattern more consistent with that of advanced economies.

These observations for the major Latin American economies align with the assessments made by individual central banks when setting their monetary policies during 2021 and 2022.[8] For example, in December 2021, the Central Bank of Chile indicated that the monetary policy rate needed to rise further to address the cumulative macroeconomic imbalances that had contributed to the rapid increase in inflation.[9] The monetary authority in Chile acknowledged that the surge in inflation was not solely due to external factors but was driven largely by internal demand pressures resulting from a significant fiscal impulse and massive withdrawals from individual pension fund savings, which had notably increased domestic consumption. The rise in services inflation, clearly exceeding that of other Latin American countries, reinforces this assessment.

While the Central Bank of Brazil (Banco Central do Brasil) did not emphasize high demand pressures as the Central Bank of Chile did during 2021, it highlighted that fiscal policy during the pandemic increased aggregate demand and deteriorated public finances, with potential consequences for the country's risk premium.[10] It also suggested that this effect could lead to currency depreciation and higher inflation. Similarly, the Central Bank of Mexico (Banco de Mexico) did not attribute the rise in inflation during 2021 to demand pressures, but expressed greater concern over the effects of exchange rate depreciation, the persistence of high core inflation levels, external inflationary forces, and cost-related pressures.[11]

In the case of Colombia, the central bank (Banco de la Republica de Colombia) considered for most of 2021 that the economy still had excess productive capacity. However, by the end of 2021, the Bank noted that GDP was on a significant growth trajectory, surpassing pre-pandemic levels.[12] This suggests that demand pressures emerged later in Colombia compared to Brazil and Chile. The Central Reserve Bank of Peru (BCRP) consistently stated during 2021 and 2022 that most indicators of economic activity expectations remained in pessimistic territory. Consequently, the BCRP attributed the rise in inflation—less intense than in other major Latin

[8]The assessments were obtained from the press releases and minutes of the monetary policy meetings available on the websites of each central bank.

[9]See the press releases of monetary policy meetings held by the Central Bank of Chile during the period of 2020-2022 at `https://www.bcentral.cl/en/web/banco-central/areas/monetary-politics/monetary-policy-meeting-rpm`.

[10]This information was obtained from the minutes of the Monetary Policy Committee (Copom) meetings held by the Banco Central do Brasil during 2020-2022. These minutes are available at `https://www.bcb.gov.br/en/publications/copomminutes/cronologicos`.

[11]The source of this discussion was obtained from the Banco de Mexico's monetary policy statements during 2020-2022. These statements are available at `https://www.banxico.org.mx/publications-and-press/announcements-of-monetary-policy-decisions/monetary-policy-announcements.html`.

[12]See the minutes from Banco de la República's Board of Directors meetings during 2020-2022, available at `https://www.banrep.gov.co/en/press-releases-board`.

American countries—primarily to a surge in international food and fuel prices, as well as to exchange rate depreciation.[13]

Despite differences in the macroeconomic diagnoses of the driving forces across countries, as assessed by the central banks, all expressed concerns regarding the rise in inflation expectations after 2020. For instance, in December 2021, the Central Bank of Brazil highlighted the risk of a de-anchoring of long-term inflation expectations.[14] The Central Reserve Bank of Peru (BCRP) stated in December 2022 that a reduction in inflation expectations would support the projection of returning to the target inflation range by the end of 2023.[15] Similarly, the Central Bank of Chile, in justifying the decision to hold the policy rate at 11.25 percent in December 2022, noted concerns that two-year inflation expectations continued to exceed the 3 percent target.[16]

This section has presented preliminary evidence that inflation accelerated during the COVID episode earlier in Latin America than in advanced economies. Additionally, this surge in inflation intensified during 2021, driven by evolving demand pressures, global inflation, inflation expectations, and exchange rate movements. The next section will further analyze the factors influencing these inflation dynamics in Latin America.

3 Driving Factors of Inflation in Latin America

To analyze the inflation dynamics in Latin America and compare them with those in advanced economies, a hybrid Phillips curve is estimated using quarterly data from 2005Q1 to 2023Q4. The specification used is as follows:

$$\pi^c_{i,t} = \beta_0 + \beta_1 \pi^{a,c}_{i,t-1} + \beta_2 \pi^e_{i,t-1} + \beta_3 y^a_{i,t-1} + \beta_4 \pi^{s,a}_{i,t-1} + \beta_5 \pi^{en,a}_{i,t-1} + \beta_6 \pi^{f,a}_{i,t-1} + \beta_7 d_t + u_i + \varepsilon_{i,t}, \quad (1)$$

where $\pi^c_{i,t}$ is the quarter-over-quarter annualized inflation rate for core CPI in country i in quarter t, $\pi^{a,c}_{i,t}$ is the annual core inflation in country i in quarter t, $\pi^e_{i,t}$ is the 12-month-ahead inflation expectation in country i in quarter t (from the Consensus Forecasts), $y^a_{i,t}$ is the annual moving average of the output gap in country i in quarter

[13] These assessments were obtained from monetary policy statements by the Central Reserve Bank of Peru during 2020-2022. These statements are available at `https://www.bcrp.gob.pe/en/communications.html`.

[14] See the respective minutes from December 2021 at `https://www.bcb.gov.br/en/publications/copomminutes/08122021`.

[15] See the statement from December 2022 at `https://www.bcrp.gob.pe/eng-docs/Monetary-Policy/Informative-Notes/2022/informative-note-december-2022.pdf`.

[16] See the press release from December 2022 at `https://www.bcentral.cl/en/content/-/details/monetary-policy-meeting-december-2022`.

t, $\pi_{i,t}^{s,a}$ is the annual depreciation of the exchange rate (against the US dollar) in country i in quarter t, $\pi_{i,t}^{en,a}$ is the annual energy inflation in country i in quarter t, $\pi_{i,t}^{f,a}$ is the annual food inflation in country i in quarter t, and d_t is the annual average of the Global Supply Chain Pressure Index constructed by the New York Fed.

The parameters β_1, β_2, β_3, and β_4 capture the roles of past inflation, inflation expectations, economic slack (measured by the output gap), and exchange rate depreciation. The specification also accounts for the propagation of non-core price shocks to core inflation (β_5 and β_6) and the effect of global supply chain disruptions on core inflation (β_7). The estimation includes country fixed effects (u_i).[17]

The quarterly inflation rate, the dependent variable, is seasonally adjusted. Using the CPI from Ha et al. (2023a), seasonality is removed with quarter dummies estimated separately for each country. The Harmonized CPI constructed by Bajraj et al. (2023) is already seasonally adjusted, so no additional adjustment is necessary when using these CPIs.

Equation (1) is estimated separately for the five Latin American countries considered in subsection 2.2 and for a set of advanced economies comprising Canada, New Zealand, Norway, Sweden, and the UK. This selection of advanced economies includes commodity exporters, which are small open economies with established Inflation Targeting regimes. Notably, the Latin American countries analyzed are also commodity exporters, making these advanced economies a suitable reference for comparing inflation dynamics across the two regions.[18]

Table 1 presents the results of the estimations for core inflation measures from Ha et al. (2023a). Separate panels are provided for the Latin American countries (LAT5) and the five advanced economies (ADV5).[19] Two samples were used to assess potential changes in inflation dynamics during the pandemic: one estimation for each set of countries covers the period 2005-2020 (05-20), and the other spans 2005-2023 (05-23). This comparison helps to identify the potential influence of the COVID episode on the estimated coefficients.

Using a quarter-over-quarter inflation rate reduces the size of the inflation persistence captured by the coefficient on lagged inflation compared to studies that use year-over-year inflation (see, for instance, Kamber et al. 2020). Despite this, the estimation for the period 2005-2020 indicates that demand pressures, as captured

[17] Since the Global Supply Pressure Index is the same for all countries, the estimations do not include time fixed effects.

[18] The same group of advanced economies is used in the following section to analyze and compare monetary policy responses in Latin America.

[19] Peru was excluded from the Phillips curve estimation for Latin America due to short and irregular series for energy and food prices.

Table 1: Phillips Curve Estimation for Core Inflation.
2005-2020 vs 2005-2023

	2005-2020		2005-2023	
	LAT5	ADV5	LAT5	ADV5
Lag inflation	0.181	0.0787	0.0976	0.485*
	(0.129)	(0.162)	(0.0786)	(0.219)
Lag inf. expectation	0.603	0.560	0.666*	0.245
	(0.428)	(0.329)	(0.275)	(0.279)
Lag output gap	0.111**	0.0664	0.145*	0.0525
	(0.0335)	(0.0555)	(0.0491)	(0.0817)
Lag ex. rate depreciation	-0.000394	0.00760	0.0056	0.0147***
	(0.00836)	(0.00913)	(0.0094)	(0.0030)
Lag energy inflation	0.0344	-0.0179	0.0455**	0.0069
	(0.0383)	(0.0148)	(0.0114)	(0.0170)
Lag food inflation	0.0457	0.00297	0.0472	0.0006
	(0.0282)	(0.0301)	(0.0422)	(0.0314)
GSCPI	-0.438	0.236	0.194	0.349**
	(0.272)	(0.145)	(0.183)	(0.102)
dummy 21-23			1.357**	0.919**
			(0.299)	(0.322)
Observations	241	320	285	375
R-squared	0.266	0.140	0.440	0.353
N. countries	4	5	4	5

Additional controls include a constant and country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

by the output gap, exert a greater impact on core inflation in Latin America than in advanced economies. A similar conclusion emerges regarding the propagation of energy inflation to core inflation: in Latin America, this propagation is more intense, although not statistically significant.

For the period 2005-2020, the estimation reveals that lagged inflation expectations contribute to explaining inflation dynamics in both Latin America and advanced economies, although this effect is not statistically significant. Additionally, exchange rate depreciation does not have a significant impact on core inflation in either region during this period, likely because the effects of exchange rate movements are already embedded in past inflation expectations and core inflation. Furthermore, core inflation in Latin America exhibits greater sensitivity to food price shocks, though this relationship is not statistically significant. Similarly, global supply disruptions do not impose statistically significant pressures on core prices in either Latin America or advanced economies.

The last two columns in Table 1 present the estimation results for the period 2005-23, highlighting differences in the influence of various factors during the COVID episode. This specification includes a dummy variable for the period 2021-2023. The results for Latin America during 2005-2023 suggest that demand pressures were likely amplified during COVID, contrasting with the estimated impact in advanced economies. Additionally, the statistical significance of inflation expectations tends to increase with the inclusion of observations from 2021-2023. Although the impact of exchange rate depreciation on core inflation appears to have risen in Latin America during the COVID period, this effect remains statistically insignificant. However, the sensitivity of core inflation to energy price shocks increases significantly when incorporating data from 2021-2023. A notable finding is the intensified effect of global supply disruptions in Latin America, captured by both the global supply chain index and the dummy for 2021-2023 observations. This dummy effect is more pronounced in Latin America than in advanced economies and is statistically significant. In contrast, one notable change in advanced economies is the increased persistence of core inflation with the inclusion of the COVID period, a pattern not observed in Latin America.

