INTERNATIONAL MONETARY FUND

It's Never Different: Fiscal Policy Shocks and Inflation

Serhan Cevik and Fedor Miryugin

WP/23/98

WORKING PAPER

2023
MAY

 WP/23/98

IMF Working Paper

European Department

It's Never Different: Fiscal Policy Shocks and Inflation

Prepared by Serhan Cevik and Fedor Miryugin[1]

Authorized for distribution by Bernardin Akitoby

May 2023

Abstract

This paper investigates the impact of fiscal shocks on inflation, using a large panel of 139 countries over the period 1970–2021. First, both headline and core measures of inflation increase in response to expansionary shifts in the fiscal policy stance. Second, we split the sample and observe an intriguing pattern that fiscal policy shocks are primarily significant in developing countries. Third, the inflationary impact of fiscal policy shocks is dependent on fiscal space and economic conditions, as well as monetary policy type, exchange rate regimes and fiscal rules, at the time of the shock. We confirm these results by using the narrative approach and forecast errors, as well as cyclically-adjusted data on government revenues and non-interest expenditures, to identify exogenous changes in fiscal policy. The analysis has several important policy implications: (i) fiscal policy is a critical anchor of macroeconomic stability; (ii) fiscal policy should be used with care in aggregate demand management as it has significant effects on inflation, which are highly dependent on fiscal space and economic conditions; and (iii) flexible exchange rates and rule-based policymaking provide greater resilience to inflationary shocks.

JEL Classification Numbers:	E31; E50; E52; E62; E63; H60
Keywords:	Inflation; fiscal policy; public debt; output gap; local projections
Author's E-Mail Address:	scevik@imf.org; fmiryugin@gwu.edu

[1] The authors would like to thank Bernardin Akitoby, Carlos Goncalves, Anneta Orraca-Tetteh, Adrian Peralta, Marcos Poplawski-Ribeiro, Francisco Roch, Tatjana Schulze and the participants of a seminar at the European Department of the International Monetary Fund (IMF) for helpful comments and suggestions.

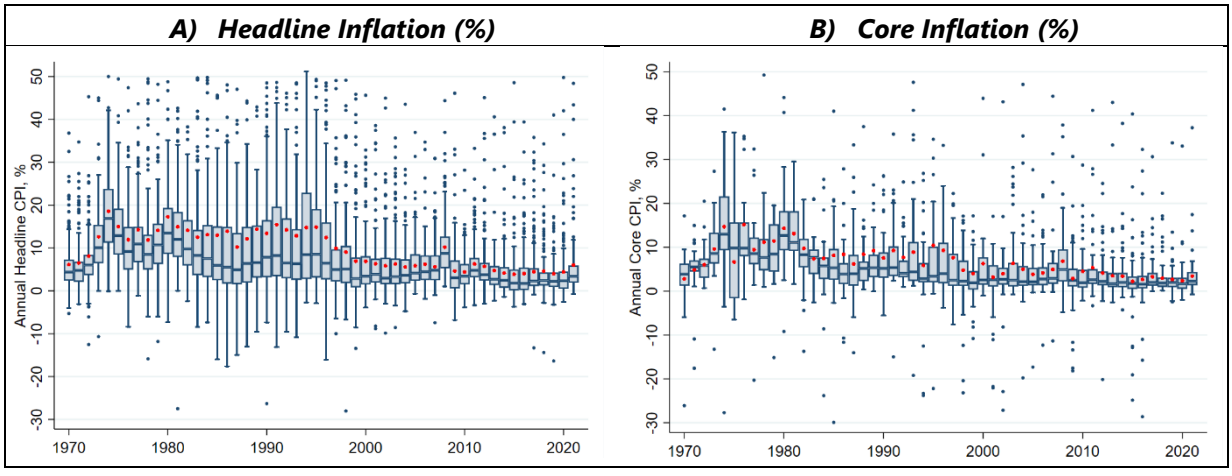
"History repeats itself, the first as tragedy, then as farce."
—Karl Marx

I. INTRODUCTION

The world economy is in the midst of the worst inflation shock since the 1970s, with global inflation surging over 10 percent in 2022, from an average of 2.1 percent during the period 2010-2020. This is not just a recurring problem in developing countries, but it could also become an entrenched phenomenon in advanced economies with a long history of low and stable inflation. A confluence of factors—ranging from the strong rebound in aggregate demand caused by a titanic wave of fiscal stimulus in the wake of the COVID-19 pandemic to global supply constraints and shock waves through international commodity markets triggered by Russia's invasion of Ukraine—has contributed to the post-pandemic surge in consumer prices (Binici and others, 2022). Nevertheless, as shown in Figure 1, there are still considerable differences in the level of inflation and how the inflation process has changed across countries over time. In this paper, we examine international evidence on the role of fiscal policy in shaping inflation dynamics, using a large panel of 139 countries across the world over the period 1970-2021.

We investigate the dynamic impact of fiscal shocks on inflation by applying the local projection (LP) method developed by Jordà (2005) and estimate impulse response functions (IRFs). We identify fiscal policy shocks as a deterioration of one standard deviation in the overall or primary budget balance as a share of GDP and explore the possibility of state-dependent effects of fiscal policy shocks on consumer price inflation by looking at two dimensions: (i) the position of a given economy in the business cycle at the time the fiscal shock hits; and (ii) the public debt-to-GDP ratio (or interest payments as a share of GDP) as a proxy of fiscal space at the time the fiscal shock occurs. For greater granularity, we also estimate the models for different types of monetary policy frameworks (i.e., inflation targeting), exchange rate regimes (i.e., fixed *vs.* floating), and the presence of fiscal rules.

Figure 1. Headline and Core Inflation Across the World



Note: Each box corresponds to the 25th and 75th percentile of observations in a given year, while the whiskers show the interquartile range. The line inside a box represents the median; the red dot denotes the average. Extreme outliers colored in blue with inflation below -30 and above 50 are removed.

The empirical analysis shows that consumer price inflation increases in response to fiscal policy shocks. A deterioration of one standard deviation in the overall budget balance-to-GDP ratio, for example, leads to an increase of 0.56 percentage points in headline inflation in the first year and by 0.71 percentage points on a cumulative basis over the medium term. The inflationary impact of fiscal policy shocks exhibits a similar magnitude when we use the primary budget balance as a measure of the fiscal stance but is estimated to be much larger on core inflation (excluding food and energy). The strength and persistence of inflation response, however, are not uniform across different types of countries and at different states of economic activity and fiscal space.

- First, we split the sample and observe an intriguing pattern that fiscal policy shocks are primarily significant in developing countries that include emerging market economies and low-income countries. The impact of fiscal shocks on headline inflation is significantly greater in developing countries but has broadly equal effects on core inflation across all countries.
- Second, we investigate the state-dependent effects of fiscal shocks on inflation with respect to fiscal space and economic conditions at the time the fiscal shock occurs and find that the response to fiscal shocks differs significantly according to the level of fiscal space and whether the economy is in recession or not. Inflation increases more due to a fiscal shock when a country has a more constrained fiscal space as measured by the public debt-to-GDP ratio (or interest payments as a share of GDP) and during expansions in economic activity.
- Third, we obtain evidence showing that the inflationary effects of fiscal shocks vary with the exchange rate regime (fixed *vs*. floating), monetary policy frameworks (such as inflation targeting), and rule-based fiscal policy frameworks. Countries with more flexible exchange rate regimes and inflation targeting to better anchor monetary policy or following explicit fiscal rules appear to be more resilient against inflation pressures caused by fiscal shocks.