To further analyze the determinants of core inflation, the harmonized CPI database from Bajraj et al. (2023) is used to separate core inflation into goods and services components. The Phillips curve is then estimated as in equation (1), with core inflation for goods and services treated as separate dependent variables. Due to the absence of data for New Zealand in the Bajraj et al. (2023) database, this advanced economy is excluded from the estimations. The results of these estimations are presented in Table 2 for core goods and Table 3 for core services. Consistent with the

Table 2: Phillips Curve Estimation for Core Goods Inflation. 2005-2020 vs 2005-2023

	2005-2020		2005-2023	
	LAT4	ADV4	LAT4	ADV4
Lag inf. core goods	0.576**	0.380**	0.520**	0.371**
	(0.154)	(0.0737)	(0.128)	(0.0879)
Lag inf. expectation	-0.217	0.184	-0.351	0.0733
	(0.436)	(0.120)	(0.218)	(0.0950)
Lag output gap	0.0211	-0.0955	0.0273	-0.0865
	(0.0479)	(0.0755)	(0.0674)	(0.0997)
Lag ex. rate depreciation	0.0502*	0.0598***	0.0535*	0.0729***
	(0.0163)	(0.00712)	(0.0177)	(0.00412)
Lag energy inflation	0.0549	-0.0378**	0.0801**	-0.00877
	(0.0614)	(0.0083)	(0.0167)	(0.0091)
Lag food inflation	0.108	0.0882	0.119	0.0768
	(0.0500)	(0.0411)	(0.0807)	(0.0567)
GSCPI	0.164	0.617***	0.999**	1.022***
	(0.478)	(0.0583)	(0.308)	(0.0676)
dummy 21-23			0.0395	0.357
			(0.844)	(0.220)
Observations	241	256	285	300
R-squared	0.452	0.341	0.677	0.586
N. countries	4	4	4	4

Additional controls include a constant and country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

previous analysis, the estimations are separated for the Latin American economies and the advanced economies under consideration, and two distinct periods are analyzed.

The estimation reveals key differences in the dynamics of core inflation in goods and services. In Latin America, the persistence of inflation in core goods is generally higher than in advanced economies, a pattern that remains consistent during the COVID period. As anticipated, exchange rate depreciation plays a more significant role in influencing core goods inflation in Latin America, an effect that becomes more pronounced when observations from the COVID period are included. Additionally, energy price shocks have a more substantial impact on core goods inflation during the 2021-2023 period, a phenomenon that is less evident in advanced economies. Global supply chain disruptions also contributed to the rise in core goods inflation during the COVID period, with a similar magnitude of effect observed in both Latin American and advanced economies.

The analysis of core services inflation provides several key insights (see Table 3). During the 2005-2020 period, core services inflation generally lacks persistence, with past inflation in services tending to reduce subsequent inflation, though this effect is not statistically significant. Inflation expectations have a more pronounced influence on service inflation in Latin America compared to advanced economies, and this effect becomes stronger when including observations from 2021-2023. Demand pressures also have a more significant impact on service inflation in Latin America, particularly when observations from the COVID-19 period are considered. Additionally, energy price shocks emerge as important drivers of service inflation in advanced economies, with their influence intensifying during the 2021-2023 period.

As previously noted, inflation expectations tend to be less well-anchored in Latin America compared to advanced economies. To further examine the dynamics of inflation expectations, the following equation is estimated:

$$\pi^e_{i,t} = \alpha_0 + \alpha_1 \pi^e_{i,t-1} + \alpha_2 \pi^{s,a}_{i,t-1} + \alpha_3 \pi^{e,a}_{i,t-1} + \alpha_4 d_t + \nu_i + \epsilon_{i,t}, \tag{2}$$

where $\pi^e_{i,t}$ represents the 12-month-ahead inflation expectation in country i during quarter t (sourced from the Consensus Forecasts), $\pi^{s,a}_{i,t}$ denotes the annual depreciation of the exchange rate (against the US dollar) in country i during quarter t, $\pi^{e,a}_{i,t}$ is the year-over-year inflation rate for energy in country i during quarter t, and d_t reflects the annual moving average of the global supply chain pressure index in quarter t. The estimations incorporate country fixed effects, differentiate between Latin America and advanced economies, and consider various samples, similar to the Phillips curve estimations. The results are presented in Table 4.

The results of these estimations suggest that inflation expectations were more

Table 3: Phillips Curve Estimation for Core Serv. Inflation. 2005-2020 vs 2005-2023

	2005-2020		2005-2023	
	LAT4	ADV4	LAT4	ADV4
Lag inf. core serv.	-0.1800 (0.175)	-0.0259 (0.236)	-0.0667 (0.113)	-0.0076 (0.190)
Lag inf. expectation	1.213** (0.322)	0.284 (0.153)	1.344** (0.275)	0.309*** (0.0235)
Lag output gap	0.0217 (0.0674)	-0.0289 (0.0487)	0.126* (0.0503)	0.0380 (0.0719)
Lag ex. rate depreciation	-0.0274 (0.0161)	-0.0031 (0.0097)	-0.0256 (0.0128)	0.0056 (0.0075)
Lag energy inflation	0.0129 (0.0133)	0.0162* (0.0051)	0.00529 (0.0066)	0.0196*** (0.0032)
Lag food inflation	0.0959 (0.0414)	0.0771 (0.0387)	0.0481 (0.0409)	0.0830 (0.0420)
GSCPI	-0.806 (0.363)	-0.299 (0.163)	-0.0414 (0.0931)	-0.0373 (0.167)
dummy 21-23			0.583 (0.465)	0.925 (0.611)
Observations	241	256	44	44
R-squared	0.383	0.096	0.714	0.570
N. countries	4	4	4	4

Additional controls include a constant and country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Determinants of Inflation Expectations: 2005-2020 vs. 2005-2023

	2005-2020		2005-2023	
	LAT4	ADV5	LAT4	ADV5
Lag inf. expectation	0.886***	0.831***	0.863***	0.877***
	(0.0521)	(0.0307)	(0.0436)	(0.0275)
Lag ex. rate depreciation	0.0000	-0.00884***	0.0010	-0.0035
	(0.0034)	(0.0014)	(0.0032)	(0.0028)
Lag energy inflation	0.0005	-0.0064*	0.0054*	-0.0010
	(0.0038)	(0.0027)	(0.0018)	(0.0042)
GSCPI	-0.0660*	-0.0290	0.1090*	0.1680**
	(0.0217)	(0.0167)	(0.0382)	(0.0573)
dummy 21-23			0.128	0.1250
			(0.0364)	(0.0767)
Observations	241	320	44	55
R-squared	0.815	0.727	0.842	0.947
Number of country_id	4	5	4	5

Additional controls include a constant and country fixed effects. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

significantly impacted by various shocks when observations from 2021-2023 are included, particularly in the case of Latin American countries. This conclusion is reinforced by the finding that the coefficient on the lag of energy inflation is notably higher and statistically significant for Latin American countries when the COVID period is included. Additionally, although the impact of exchange rate depreciation on inflation expectations increases in Latin American countries with the inclusion of the COVID period, this coefficient remains statistically insignificant. Furthermore, global supply chain disruptions exhibit a positive and statistically significant effect on inflation expectations in both groups of countries when observations from 2021-2023 are considered.

All these results support the idea that the propagation of various shocks to inflation was amplified during the COVID-19 episode. Additionally, the evidence indicates that this amplification was more pronounced in Latin America than in advanced economies. However, several factors could explain the stronger propagation of shocks to inflation during the pandemic.

For advanced economies, recent studies have emphasized the non-linear dynamics of inflation to account for the patterns observed during the COVID episode[20]. These non-linearities are related to the level of inflation or inflation expectations. To assess this non-linearity, the Phillips curve (1) is re-estimated with an interaction effect that depends on each country's past inflation expectation levels. Formally, the following specification is estimated:

$$\pi^c_{i,t} = \delta_0 + X'_{i,t}\beta + f(z_{i,t-1})X'_{i,t}\omega + u_i + \varepsilon_{i,t}, \tag{3}$$

where the controls in $X_{i,t}$ are the same as those used in specification (1). The estimation also includes country fixed effects (u_i). The function $f(z_{i,t})$ is defined as:

$$f(z_{i,t}) = \frac{\exp(\gamma z_{i,t})}{1 + \exp(\gamma z_{i,t})} \tag{4}$$

where $z_{i,t}$ is a normalized variable for the inflation expectations (one year ahead) in country i at quarter t. The quarter-moving average for inflation expectations in each country is computed and denoted as $x_{i,t}$. Then, $z_{i,t} = (x_{i,t} - \mu_{x,i})/\sigma_{x,i}$, where $\mu_{x,i}$ and $\sigma_{x,i}$ are the sample mean and standard deviation of $x_{i,t}$ for country i. The parameter γ is set to 2.5, which falls within the range of values used in other studies employing this type of specification (e.g., Auerbach and Gorodnichenko (2012); Tenreyro and Thwaites (2016)). This specification is similar to the one used by Carriere-Swallow et al. (2023) to estimate state-dependent exchange rate pass-through.

[20] See, for example, Harding et al. (2022, 2023, 2024).

In the specification above, when $f(z_{i,t-1})$ is close to one, the economy is in a regime of high inflation expectations. Conversely, when $f(z_{i,t-1})$ is close to zero, it indicates a regime of low inflation expectations. Consequently, the vector β measures the effects of the controls under a regime of low inflation expectations, while the vector ω estimates the *additional* effects of the controls relative to this baseline when the economy is in a regime of high inflation expectations. The estimation results for the coefficients in vector ω are presented in Table 5 for the sample period 2005-2023.

The estimation results confirm several findings observed during the 2021-2023 period. Demand pressures exert a more intense and statistically significant effect on core inflation in Latin American economies when the economy operates under a high inflation expectations regime. While inflation expectations also have a larger impact on core inflation in this regime, the effect is not statistically significant. A similar, non-significant pattern is observed for the influence of energy inflation on core inflation. Exchange rate depreciation exhibits no additional effect under high inflation expectations. Notably, food inflation appears to have a reduced impact on core inflation in Latin America when inflation expectations are elevated, though this effect lacks statistical significance. Additionally, core inflation displays less inertia in Latin America under high inflation expectations. Consistent with previous findings, global supply chain disruptions have a significantly greater impact on core inflation in Latin America within a high inflation expectations regime, an effect not observed in advanced economies.

In summary, this section provides significant evidence that shocks related to demand pressures, exchange rate depreciation, and global supply disruptions propagated more intensely during the pandemic in Latin America compared to advanced economies. This heightened propagation appears to be associated with less well anchored inflation expectations in Latin America, indicating that elevated inflation expectations amplify the effects of these shocks on inflation. Appendix B presents additional results that support the idea that the transmission of energy and food price shocks to core inflation is higher when either headline inflation or inflation expectations are elevated in Latin American countries.