We confirm the baseline results by using the narrative approach and forecast errors (the difference between actual budget balance and its forecast), as well as cyclically-adjusted data on government revenues and non-interest expenditures, to identify exogenous changes in fiscal policy and obtain robust evidence on the inflationary impact of expansionary fiscal shocks. All in all, the empirical analysis presented in this paper have several important policy implications: (i) fiscal policy is a critical anchor of macroeconomic stability; (ii) fiscal policy should be used with care in aggregate demand management as it has significant effects on inflation, which are highly dependent on fiscal space and economic conditions; and (iii) flexible exchange rates and rule-based policymaking (inflation targeting for monetary policy and fiscal rules for fiscal policy) provide greater resilience to inflationary shocks.

The remainder of this study is organized as follows. Section II provides an overview of the related literature. Section III describes the data used in the analysis. Section IV introduces the salient features of our econometric strategy and presents the empirical results, including a series of robustness checks. Finally, Section V offers concluding remarks with policy implications.

II. Literature Review

The role of fiscal policy in shaping inflation dynamics is extensively addressed in the literature, notably starting with the "unpleasant monetarist arithmetic" put forward by Sargent and Wallace (1981), who argue that fiscal dominance—resulting from persistent deficits and mounting public

debt—exerts pressure on the central bank to follow inflationary monetary policy. Consequently, continuing fiscal deficits, especially in the absence of credible policy commitments, increase inflation expectations and thereby lead to higher consumer price inflation (Leeper, 1991; Sims, 1994; Woodford, 1994, 1995; Sims, 2011; Cochrane, 2019). Fischer, Sahay, and Vegh (2002), focusing on a panel of 133 countries between 1960 and 1996, show that there is a link between fiscal deficits and inflation in high inflation cases. Celasun, Gelos, and Prati (2004) and Catao and Terrones (2005) find a positive link between fiscal imbalances and inflation, especially in the case of developing countries with high levels of inflation. More recently, using a panel of 21 advanced economies, Banerjee and others (2022) show that the inflationary effect of fiscal deficits crucially depends on the prevailing fiscal-monetary policy regime. That is, under fiscal dominance, the average effect on inflation of higher deficits is up to five times larger than under monetary dominances.

This paper also builds on a broader literature on inflation dynamics across countries and over time. The equilibrium rate of inflation is a function of factors determining a degree of inflation aversion, including policy preferences (Rogoff, 1985), macroeconomic developments including the level of income and trade openness (Végh, 1989; Romer, 1993; Campillo and Miron, 1997; Lane 1997; Galí and Gertler, 1999; Clark and McCracken, 2006; Badinger, 2009), flexibility of labor-market institutions (Cukierman and Lippi, 1999), type of exchange rate regimes (Levy-Yeyati and Sturzenegger, 2001; Husain, Mody, and Rogoff, 2005), and political and institutional factors (Cukierman, 1992; Aisen and Veiga, 2007). While Moore, Lewis-Bynoe, and Morgan (2012) identify domestic demand pressures, commodity price shocks, and political factors as the key determinants of inflationary episodes, other studies, building on Kydland and Prescott (1977) and Barro and Gordon (1993), find a robust relationship between institutional factors such as central bank independence and inflation (Cukierman, Webb, and Neyapti, 1992; Alesina and Summers, 1993; Campillo and Miron, 1997; Lougani and Sheets, 1997; Cottarelli, Griffiths, and Moghadam, 1998; Posen, 1998; Neyapti, 2003; Arnone, Laurens, and Segalotto, 2006; Brumm, 2006; Walsh, 2008).

Another strand of the literature connects the macroeconomic policy trilemma to inflation, reasoning that when a country maintains a pegged exchange rate regime, it loses its monetary independence and thus effective control of inflation dynamics. While Hausmann and others (1999) and Frankel, Schmukler, and Serven (2004) argue that exchange rate flexibility does not necessarily provide monetary autonomy, Shambaugh (2004) finds evidence suggesting that "countries with fixed exchange rates follow the interest rate of the base country more closely than countries with flexible exchange rates." In other studies, Gruben and McLeod (2002), Gupta (2008), and Badinger (2009) examine the relationship between capital account openness and inflation and find that unrestricted capital mobility lowers inflation by disciplining central banks. More recently, Cevik and Zhu (2020) show that a country's ability to conduct its own monetary policy for domestic purposes independent of external monetary influences leads to lower inflation. This is also consistent with empirical findings that indicate that the adoption of inflation targeting as a monetary policy framework has a significant negative effect on inflation in developing countries (Brito and Bystedt, 2010; Samarina, Terpstra, and De Haan, 2014; Zhang and Wang, 2022).

III. DATA OVERVIEW

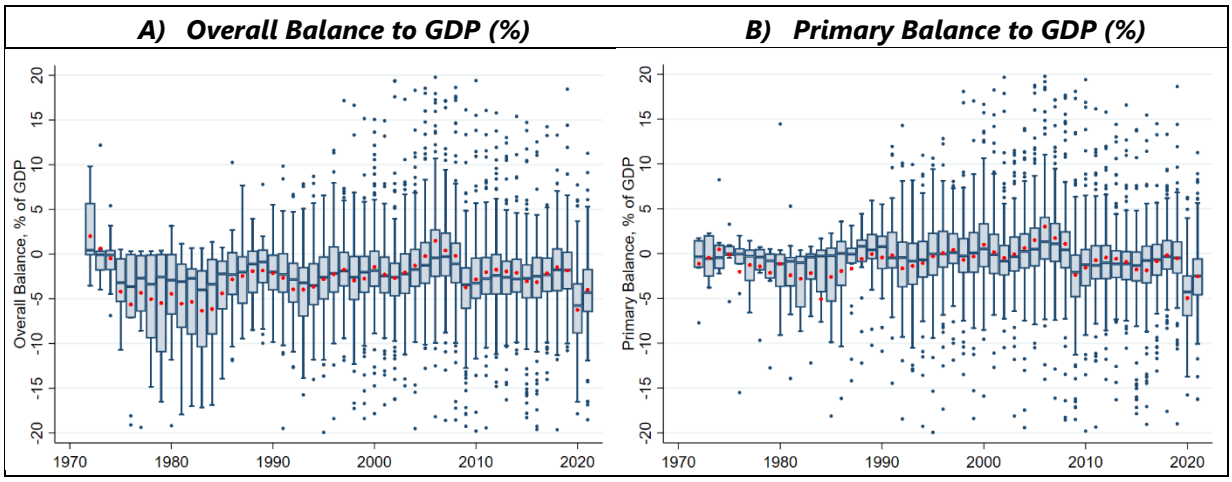
We construct a panel dataset of annual observations covering 139 countries over the period 1970–2021. The dependent variable is inflation, which is computed on an annual basis as the year-on-year percentage change in the consumer price index (CPI) as follows:

$$\pi_{i,t} = \left(\frac{CPI_{i,t}}{CPI_{i,t-1}}\right) * 100$$

where $\pi_{i,t}$ denotes inflation in country i at time t based on headline and core CPI series, drawn from the World Bank's global database of inflation.[2] We remove extreme outliers such as the recent hyperinflation episode in Zimbabwe or the transition period in the former Soviet republics). Appendix Table A1 provides the summary statistics of all variables used in the estimations.

The main explanatory variable of interest is the fiscal policy stance as measured by the overall or primary budget balance as a share of GDP, which show considerable variation across countries and over time (Figure 2). We obtain the fiscal data from the IMF's Government Finance Statistics (GFS) database. We measure fiscal policy shocks as a deterioration of one standard deviation in the overall or primary budget balance as a share of GDP. As a robustness check, we identify exogenous changes in fiscal policy with several alternative approaches. First, we use the narrative approach, which covers only for a subset of 17 advanced economies over the period 1980–2011 and 14 emerging market economies over the period 1991–2017 (Devries and others, 2011; David and Leigh, 2018). Second, we follow Auerbach and Gorodnichenko (2013) and use forecast errors—the difference between actual budget balance and its forecast—in 35 advanced and 50 emerging market economies over a shorter period (2003–2021). We construct these "fiscal policy" forecast

Figure 2. Fiscal Policy Stance Across the World



Note: Each box corresponds to the 25th and 75th percentile of observations in a given year, while the whiskers show the interquartile range. The line inside a box represents the median; the red dot denotes the average. Extreme outliers colored in blue with CPI below -20 and above 20 are removed.