4 Monetary Policy Reaction in Latin America

A long tradition in macroeconomics has sought to characterize the systematic response of monetary policy using a reaction function that captures its predicted component. Since Taylor (1993), a growing body of literature has described the monetary policy rate as a function of inflation and output. These Taylor-type rules have been estimated for advanced economies (e.g., Clarida et al. (1998), Lubik and Schorfheide

Table 5: Additional Effects on Core Inflation Under High Inflation Expectations (ω)

	2005-2023	
	LAT4	ADV5
Lag core inf.	-0.359**	0.361
	(0.101)	(0.480)
Lag inf. expectations	0.373	-1.002
	(0.459)	(0.856)
Lag output gap	0.687*	0.139
	(0.217)	(0.170)
Lag ER depreciation	-0.0233	-0.0238
	(0.0610)	(0.0443)
Lag energy inflation	0.0312	0.000553
	(0.126)	(0.0292)
Lag food inflation	-0.259	-0.0128
	(0.136)	(0.116)
GSCPI	1.371*	0.343
	(0.513)	(0.301)
Observations	285	375
R-squared	0.485	0.363
N. countries	4	5

Additional controls include a constant and country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

(2007)) and emerging economies (e.g., Mohanty and Klau (2005), Aizenman et al. (2011), Caputo and Herrera (2017)). In this section, the aim is to characterize the monetary policy reaction to macroeconomic variables in five Latin American countries: Brazil, Chile, Colombia, Mexico, and Peru.[21]

Formally, the following Taylor-type rule is estimated for the monetary policy rate in country i:

$$R_{i,t} = \alpha_0 + \alpha_1 R_{i,t-1} + \alpha_2 \pi^{c,a}_{i,t} + \alpha_3 y_{i,t} + \alpha_4 \pi^{e}_{i,t} + \alpha_5 \Delta\pi^{c,a}_{i,t} + \alpha_6 \Delta y_{i,t} + \alpha_7 \Delta\pi^{e}_{i,t} + u_i + \nu_{i,t} \quad (5)$$

where $\pi^{c,a}_{i,t}$ is the year-over-year core inflation rate in country i in quarter t, $y_{i,t}$ is the output gap, and $\pi^{e}_{i,t}$ is the inflation expectations one year ahead (from Consensus Forecasts). The specification also includes the changes in these three variables. This equation is estimated in a panel for the previously mentioned Latin American countries: Brazil, Chile, Colombia, Mexico, and Peru. Country fixed effects (u_i) are also included. The data used is the same as in Section 3 for estimating the Phillips curve, starting in 2005. The monetary policy rates are obtained from the IFS database (concept: Monetary Policy-Related Interest Rate, Percent per Annum). The same specification (5) is also estimated for a different panel of five advanced economies: Canada, Norway, New Zealand, Sweden, and the United Kingdom.[22]

Column two in Table 6 presents the results for the estimation of equation (5) for the Latin American panel (LA5-M1). Column three shows the results for the advanced economies panel (ADV-M1). In both sets of countries, monetary policy exhibits inertia, as indicated by the high and statistically significant coefficient on the lagged monetary policy rate.

One notable result is that the change in inflation expectations is a key determinant of monetary policy in both regions. However, the sensitivity of the monetary policy rate to changes in inflation expectations is nearly three times higher in Latin America than in advanced economies. Specifically, when the change in inflation expectations increases by one percent, the monetary policy rate in Latin America rises by nearly one percent as well. In advanced economies, the corresponding increase in the monetary policy rate is only about 0.30 percent for the same one percent change in inflation expectations.

Inflation expectations have a similar influence on monetary policy in advanced economies as in the Latin American panel. However, this effect is not statistically significant in the case of Latin American countries.

[21]See Werner (2023) for a recent effort to estimate simple long-term Taylor rules for the same five Latin American countries.

[22]An additional specification including the exchange rate was tested, but this variable was not statistically significant once inflation expectations were controlled for in the estimation.

Table 6: Taylor-Type Rule Estimation

Variables	LA5 - M1	ADV5 - M1	LA5 - M2	ADV5 - M2	LA5 - M3	ADV5 - M3
Lag level MP rate	0.918***	0.971***	0.886***	0.918***	0.893***	0.951***
	(0.0251)	(0.0104)	(0.0244)	(0.0136)	(0.0258)	(0.00738)
Lag change MP rate					0.396***	0.419***
					(0.0383)	(0.0607)
Core inf. ($\pi^{c,a}$)	0.0375	0.0352**	0.0629	0.0154**	0.0585	0.0221**
	(0.0587)	(0.0125)	(0.0649)	(0.00501)	(0.0661)	(0.00533)
Output gap (y)	0.0585*	0.0367	0.0456*	0.0177	0.0117	-0.00440
	(0.0218)	(0.0245)	(0.0211)	(0.0202)	(0.0115)	(0.00757)
Inf. exp. (π^e)	0.291	0.127***	0.311	0.142***	0.193	0.0358**
	(0.163)	(0.0240)	(0.158)	(0.0216)	(0.131)	(0.0109)
Change in $\pi^{c,a}$	0.234**	-0.0274	0.237**	-0.0273	-0.0625	-0.0257*
	(0.0576)	(0.0474)	(0.0526)	(0.0272)	(0.0673)	(0.0102)
Change in π^e	0.858*	0.309***	0.847*	0.301***	0.953*	0.318***
	(0.364)	(0.0497)	(0.368)	(0.0487)	(0.353)	(0.0326)
Change in y	-0.0150	-0.00288	-0.00784	0.00760	0.0165**	0.0140
	(0.0123)	(0.00899)	(0.0102)	(0.00791)	(0.00458)	(0.0107)
Lag level MP rate US			0.0753**	0.0806**	0.0671**	0.0406*
			(0.0213)	(0.0220)	(0.0174)	(0.0155)
Lag change MP rate US					0.277**	0.141**
					(0.0764)	(0.0486)
Observations	425	470	425	470	423	470
R-squared	0.957	0.968	0.958	0.970	0.970	0.979
N. countries	5	5	5	5	5	5

Additional controls include a constant and country fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In this specification (5), monetary policy in both country groups exhibits a counter-cyclical orientation, as indicated by the response to the output gap. In the case of Latin America, monetary policy responds exclusively to the level of the output gap. Notably, this effect is statistically significant at the 10 percent level for Latin America. While the level of the output gap has a positive effect on interest rates in advanced economies, this effect is not statistically significant. Furthermore, changes in the output gap do not significantly influence monetary policy in either group of countries.

Is the stronger reaction of monetary policy in Latin America to inflation expectations the reason behind the aggressive financial policies implemented post-2020? How do these recent responses compare with other episodes of heightened inflation expectations in Latin America?

To address these questions, the estimated version of the equation for Latin America is used to compute the fitted values of the monetary policy rate over two periods.[23] Unlike most previous studies that focus on the level of the monetary policy rate, this analysis aims to understand the changes in policy rates during recent and prior episodes. Using the fitted values, the predicted changes in the monetary policy rate are computed for each country and compared across country groups, specifically Latin America versus advanced economies.

One period examined is post-COVID, from 2021Q1 to 2023Q1, while the other spans from 2006Q3 to 2008Q3, when inflation expectations rose significantly in Latin America (refer to figure 2 in section 2). The analysis takes the average of the fitted values of policy rate changes across the five Latin American countries and compares these average fitted changes with the average actual changes in policy rates across the different sets of countries. Figure 12 displays the actual and fitted changes in policy rates for both periods in the Latin America panel. The estimated equation captures part of the aggressive rise in monetary policy rates in Latin America post-COVID, but it does not fully account for the magnitude of all observed increases (panel B in figure 12). In particular, the estimated equation (5) falls short in explaining the average increases observed in late 2021 and 2022. The model suggests a significant reduction in the monetary policy rate in 2022Q4 as inflation expectations eased from their peaks. However, in that quarter, the actual policy showed an average rate increase of one percent in Latin America.

The other episode in Latin America, during which inflation expectations rose, was between 2006Q3 and 2008Q3. Panel A in figure 12 illustrates that the predicted changes tend to indicate a more aggressive reaction than the actual monetary policy

[23]Since these specifications include the past level of the monetary policy rate in each country, these predictions are obtained recursively for this variable in the two periods considered.

rate changes observed during this period.

The actual monetary policy changes are compared with the predicted ones for advanced economies during the same recent period: 2021Q1 to 2023Q1. The predicted changes for advanced economies are obtained using the estimated equation in column three of Table 6 (ADV-M1). This comparison is shown in panel B of figure 13. In that figure, panel A presents the actual and predicted changes in monetary policy in Latin America during 2021Q1 to 2023Q1. The actual increases in the policy rate in advanced economies during 2021 were lower than in Latin America and also lower than the predicted changes suggested by the estimation for advanced economies. Since mid-2022, the actual increases in monetary policy rates in advanced economies have exceeded the expected changes. Although not directly considered in the estimation, this behavior in policy rates since mid-2022 is also evident in the case of the US.

The actual monetary policy changes are compared with the predicted ones for advanced economies during the same recent period: 2021Q1 to 2023Q1. The predicted changes for advanced economies are obtained using the estimated equation in column three of Table 6 (ADV-M1). This comparison is shown in panel B of figure 13. In that figure, panel A presents the actual and predicted changes in monetary policy in Latin America during 2021Q1 to 2023Q1. The actual increases in the policy rate in advanced economies during 2021 were lower than those in Latin America and also lower than the predicted changes suggested by the estimation for advanced economies. Since mid-2022, the actual increases in monetary policy rates in advanced economies have exceeded the expected changes. Although not directly considered in the estimation, this behavior in policy rates since mid-2022 is also evident in the case of the US.

Returning to the case of Latin America, an important question is whether the recent behavior of advanced economies has influenced the monetary policy strategy in Latin America. Does US monetary policy impact monetary policy in Latin America? For instance, Caputo and Herrera (2017) argues from both theoretical and empirical perspectives that in open economies with an inflation-targeting regime, the monetary policy rule is influenced by the Fed Funds rate. This observation aligns with evidence suggesting that US monetary policy plays a crucial role in determining several financial variables globally (e.g., Rey (2015); Miranda-Agrippino and Rey (2020); Kalemli-Ozcan (2019), among others).