[2] This dataset is available at https://www.worldbank.org/en/research/brief/inflation-database. Ha, Kose, and Ohnsorge (2021) provide detailed information on the database.

errors as the differences between the one-year-ahead forecasts in the autumn edition of the IMF's WEO report and the actual overall and primary budget balances reported in the following year:

$$fe_{i,t} = bp^{a}_{i,t} - bp^{f}_{i,t}$$

in which $fe_{i,t}$ denotes the difference between actual budget balance as a share of GDP ($bp^{a}_{i,t}$) and its one-year-ahead forecast ($bp^{f}_{i,t}$) in country i at time t. This identification approach helps deal with the potential feedback from the state of the economy to fiscal policy shocks. Third, instead of focusing on the overall fiscal stance, we use cyclically adjusted government revenues and expenditures to provide a more granular assessment of how different fiscal policy tools affect inflation.

We are also interested in the possibility of state-dependent nonlinear effects of fiscal policy on consumer price inflation by looking at two dimensions: (i) the state of the economy at the time the fiscal shock hits; and (ii) the level of public debt as a proxy of fiscal space and its interaction with the fiscal policy stance during shocks. Following the literature on the determinants of inflation, we include a set of control variables, such as real GDP per capita, real GDP growth, international trade as a share of GDP, credit to the private sector as a share of GDP, money supply growth, central bank independence as measured by the extended central bank independence (CBIE) index constructed by Romelli (2022). To obtain granular estimations, we separate countries into the following groups: (i) inflation-targeting, (ii) fixed and flexible exchange rate regimes based on the de facto exchange rate arrangement classification of Ilzetzki, Reinhart, and Rogoff (2019), and iii) with and without fiscal rules.

It is essential to analyze the time-series properties of the data to avoid spurious results by conducting panel unit root tests. We check the stationarity of all variables by applying the Im-Pesaran-Shin (2003) procedure, which is widely used in the empirical literature to conduct a panel unit root test. These results, displayed in Appendix Table A2, indicate that the variables used in the analysis are stationary after logarithmic transformation or upon first differencing.

IV. Empirical Strategy

To estimate the dynamic impact of fiscal developments on consumer price inflation over the short and medium term, we apply the semi-parametric LP technique and estimate a set of IRFs that directly plot a sequence of linear projections of headline and core inflation on the current information set including fiscal policy shocks. Accommodating a panel structure, this framework does not constrain the shape of IRFs and therefore is less sensitive to misspecification compared to conventional vector autoregressive (VAR) models (Auerbach and Gorodnichenko, 2013; Jordà and Taylor, 2016). Since it is especially useful in estimating nonlinear dynamic responses, the LP framework is widely adopted in the recent literature to analyze the effects of monetary policy shocks (Jeenas, 2018) and fiscal policy shocks (Ramey and Zubairy, 2018; Romer and Romer, 2019). Accordingly, in this paper, we investigate the impact of fiscal policy shocks on consumer price inflation in a panel setting by estimating the following baseline regression:

$$\pi_{i,t+h} - \pi_{i,t-1} = \alpha_i + \tau_t + \beta_h fs_{i,t} + \theta' X_{i,t} + \varepsilon_{i,t}$$

where $\pi_{i,t}$ denotes inflation as measured by headline or core inflation in country i at time t; $fs_{i,t}$ is a measure of fiscal policy shocks and β_h is the cumulative response h years after a fiscal policy shock; and $X_{i,t}$ is a vector of control variables including 3 lags of fiscal policy shocks, 3 lags of the dependent variable, and 3 lags of real GDP growth. To ensure robustness, we also include real GDP per capita, international trade as a share of GDP, money supply growth, credit to the private sector as a share of GDP, and the CBIE index as additional control variables. The coefficients α_i and τ_t denote time-invariant country-specific features and shocks that are common across all countries in a given period, respectively. $\varepsilon_{i,t}$ is an idiosyncratic error term. This equation is estimated using Ordinary Least Squares (OLS) with Spatial Correlation Consistent (SCC) standard errors as proposed by Driscoll and Kraay (1998) to address cross-sectional and serial correlation.