To explore the role of US monetary policy in other economies, two alternative specifications of equation (5) are estimated. The first specification incorporates the past level of the US monetary policy rate (the Fed Funds rate) into the monetary

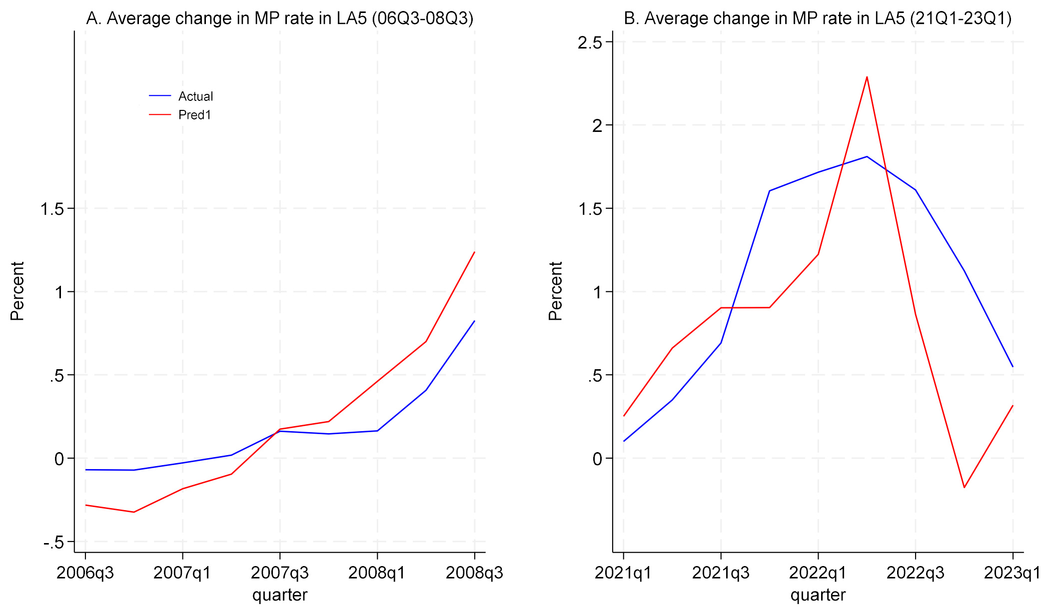


Figure 12: Changes in Monetary Policy Rates in Latin America: Comparison Between 2006Q3-2008Q3 and 2021Q1-2023Q1

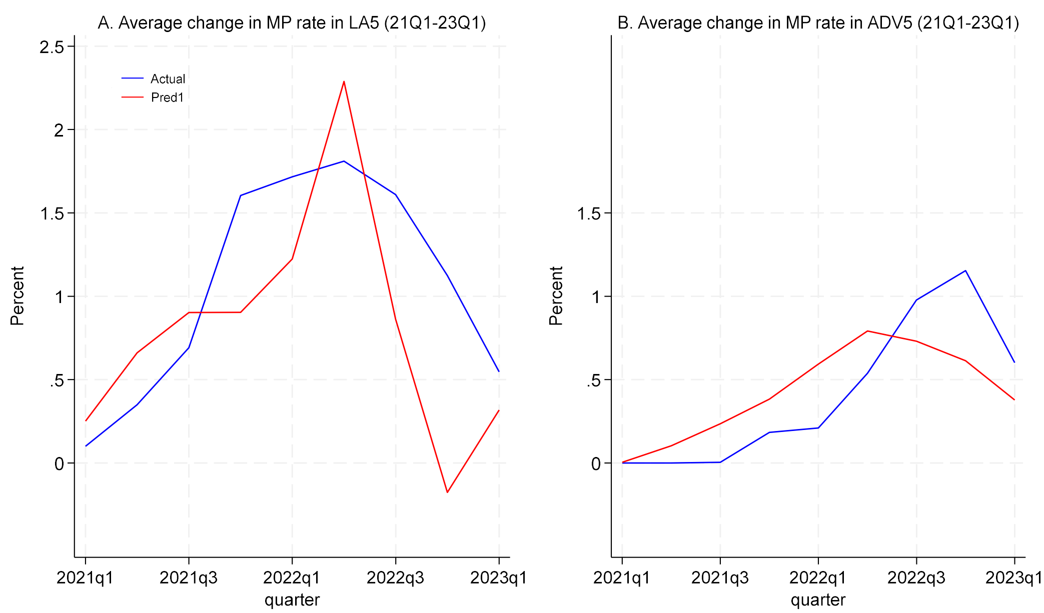


Figure 13: Changes in Monetary Policy Rates 2021Q1-2023Q1: Comparison Between Latin America and Advanced Economies

policy reaction function:

$$\begin{aligned} R_{i,t} &= \alpha_0 + \alpha_1 R_{i,t-1} + \alpha_2 \pi^{c,a}_{i,t} + \alpha_3 y_{i,t} + \alpha_4 \pi^e_{i,t} + \alpha_5 \Delta\pi^{c,a}_{i,t} \\ &\quad + \alpha_6 \Delta y_{i,t} + \alpha_7 \Delta\pi^e_{i,t} + \alpha_8 R_{US,t-1} + u_i + \nu_{i,t} \end{aligned} \tag{6}$$

The other specification includes past changes in both the domestic monetary policy and US monetary policy:

$$\begin{aligned} R_{i,t} &= \alpha_0 + \alpha_1 R_{i,t-1} + \delta_1 \Delta R_{i,t-1} + \alpha_2 \pi^{c,a}_{i,t} + \alpha_3 y_{i,t} + \alpha_4 \pi^e_{i,t} + \alpha_5 \Delta\pi^{c,a}_{i,t} \\ &\quad + \alpha_6 \Delta y_{i,t} + \alpha_7 \Delta\pi^e_{i,t} + \alpha_8 R_{US,t-1} + \delta_2 \Delta R_{US,t-1} + u_i + \nu_{i,t} \end{aligned} \tag{7}$$

The estimation results from these two alternative specifications are presented in columns 4-7 of Table 6, with separate analyses for Latin America and advanced economies. These alternative specifications emphasize the robustness of the role of inflation expectations in Latin America compared to advanced economies. Monetary policy changes in Latin America are more sensitive to changes in inflation expectations than in advanced economies.

For specification (6), the results indicate that the past level of US monetary policy significantly influenced monetary policy in both Latin America and the advanced economies in the sample. Similarly, specification (7) suggests that Latin America is more sensitive to the trajectory of US monetary policy than advanced economies. Moreover, the coefficients for both the past level and past changes in US monetary policy in these alternative specifications are statistically significant.

To conclude the discussion on the reaction of monetary policy in Latin America, the changes in policy rates are reproduced in figure 12, with the addition of predictions derived from the estimations of equations (6) and (7). Figure 14 presents these alternative predictions alongside the actual changes and the predictions already shown in figure 12. The second alternative specification more closely aligns with the observed changes in monetary policy in Latin America. Specifically, the reduction in the monetary policy rate in 2022Q4 in Latin America can be partly attributed to the behavior of US monetary policy, which continued to raise the Fed Funds rate (as indicated by the prediction based on the estimation of model 7).

5 Final Remarks

After several decades of declining inflation, the shocks that occurred post-COVID have tested the resolve of central banks to maintain low inflation levels. This challenge was particularly critical for Latin America, given the region's history of very high inflation rates during the 1970s and 1980s. Additionally, with less well-anchored

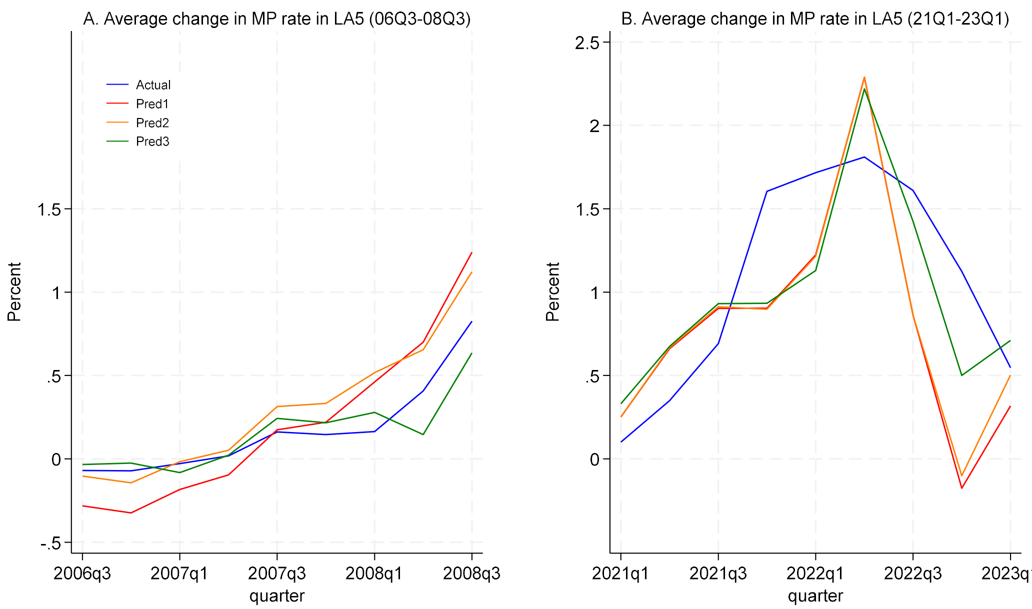


Figure 14: Changes in Monetary Policy Rates in Latin America: Incorporating the Role of Past Changes and the Fed Rate

inflation expectations, monetary policy in Latin America faced more macroeconomic dilemmas than in advanced economies.

This study aimed to identify the distinctive features of inflation dynamics in Latin America, with a particular emphasis on the recent episode. Additionally, the analysis sought to explain the monetary policy responses to the recent inflation surge, comparing them to those observed in advanced economies and during the 2006-2008 period.

The main conclusions are as follows. First, the traditionally higher and more volatile inflation in Latin America has experienced a remarkable convergence in both levels and volatility over the past few decades. This convergence has led to inflation patterns in the region aligning more closely with those observed in advanced economies, marking a significant shift in economic dynamics. Despite a surge in inflation across Latin America after COVID-19, significant reductions have occurred since the end of 2022, with values approaching pre-pandemic levels by the end of 2023.

Second, the acceleration of core inflation during 2021 began earlier in Latin America than in advanced economies, driven by several factors. Demand pressures, as indicated by the output gap, and global supply disruptions had a more intense impact on Latin America during the COVID-19 episode compared to previous periods and advanced economies. Additionally, the rise in inflation expectations and exchange rate depreciation influenced inflation in Latin America, further exacerbated by the more pronounced currency devaluations during the initial phase of the pandemic.

Third, monetary policy in Latin American countries tends to react more strongly to changes in inflation expectations compared to advanced economies. Additionally, the Federal Funds rate has a greater impact on monetary policy in Latin America than in advanced economies. Consequently, implementing consistent monetary policy tightening or loosening in Latin America becomes more challenging if the US adopts a divergent stance. The first factor, the role of inflation expectations, explains why central banks in Latin America raised their rates more quickly and aggressively during 2021 and 2022. The second factor helps to understand the slower normalization of the monetary policy rate in Latin America since mid-2022.

References

Aizenman, J., Hutchison, M., and Noy, I. (2011). Inflation Targeting and Real Exchange Rates in Emerging Markets. *World Development*, 39(5):712–724.

Auerbach, A. J. and Gorodnichenko, Y. (2012). Measuring the Output Responses to Fiscal Policy. *American Economic Journal: Economic Policy*, 4.

Bajraj, G., Carlomagno, G., and Wlasiuk, J. M. (2023). Where is the Inflation? The Diverging Patterns of Prices of Goods and Services. (969).

Ball, L. M., Leigh, D., and Mishra, P. (2022). Understanding U.S. Inflation During the COVID Era. Working Paper 30613, National Bureau of Economic Research.

Black, S., Liu, A. A., Parry, I. W., and Vernon, . N. (2023). Imf fossil fuel subsidies data: 2023 update.

Blanchard, O. J. and Bernanke, B. S. (2023). What Caused the US Pandemic-Era Inflation? Working Paper 31417, National Bureau of Economic Research.

Blanchard, O. J. and Galí, J. (2010). The Macroeconomic Effects of Oil Price Shocks: Why Are the 2000s so Different from the 1970s? In *International Dimensions of Monetary Policy*. University of Chicago Press.

Brito, S., Carriere-Swallow, M. Y., and Gruss, B. (2018). Disagreement about Future Inflation: Understanding the Benefits of Inflation Targeting and Transparency. IMF Working Papers 2018/024, International Monetary Fund.

Caputo, R. and Herrera, L. O. (2017). Following the leader? The relevance of the Fed funds rate for inflation targeting countries. *Journal of International Money and Finance*, 71:25–52.