We focus on the impulse responses of inflation due to fiscal policy shocks—defined as a deterioration of one standard deviation in the overall or primary budget balance as a share of GDP—and obtain IRFs by plotting the estimated coefficient β_h with 90 percent and 68 percent confidence bands computed using the respective standard errors. Therefore, our results should be interpreted as the impact of a fiscal policy shock on the difference between the inflation rate h years after the fiscal shock and the inflation rate prior to the shock.

We also explore whether initial macro-fiscal conditions at the time of the fiscal policy shock influence its impact on inflation by allowing the dynamic responses to vary as follows:

$$\pi_{i,t+h} - \pi_{i,t-1} = \alpha_i + \tau_t + \beta_h^K F(z_{i,t}) fs_{i,t} + \beta_h^L [1 - F(z_{i,t})] fs_{i,t} + \theta' X_{i,t} + \varepsilon_{i,t}$$

$$\text{with } F(z_{i,t}) = \frac{\exp(-\gamma z_{i,t})}{1+\exp(-\gamma z_{i,t})}, \gamma > 0$$

in which $z_{i,t}$ denotes the state of the economy as measured by the output gap estimated via the Hodrick-Prescott (HP) filter[3] and fiscal space as measured by the public debt-to-GDP ratio that is normalized to have zero mean and unit variance.[4] The coefficients β_h^K and β_h^L capture the impact of fiscal policy shocks on inflation at each horizon h in case of recessions ($F(z_{i,t}) \approx 1$ when z goes to minus infinity) and expansions ($[1 - F(z_{i,t})] \approx 1$ when z goes to plus infinity), respectively. We estimate the state-dependent model with $\gamma = 10$.[5] This allows us to capture state-dependent nonlinear effects of fiscal policy on consumer price inflation according to the cyclical position of the economy and available fiscal space to cushion against the recessionary impact of fiscal shocks.

[3] The HP filter proposed by Hodrick and Prescott (1997) separates the GDP series into trend and cyclical components, using a smoothing parameter of 6.25 on annual data.

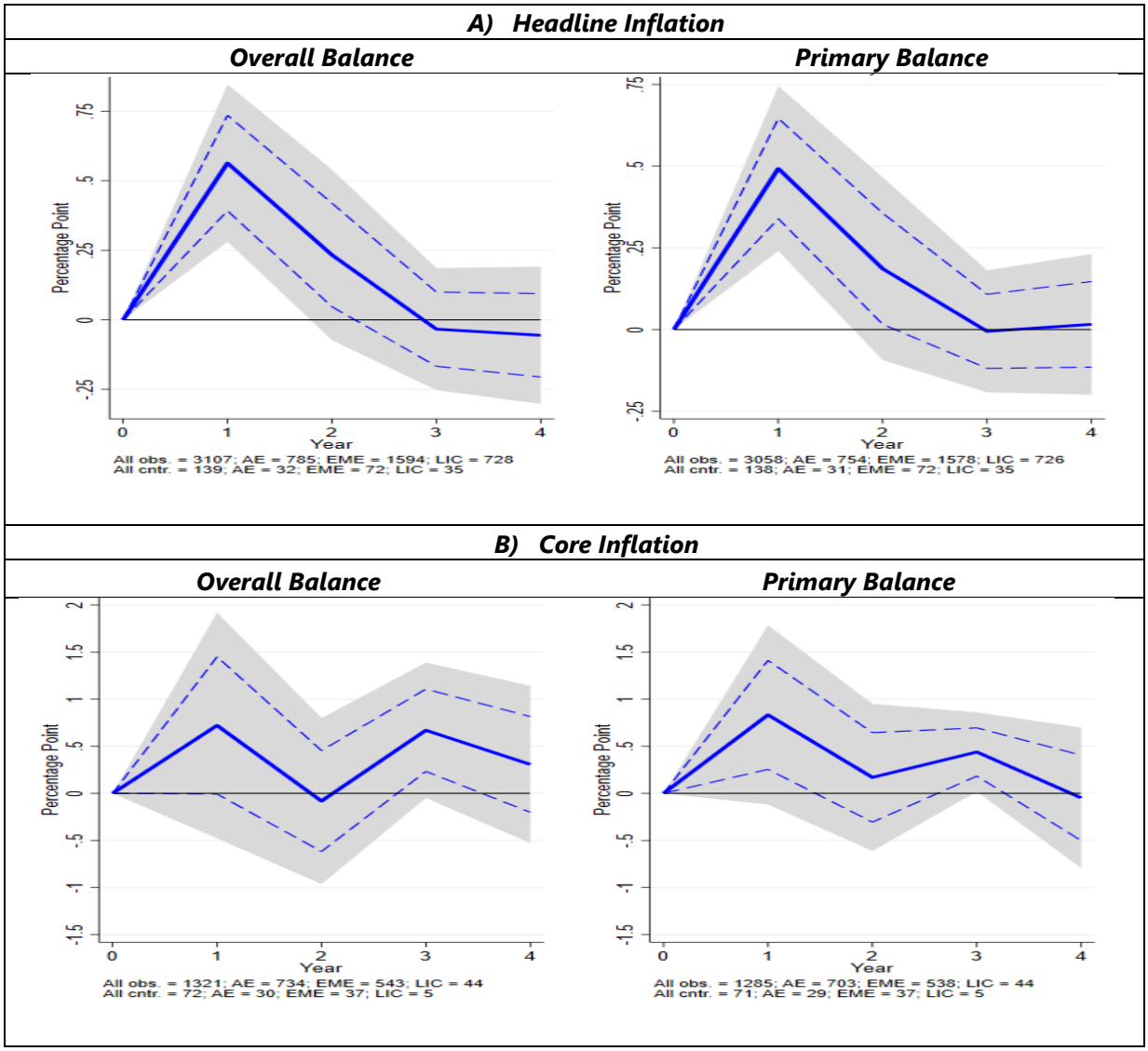
[4] The weights assigned to each regime vary between 0 and 1 according to the weighting function *F(.)*, so that $F(z_{i,t})$ can be interpreted as the probability of being in a given economic state—boom or bust—or the availability of fiscal space. Recent research utilizes a wide variety of indicators of fiscal space, including those associated with the debt service capacity of sovereigns (Panizza, 2008; Jaimovich and Panizza, 2010). In this paper, we use the public debt-to-GDP and interest payments-to-GDP ratios, which are the most widely available fiscal-space variable for a broad range of countries.

[5] The results for headline inflation remain broadly unchanged with alternative values of the parameter γ, between 0.1 and 10, as presented in Appendix Table A6-A9. Alternative results for core inflation are available upon request.

V. Empirical Results

The main variables of interest are headline and core measures of consumer price inflation, and therefore we directly estimate the percentage change in the variables of interest in response to a fiscal policy shock defined as a deterioration of one standard deviation in the overall and primary budget balance to GDP ratio. In Figure 3, we present the results of our baseline specification including control variables described in the previous section. Each chart shows the impact on headline inflation in our sample over a 4-year period in response to a fiscal expansion shock, where