Carriere-Swallow, M. Y., Firat, M., Furceri, D., and Jimenez, D. (2023). State-Dependent Exchange Rate Pass-Through. IMF Working Papers 2023/086, International Monetary Fund.

Carrière-Swallow, Y., Gruss, B., Magud, N. E., and Valencia, F. (2021). Monetary Policy Credibility and Exchange Rate Pass-Through. *International Journal of Central Banking*, 17(3):61–94.

Clarida, R., Galı, J., and Gertler, M. (1998). Monetary policy rules in practice: Some international evidence. *European Economic Review*, 42(6):1033–1067.

Cuitiño, M. F., Medina, J. P., and Zacheo, L. (2022). Conditional exchange rate pass-through and monetary policy credibility: Insights from Uruguay and Chile. *Economic Modelling*, 114(C).

Fuentes, O. M., Mitchell, O. S., and Villatoro, F. (2024). Early pension withdrawals in chile during the pandemic. *Journal of Pension Economics & Finance*, pages 1–26.

Ha, J., Kose, A., and Ohnsorge, F. (2019). *Inflation in Emerging and Developing Economies: Evolution, Drivers, and Policies*.

Ha, J., Kose, A., and Ohnsorge, F. (2021). Inflation During the Pandemic: What Happened? What is Next? Technical Report 108677, Munich Personal RePEc Archive.

Ha, J., Kose, A., and Ohnsorge, F. (2022). From Low to High Inflation: Implications for Emerging Market and Developing Economies. Technical Report 29/2022, Centre for Applied Macroeconomic Analysis, Australian National University.

Ha, J., Kose, A., and Ohnsorge, F. (2023a). One-stop Source: A Global Database of Inflation. *Journal of International Money and Finance*, 137:102896.

Ha, J., Kose, A., Ohnsorge, F., and Yilmazkuday, H. (2023b). Understanding the global drivers of inflation: How important are oil prices? *Energy Economics*, 127:107096.

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., and Tatlow, H. (2021). "a global panel database of pandemic policies (oxford covid-19 government response tracker).". *Nature Human Behaviour*, 140:529–538.

Harding, M., Lindé, J., and Trabandt, M. (2022). Resolving the missing deflation puzzle. *Journal of Monetary Economics*, 126:15–34.

Harding, M., Lindé, J., and Trabandt, M. (2023). Understanding post-covid inflation dynamics. *Journal of Monetary Economics*, 140.

Harding, M., Lindé, J., and Trabandt, M. (2024). Monetary Policy and Inflation Scares. mimeo.

IMF (2021a). Brazil: 2021 article iv consultation-press release; staff report; and statement by the executive director for brazil. Technical report, International Monetary Fund.

IMF (2021b). Chile: 2021 article iv consultation-press release; staff report; and statement by the executive director for chile. Technical report, International Monetary Fund.

IMF (2021c). Fiscal monitor database of country fiscal measures in response to the covid-19 pandemic. Technical report, International Monetary Fund.

IMF (2021d). Peru: 2021 article iv consultation-press release; staff report; and statement by the executive director for peru. Technical report, International Monetary Fund.

International Monetary Fund (2022). The Inflation Surge: Policy Trade-offs Amid Uncertainty. Regional Economic Outlook: Western Hemisphere, International Monetary Fund.

International Monetary Fund (2024). World Economic Outlook Database. April 2024. World Economic Outlook, International Monetary Fund.

Jordà, O. (2005). Estimation and inference of impulse responses by local projections. *American Economic Review*, 95:161–182.

Jordà, and Nechio, F. (2023). Inflation and wage growth since the pandemic. *European Economic Review*, 156.

Kalemli-Ozcan, S. (2019). US Monetary Policy and International Risk Spillovers. CEPR Discussion Papers 14053, C.E.P.R. Discussion Papers.

Kamber, G., Mohanty, M., and Morley, J. (2020). Have the driving forces of inflation changed in advanced and emerging market economies? BIS Working Papers 896, Bank of International Settlements.

Kilian, L. and Zhou, X. (2023). A broader perspective on the inflationary effects of energy price shocks. *Energy Economics*, 125:106893.

Kose, A., Matsuoka, H., Panizza, U., and Vorisek, D. (2019). Inflation Expectations: Inflation Expectations: Review and Evidence. Policy Research Working Paper 8785, World Bank.

Lubik, T. A. and Schorfheide, F. (2007). Do central banks respond to exchange rate movements? a structural investigation. *Journal of Monetary Economics*, 54:1069–1087.

Madeira, C. (2024). *The effect of Covid pension withdrawals and the Universal Guaranteed Pension on the income of future retirees in Chile*. Bank for International Settlements, Monetary and Economic Department.

Miranda-Agrippino, S. and Rey, H. (2020). U.S. Monetary Policy and the Global Financial Cycle. *The Review of Economic Studies*, 87(6):2754–2776.

Mohanty, M. S. and Klau, M. (2005). Monetary Policy Rules in Emerging Market Economies: Issues and Evidence. In Langhammer, R. J. and Souza, L. V., editors, *Monetary Policy and Macroeconomic Stabilization in Latin America*, Springer Books, pages 205–245. Springer.

Olivera, J. and Valderrama, J. A. (2022). The impact of the covid-19 pandemic on the future pensions of the peruvian pension system. *IDB Working Paper Series*.

Rey, H. (2015). Dilemma not trilemma: The global financial cycle and monetary policy independence. Working Paper 21162, National Bureau of Economic Research.

Taylor, J. B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, 39:195–214.

Tenreyro, S. and Thwaites, G. (2016). Pushing on a string: Us monetary policy is less powerful in recessions. *American Economic Journal: Macroeconomics*, 8(4):43–74.

Werner, A. (2023). Monetary policy in Latin America: The easing cycle has begun. Policy Brief 23-16, The Peterson Institute for International Economics.

Appendix A. Additional Analysis of the Convergence of Inflation in Latin America

In Section 2, the analysis utilized official inflation series. However, as Bajraj et al. (2023) highlights, such comparisons may be flawed due to variances in the composition and weights of CPI baskets across countries, methodological differences in index computation, and inconsistencies in the availability and definitions of intermediate aggregates, such as CPI for goods or services. This appendix examines how these differences in baskets, weights, and methodologies influence the observed inflation disparities between Latin American countries and advanced economies.[24]

To address these complexities, an updated version of the database developed by Bajraj et al. (2023) is utilized. This database harmonizes the CPI structure across 55 countries using Eurostat's Harmonized Index of Consumer Prices (HICP) methodology. The authors describe a process for compiling this database, which involves collecting highly disaggregated official CPI data, aligning it with the 93 HICP categories at the "class" level, and using this data to calculate any desired aggregate index. This calculation can employ either the original weights provided by each country or a standardized set of weights. Applying this uniform methodology across all countries allows for the generation of any aggregate index of interest and ensures that each index accurately reflects the cost of a comparable basket of goods or services. This approach facilitates a nuanced analysis of the impacts of various weighting schemes on inflation dynamics. Additionally, the comprehensive nature of this database, along with the availability of data, supports a detailed examination of inflation dynamics, particularly in the context of the COVID-19 pandemic.

Figure 16 replicates the dynamics of the main CPI components for both groups of countries using harmonized series. Specifically, the HICP structure and methodology are applied to each country. However, the weights of the 93 harmonized CPI components are based on the most disaggregated official data available for each country.[25] Interestingly, despite the country samples not being identical at all points in time, the most striking patterns observed when comparing the original series from each country are retained in the harmonized series. Notably, except for energy, inflation in Latin American countries has been systematically higher and more volatile than in developed countries. In contrast, on average, energy inflation in Latin America matches that of developed countries, albeit with significantly lower volatility. The harmonized series also highlight the similarity in inflationary dynamics between both

[24] The Latin American countries and advanced economies included in this database are listed in Table 9 in the appendix.

[25] For details on the harmonization procedure, see Bajraj et al. (2023).

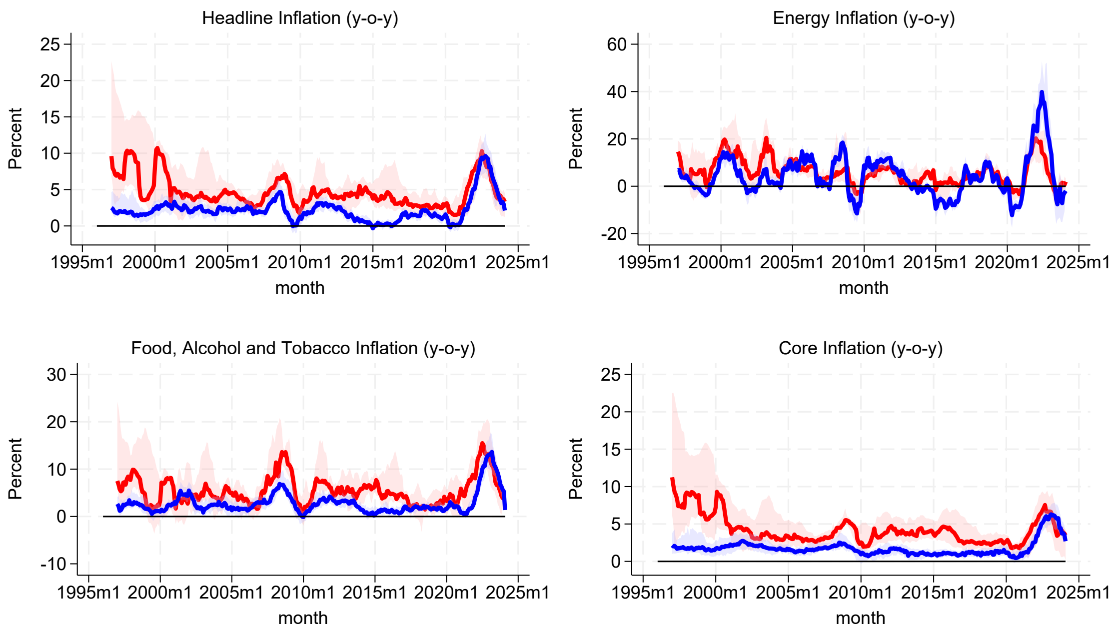


Figure 15: Inflation in Advanced and Latin American Economies (harmonized series)
Notes: Inflation in advanced (blue) and Latin American (red) countries. Monthly data is represented as a 12-month percentage change (logarithmic). The lines denote the median inflation rate across countries within each group, with shaded areas highlighting the 25th and 75th percentiles. Price indexes are computed using the HICP methodology and baskets, applying each country's specific weights. Source: Calculations based on data from Bajraj et al. (2023).

groups of countries during the COVID period and up to the present, in both levels and volatility, across the four series analyzed.

The overall similarity between the original and harmonized series is largely expected, as harmonization does not alter the weights of the underlying disaggregated components in each index. Instead, it changes the structure and marginally modifies the basket of goods and/or services included in each index.[26] Nonetheless, there are notable differences between the series from both exercises, particularly for Latin American countries, where the original series appears to show a more significant and sustained decrease in inflation over the analyzed period.

[26] At the aggregate level, the main differences between the two types of series arise from the exclusion of elements not included in the HICP structure, such as owner-occupier imputed rent or gambling activities.

A.1. Analyzing Core CPI Components: Disaggregated Inflation Trends in Goods and Services

A nuanced examination of core CPI inflation is conducted by separating it into two principal components: services and goods, excluding energy and food. Utilizing the harmonized database developed by Bajraj et al. (2023) allows for the use of highly disaggregated data in this analysis. One of the advantages of this database is its capability to compute any intermediate aggregate index, facilitating a detailed decomposition of inflation. This approach enhances the understanding of inflationary dynamics within core CPI and helps to identify the distinct inflationary pressures originating from goods and services.

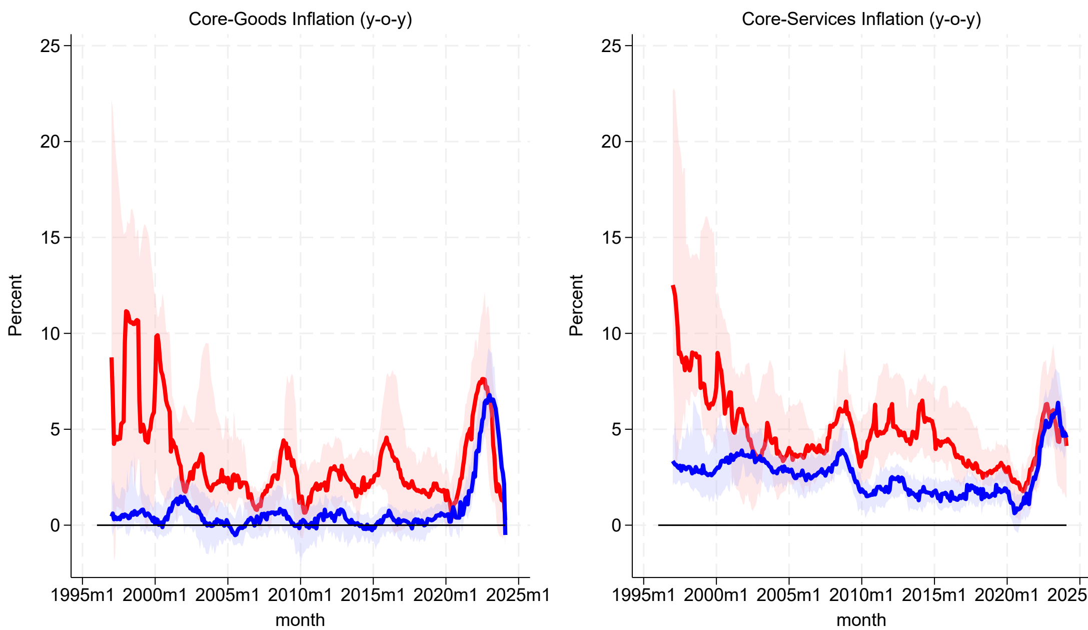


Figure 16: Core CPI Breakdown: Services vs. Goods (Excluding Energy & Food)

Notes: Inflation in advanced (blue) and Latin American (red) countries. Monthly data is represented as a 12-month percentage change (logarithmic). The lines denote the median inflation rate across countries within each group, with shaded areas highlighting the 25th and 75th percentiles. Price indexes are computed using the HICP methodology and baskets, applying each country's specific weights. Source: Own calculations based on data from Bajraj et al. (2023).

Upon decomposing core inflation between goods and services, a consistent pattern emerges—service inflation systematically exceeds that of goods (excluding energy and food) in both groups of countries, as found by Bajraj et al. (2023) for all economies. Notably, this pattern is particularly pronounced in advanced economies, where core goods inflation remained very low and stable from the mid-1990s until the onset of COVID-19, averaging 0.35% annually. In contrast, service inflation was significantly higher, averaging 2.3% between 1997 and February 2020, and exhibited a marked decline during this period, especially following the global financial crisis. This divergence between services and goods aligns with the findings of Bajraj et al. (2023). In Latin America, while the gap between service and goods inflation is substantial on average, it is less consistent over time due to greater volatility in both services and core goods inflation.

The dynamics of goods and services inflation during COVID-19 were distinctive, exhibiting a high level of synchronization across both groups of countries. Core goods inflation surged earlier and reached higher peak levels than services inflation, resulting in a negative gap between services and goods inflation from the second half of 2020 to 2022. However, as the supply pressures that emerged during the pandemic began to subside and the demand for services normalized, goods inflation sharply declined in both groups of countries. In contrast, services inflation increased and has subsequently declined much more slowly. These variations in the dynamics of these two broad components of core inflation, which together constitute two-thirds of the CPI, underscore the critical need to understand the factors driving each component. Such insights are particularly vital for devising appropriate policy responses to substantial deviations from inflation targets, as observed recently.

A.2. The Role of Weights in Harmonized CPI Inflation

In this subsection, the role of CPI basket components' weights in shaping overall inflation dynamics is assessed. The examination thus far has revealed both significant differences and strong co-movement in aggregate CPI inflation across various economies. This raises an important question: To what extent are the variations in inflation dynamics attributable to fluctuations in the inflation rates of disaggregated CPI components versus the distinctive weights allocated to these components in each country's CPI? Disentangling these factors is challenging, as the differences in consumption baskets across countries are not merely about weights. They also involve variations in the items included or excluded from the baskets monitored by statistical offices and how each item is defined. The harmonized consumption baskets (Bajraj et al., 2023) help navigate these complexities by eliminating differences in both composition and definition, allowing for a comparison of inflation outcomes using each

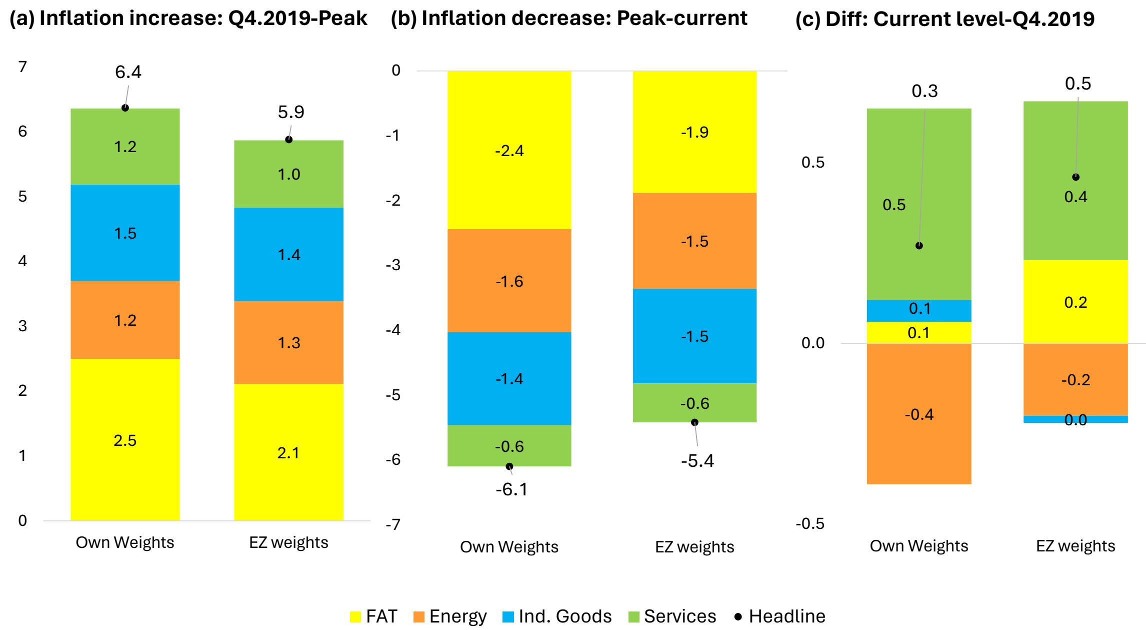


Figure 17: Average Incidence of Main CPI Components – Latin America

Notes: Contributions of main CPI components to changes in annual inflation, expressed in percentage points, using the HICP methodology and baskets. Inflation contributions are measured using each country's specific weights (own weights) and Eurozone weights (EZ weights). "FAT" refers to food, alcohol, and tobacco; "Ind. Goods" excludes energy. Source: Own calculations based on data from Bajraj et al. (2023).

country's original weights with those using a common set of weights (specifically, the average weights of the Eurozone). This analysis, particularly focusing on the inflation surge during the COVID-19 episode and the subsequent normalization process, is the focus of this subsection.

We examine the contribution of the primary CPI components (energy, FAT, industrial goods excluding energy, and services) to the rise in inflation observed from 2021 to 2022, as well as to the subsequent easing trend. Q4 2019 is used as the baseline—the quarter preceding the pandemic. The peak inflation quarter for each country is identified, typically Q2 or Q3 of 2022, and the increase in headline inflation from Q4 2019 to this peak is dissected into contributions from each component. The same method is applied to the reduction phase, calculating the decrease in headline inflation from its peak to the current quarter (Q1 2024) and breaking it down by

Table 7: Comparative Weights in Harmonized CPI Components

	FAT		Energy		Ind. Goods		Services	
	Own	EZ	Own	EZ	Own	EZ	Own	EZ
				All				
Mean	25	21	10	10	25	27	40	42
Median	22	20	9	10	26	27	41	42
				Latin America				
Mean	26	22	8	10	25	27	41	41
Median	25	22	9	10	24	27	41	41
				Advanced Economies				
Mean	20	20	10	10	26	27	44	43
Median	20	20	9	10	27	27	43	43
				Emerging Market Economies (ex Latam)				
Mean	33	21	11	10	23	28	33	41
Median	30	20	11	10	24	27	32	42

Notes: Average and median weights across countries in each group are reported in percentage terms. Period 2011-2024. Both exercises employ the HICP methodology and baskets, weighting the 93 harmonized CPI components using either each country's specific weights ("Own") or the average Eurozone-country weights for all countries ("EZ"). "FAT" refers to food, alcohol, and tobacco; "Ind. Goods" includes industrial goods excluding energy. The aggregate weights of the main CPI components using the EZ weights are not uniform across countries because some countries do not have the 93 harmonized categories. In such cases, the weights of the available categories are normalized to sum up to 100%. Source: Calculations based on data from Bajraj et al. (2023).

component. This analysis allows for the identification of which components have reverted to pre-pandemic levels and which are still in the adjustment process.

The analysis is conducted across three distinct groups: Latin America, advanced economies, and emerging market economies (excluding Latin America). Two sets of weights for the 93 harmonized categories are employed: (a) the original weights from each country's disaggregated series and (b) the average weights from the Eurozone, as reported by Eurostat and applied to all countries. By comparing the decompositions from both sets of weights, the impact of varying weights on the level and changes of inflation is evaluated.

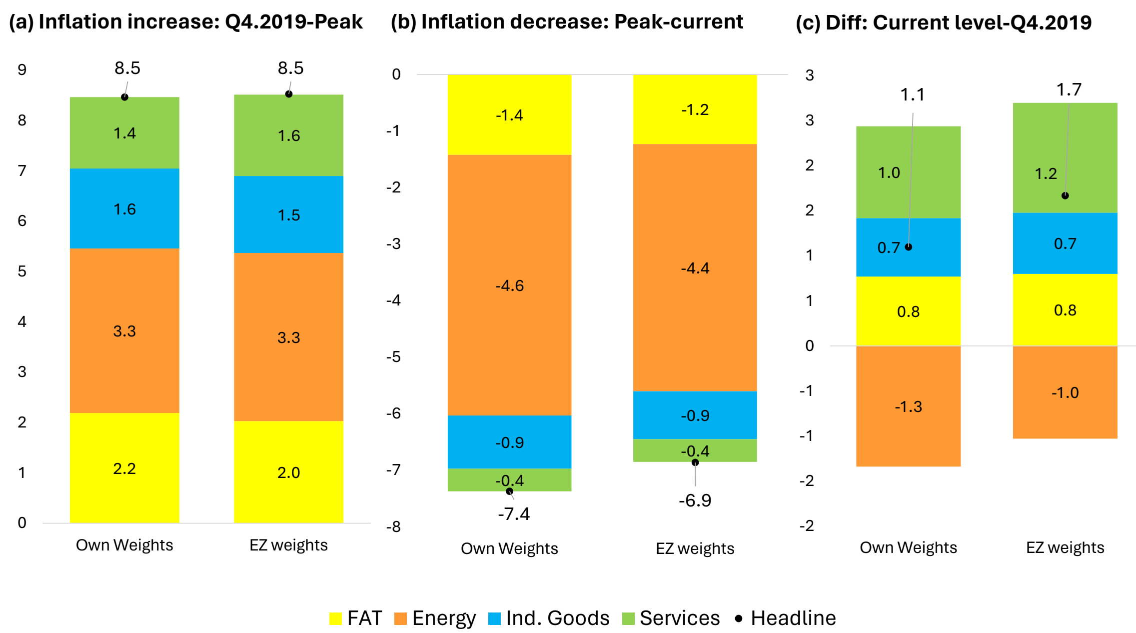


Figure 18: Average Incidence of Main CPI Components – Advanced Economies
Notes: Refer to the notes in Fig. 17. Source: Calculations based on data from Bajraj et al. (2023).

Figure 17 presents the decomposition analysis for Latin American economies. The visualization indicates that the magnitude and composition of shifts in headline inflation are minimally influenced by whether national or Eurozone weights are used. The increase from Q4 2019 to the pandemic peak averaged 6.4 percentage points (pp) using country-specific weights and 5.9 pp with Eurozone weights (columns 1 & 2). This variation is primarily due to a higher incidence from food (2.5 pp with country-specific weights versus 2.1 pp with EZ weights) and, to a lesser extent, services (1.2 vs 1.0 pp, respectively). The decline from the peak shows a larger gap, with 6.1 pp under national weights and 5.4 pp under EZ weights, largely driven by the greater negative contribution from food when using national weights (columns 3 & 4). When comparing current inflation to Q4 2019 (columns 5 & 6), the data indicates that the impacts of core goods and food have reverted to pre-pandemic levels, while energy is marginally below in both assessments. However, services remain significantly above their 2019 levels.

These findings imply that, aside from certain differences in food and services, employing Eurozone weights for aggregate index calculations does not markedly alter the inflation estimations for Latin American countries when CPI baskets have been harmonized. This result is consistent with the observation that there are no substantial differences in the weights of the primary CPI components between the baskets of Latin American countries and those of the Eurozone, except for food, which is weighted more heavily in Latin American baskets (Table 7).

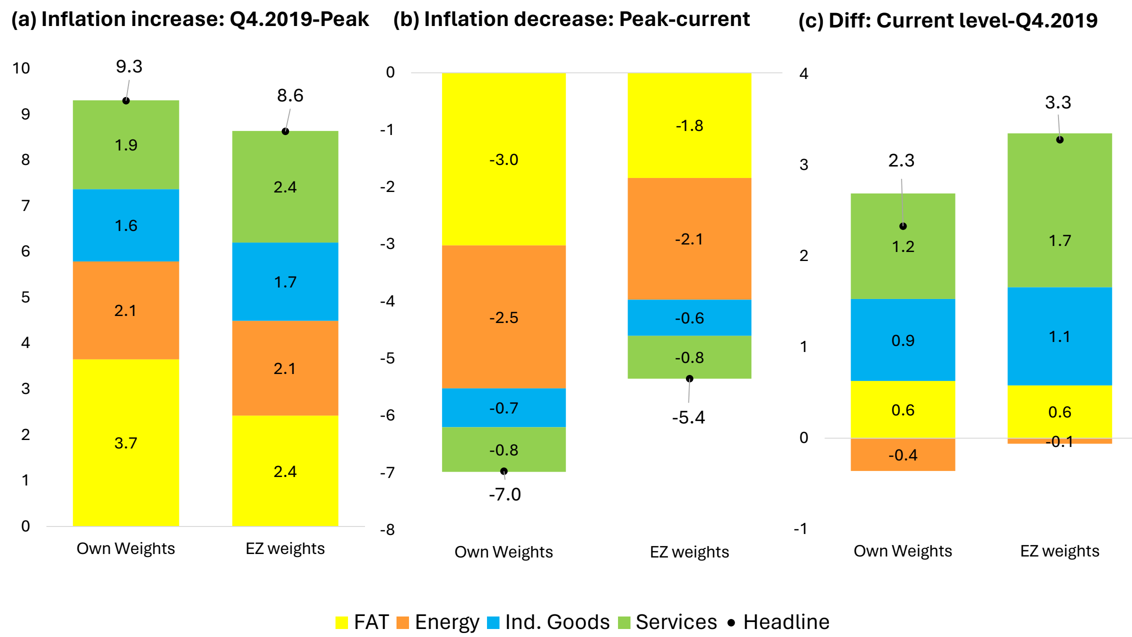


Figure 19: Average Incidence of Main CPI Components – EM Economies (ex Latam)
Notes: See notes in Fig. 17. Source: Calculations based on data from Bajraj et al. (2023).

Figure 18 provides a decomposition of inflation's rise and subsequent fall during the pandemic for advanced economies (AEs), analyzing the impact of employing local versus Eurozone weights. The comparison reveals minimal differences in the overall magnitudes and the specific contributions of inflation changes from Q4 2019. This lack of variance largely stems from including several Eurozone countries in the sample of developed economies (Table 7 shows the similarity in weights across the four CPI components for both weight sets). Notably, the inflation spike from Q4 to its peak (averaging 8.5 percentage points for both calculations) exceeds the increase observed in Latin American economies (ranging between 5.9 and 6.4 pp, according to Fig.

17). This rise is driven by significant contributions from energy inflation (3.3 pp) and food (2.2 pp), alongside notable increases in core components (industrial goods and services), which jointly contribute 3.0 pp to the headline inflation increase.

In examining the inflation reduction, energy stands out with a substantial negative impact of approximately -4.5pp, followed by decreases in food and core goods inflation and services. The overall outcome (columns 5 & 6) indicates that food and the two core components remain significantly above their pre-pandemic levels, contributing to an incidence nearly 2.5pp higher than pre-pandemic figures. However, this excess is obscured by the pronounced negative influence of energy prices.

The investigation into the impact of employing different CPI basket weights on inflation estimations revealed no notable effects on either Latin American or advanced economies (AEs). Both regions' country-specific CPI basket weights largely align with those typical of the Eurozone (EZ), suggesting minimal influence from the choice of weights on inflation calculations in these contexts. However, the influence of weight selection becomes more pronounced when considering Emerging Market Economies (EMEs), excluding Latin America. Table 7 shows significant deviations in average weights between EMEs and the EZ. Notably, Food, Alcohol, and Tobacco (FAT) comprise a more substantial portion of the basket in EMEs—33% compared to the EZ's 21%—and services hold a smaller share, 33% relative to the EZ's 41%.

Figure 19 illustrates the tangible impact of these weight differences on inflation estimations. Inflation rise calculated with original weights registers at 9.3 percentage points (pp) versus 8.6 pp with EZ weights. Given the countervailing effects of food and services, compositional changes are accentuated—FAT's contribution shifts from 3.7pp under original weights to 2.4pp with EZ weights. More pronounced disparities emerge in the analysis of inflation decline—7.0pp with original weights versus 5.4pp with EZ weights, with FAT's contributions being -3.0 and -1.8pp, respectively. Additionally, evaluating the current inflation scenario presents significant differences: 2.3pp above the pre-pandemic level with country-specific weights, compared to a 3.3pp increase using EZ weights.

Variations in CPI basket weights across different economic contexts can yield divergent interpretations of inflation dynamics. These differences are particularly relevant for monetary policy formulation, underscoring the necessity of considering the potential effects of weight selection on inflation analysis.

Appendix B. Transmission of Supply Shocks to Core Inflation

A recurrent factor behind inflation fluctuations is the evolution of oil and energy prices. Numerous studies have documented the significant role of oil and energy price booms in driving both headline and core inflation. Although the intensity of the pass-through of oil and energy prices to other prices has diminished since the 1970s (e.g., Blanchard and Galí (2010)), the influence of oil and energy prices remains evident as a key driver of inflation in many countries, as demonstrated by Ha et al. (2023b) and Kilian and Zhou (2023). Moreover, the recent surge in inflation following the COVID-19 pandemic was exacerbated by rising oil and energy prices during 2022. This appendix revisits the propagation of supply shocks, such as energy prices, to core inflation. Utilizing the harmonized CPI database, the pass-through to core inflation is estimated, comparing Latin America with advanced economies. The analysis also extends to the pass-through of food price shocks to core inflation. Similar to the literature exploring the state-dependent nature of exchange rate pass-through (e.g., Carrière-Swallow et al. (2021), chapter 5 in Ha et al. (2019), Carriere-Swallow et al. (2023)), this study estimates how the intensity of the pass-through of energy prices is influenced by past levels of headline inflation and inflation expectations.

Following the methodology proposed by Jordà (2005) and Carriere-Swallow et al. (2023), local projections are used to estimate the effects of energy price shocks on core inflation. Formally, the following equation is estimated to determine the effect of energy prices on core prices after h quarters:

$$p^c_{i,t+h} - p^c_{i,t-1} = \beta_h(p^e_{i,t} - p^e_{i,t-1}) + \theta'_h M_{i,t-1} + \gamma_i + \gamma_t + \epsilon_{i,t}, \tag{8}$$

where $p^c_{i,t}$ represents the log of the core CPI in quarter t in country i, and $M_{i,t-1}$ is a vector of country-specific controls. These controls include lagged core inflation, lagged energy inflation, lagged food inflation, lagged inflation expectations, and lagged exchange rate devaluation. The specification in (8) also includes country fixed effects (γ_i) to account for cross-country differences that remain constant over time (such as average inflation), and time-fixed effects (γ_t) to capture unobservable time-varying factors common to all countries in the estimation. The focus is on the parameter β_h, which captures the effect of an energy price shock on core prices h quarters ahead.

Equation (8) is estimated separately for Latin America and advanced economies, utilizing the price indices from Bajraj et al. (2023), which disaggregate core prices into goods and services. This allows for the estimation of equation (8) using either core prices for goods or services.[27]

Figure 20 illustrates that energy prices exhibit a greater pass-through to core inflation in Latin American countries compared to advanced economies.

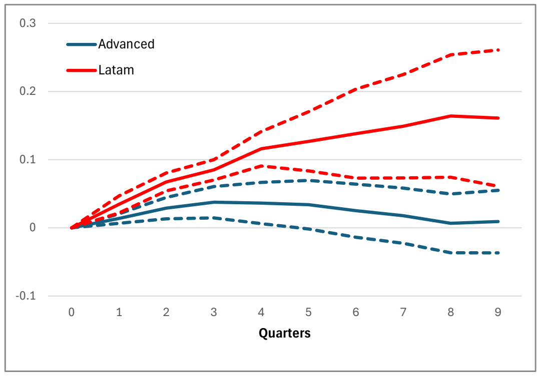


Figure 20: Response of Core CPI to Energy Price Shock

Notes: Percentage points, with the 90 percent confidence interval indicated by dashed lines.

Using the database provided by the Central Bank of Chile, the equation (8) can be re-estimated, separating core inflation in goods from services. In this specification, past core inflation in services is added as a control when the dependent variable is the change in core goods prices. Similarly, past core inflation in goods is controlled for in the estimation when explaining changes in core service prices. The estimated responses to energy price shocks, distinguishing between core prices in goods and services, are presented in figure 21. Panel A displays the responses for goods prices, separating Latin America from advanced economies, while Panel B illustrates the same for service prices.

Figure 21 underscores that the higher propagation observed in Latin America, compared to advanced economies, applies similarly to both goods and services. The question arises as to why the propagation of energy price shocks is more pronounced in Latin America. A straightforward explanation could be that the share of energy as an input for producing and distributing various goods and services is higher in Latin America than in advanced economies. However, is this explanation sufficient to account for the differences in the propagation of energy price shocks? To explore other potential explanations, the previous estimation in equation (8) can be extended to consider changes in the propagation of energy price shocks depending on the state

[27]The list of countries used corresponds to the intersection of countries with data in the Central Bank of Chile database in Table 9 and countries with data on inflation expectations in Table 10.

of the economy. This approach is similar to what has been analyzed in the context of exchange rate pass-through. The variation in exchange rate pass-through to inflation across countries often relates to the nature of the shock triggering currency movements and country-specific characteristics. Furthermore, Carriere-Swallow et al. (2023) demonstrates that exchange rate pass-through varies with the level of headline inflation, the business cycle position, and the level of uncertainty. This analysis will explore how headline inflation and inflation expectations might influence the intensity of energy price shock pass-through to other prices.

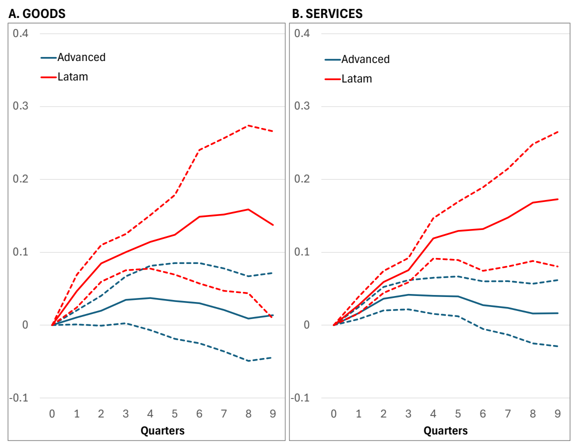


Figure 21: Response of Core CPI to Energy Price Shock: Comparison between Goods and Services

Notes: Percentage points, with the 90 percent confidence interval indicated by dashed lines.

In the same manner as the exchange rate pass-through has shown variation over time related to country characteristics at the moment of the shock, it is possible to explore whether the transmission of energy prices depends on the state of the economy. Analyzing whether the level of headline inflation or inflation expectations affects the size of the propagation of energy price shocks requires modifying the equation (8). In particular, the goal is to include the possibility that the effect of energy price shocks depends on the level of headline inflation. To implement this, the approach follows Auerbach and Gorodnichenko (2012), who propose a smooth transition VAR estimation to estimate the fiscal multiplier in expansion and recession. Accordingly, equation (8) is modified to incorporate the possibility of an additional effect of energy price shocks on core prices when the level of headline inflation is high:

$$\begin{aligned} p^c_{i,t+h} - p^c_{i,t-1} &= f(z_{i,t-1})\beta_{1,h}(p^e_{i,t} - p^e_{i,t-1}) + \beta_{0,h}(p^e_{i,t} - p^e_{i,t-1}) \\ &\quad + f(z_{i,t-1})\theta'_{h,1}M_{i,t-1} + \theta'_{h,0}M_{i,t-1} + \gamma_i + \gamma_t + \epsilon_{i,t} \end{aligned} \tag{9}$$

$$f(z_{i,t}) = \frac{\exp(\gamma z_{i,t})}{1 + \exp(\gamma z_{i,t})} \tag{10}$$

where $z_{i,t}$ is a normalized variable for the headline inflation (year-over-year) level in country i at quarter t. The quarter-moving average for the annual headline inflation for each country is computed, denoting this variable as $x_{i,t}$. Then, $z_{i,t} = (x_{i,t} - \mu_{x,i})/\sigma_{x,i}$, where $\mu_{x,i}$ and $\sigma_{x,i}$ are the sample mean and standard deviation of variable $x_{i,t}$ for country i. The parameter γ is set to 2.5, which is within a range of values used in other studies employing this type of specification (e.g., Auerbach and Gorodnichenko (2012); Tenreyro and Thwaites (2016)). It is worth noting that this specification is equivalent to the one used by Carriere-Swallow et al. (2023) to estimate exchange rate pass-through depending on the level of inflation and other variables that can affect the state of the economy.

In the specification given by equations (9)–(10), when $f(z_{i,t-1})$ is close to one, it indicates that the economy has been in a regime of high headline inflation. In contrast, when $f(z_{i,t-1})$ is close to zero, it captures the opposite situation, where the economy has been experiencing a low level of headline inflation. Consequently, $\beta_{0,h}$ measures the effect of energy price shocks on core prices h quarters ahead under a regime of low headline inflation, whereas $\beta_{1,h}$ estimates the *additional* effect of energy price shocks (relative to the low headline inflation) when the economy is in a regime of high headline inflation.

The estimation for $\beta_{1,h}$ is presented in figure 22. This figure highlights that when headline inflation has been high, the pass-through of energy price shocks to core inflation is more pronounced in Latin America. More importantly, this additional effect is not observed in advanced economies, where a smaller negative additional effect is found. This suggests that when headline inflation has been high in advanced economies, the propagation of energy price shocks to core prices tends to decrease. This result aligns with Carriere-Swallow et al. (2023), who find that the exchange rate pass-through to inflation is higher under a regime of high headline inflation in a sample of both emerging and advanced economies. In this case, evidence shows that the additional effect of shocks on core inflation under high headline inflation is observed in Latin America but not in advanced economies.

Similar results of higher propagation of supply shocks to core inflation can be obtained when inflation expectations are high.[28] Since it is well established that

[28] These results are available upon request.

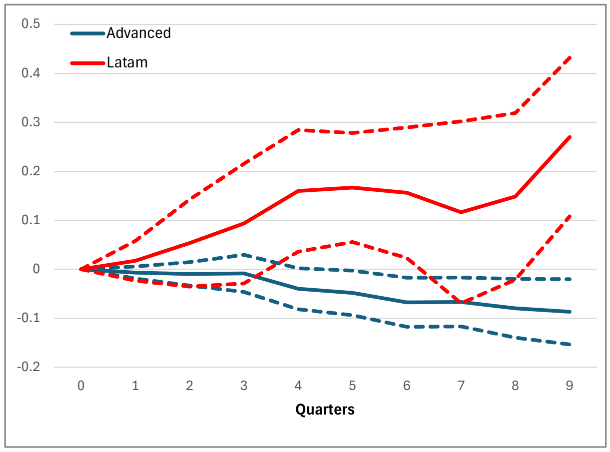


Figure 22: Response of core CPI to energy price shocks. Additional effect under a regime of high level in headline inflation

Notes: Percentage points; 90 percent confidence interval marked with dashed lines.

emerging economies tend to have inflation expectations less well-anchored (e.g., Kose et al. (2019)), this higher propagation is also related to what is found in section 3. Moreover, Carrière-Swallow et al. (2021) and Cuitiño et al. (2022) provide evidence that economies with inflation expectations better anchored around the inflation target can experience a lower exchange rate pass-through. This evidence highlights the benefit of monetary policy credibility in stabilizing inflation over the medium term. Such credibility helps to reduce the propagation of shocks to inflation. A similar argument can be derived for the transmission of supply shocks. The results suggest that the problem of credibility in inflation expectations and its effect in intensifying adverse supply shocks is present in Latin America but not necessarily in advanced economies.

The main message of this appendix is that the persistence of inflation can exhibit several non-linearities related to the past level of headline inflation or inflation expectations. This can make inflation shocks more persistent when they coincide with high inflation or inflation expectations. Nevertheless, evidence indicates that these non-linearities in the propagation of shocks are present in Latin America, while advanced economies seem immune to worsening in the propagation of energy and food price shocks.

Appendix C

Table 8: List of Countries Used in Subsection 2.1

Adv. Countries		Latam Countries
Australia	Latvia	Bolivia
Austria	Lithuania	Brazil
Belgium	Luxembourg	Chile
Canada	Macao	Colombia
Croatia	Malta	Costa Rica
Cyprus	Netherlands	Dominican Republic
Czechia	New Zealand	Ecuador
Denmark	Norway	El Salvador
Estonia	Portugal	Guatemala
Finland	San Marino	Honduras
France	Singapore	Mexico
Germany	Slovak Republic	Nicaragua
Greece	Slovenia	Panama
Hong Kong	Spain	Paraguay
Iceland	Sweden	Peru
Ireland	Switzerland	Uruguay
Israel	Taiwan, China	
Italy	United Kingdom	
Japan	United States	
Korea, Rep.		

Table 9: List of Countries Used in Appendix A

Advanced Countries	Latam Countries	Emerging Ex-Latam
Austria	Bolivia	Albania
Belgium	Brazil	Bulgaria
Canada	Chile	Hungary
Croatia	Colombia	India
Cyprus	Costa Rica	Montenegro
Czechia	Ecuador	Macedonia
Denmark	Mexico	Philippines
Estonia	Paraguay	Poland
Finland	Peru	Romania
France	Uruguay	Serbia
Germany		Russia
Greece		Saudi Arabia
Iceland		South Africa
Ireland		
Italy		
Japan		
Korea, Rep.		
Latvia		
Lithuania		
Luxembourg		
Malta		
Netherlands		
Norway		
Portugal		
Singapore		
Slovak Republic		
Slovenia		
Spain		
Sweden		
Switzerland		
Taiwan, China		
United Kingdom		
United States		

Table 10: List of Countries from the Inflation Expectations Database

Advanced Countries	Latam Countries
Austria	Bolivia
Belgium	Brazil
Canada	Chile
Denmark	Colombia
Finland	Costa Rica
France	Dominican Republic
Germany	Ecuador
Greece	El Salvador
Ireland	Guatemala
Israel	Honduras
Italy	Mexico
Netherlands	Nicaragua
Norway	Panama
Portugal	Paraguay
Spain	Peru
Sweden	Uruguay
Switzerland	
United Kingdom	
United States	

Hutchins Center on Fiscal & Monetary Policy at BROOKINGS

The mission of the Hutchins Center on Fiscal and Monetary Policy is to improve the quality and efficacy of fiscal and monetary policies and public understanding of them.

Questions about the research? Email ESmedia@brookings.edu.
Be sure to include the title of this paper in your inquiry.