Figure 3. Fiscal Shocks and Inflation: Baseline

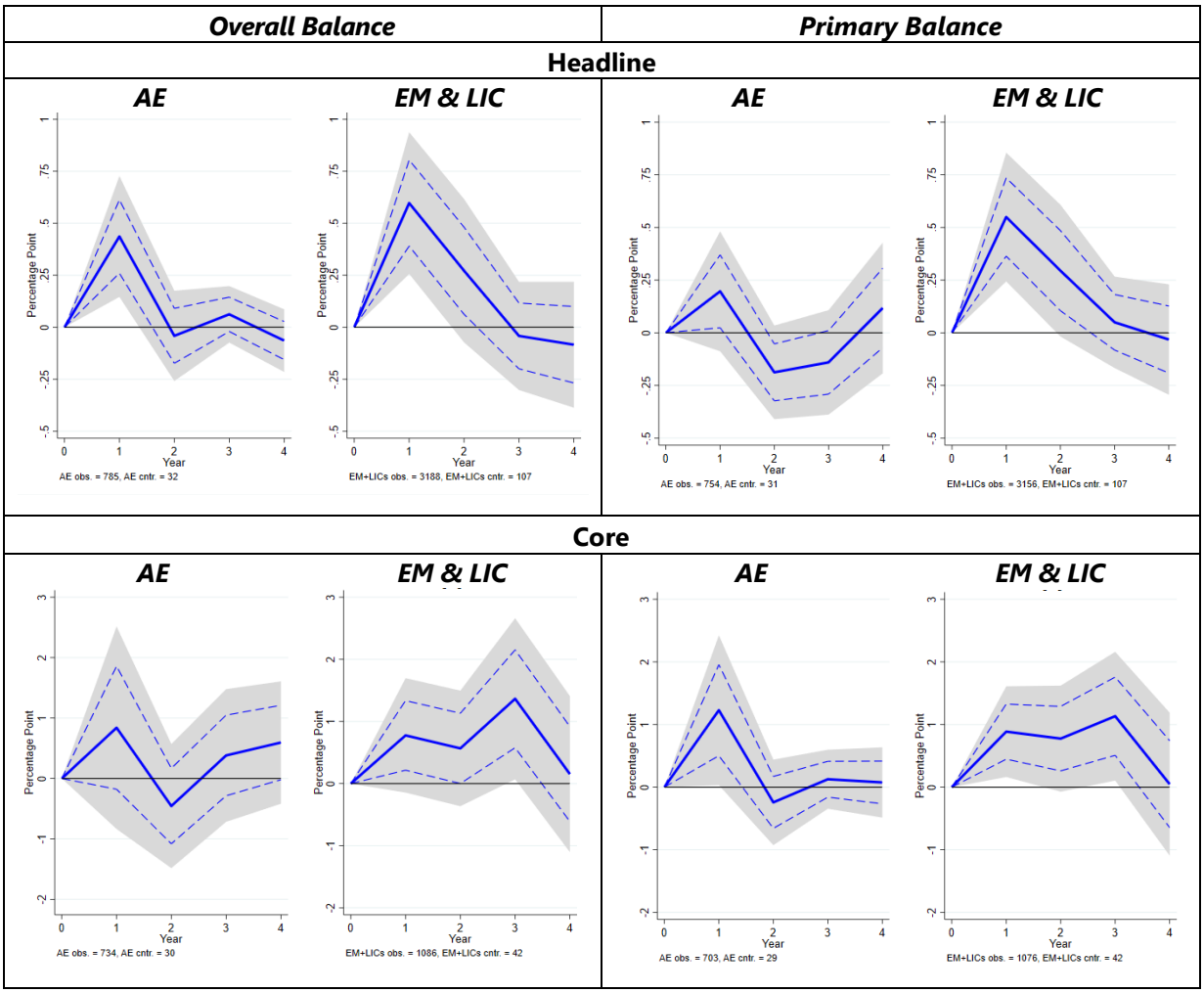


Note: The blue line depicts the response of inflation to a one standard deviation fiscal shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

0 indicates the year in which the fiscal shock occurs. The shaded area indicates the 90 percent confidence interval based on robust standard errors, while the dashed lines designate the 68 percent confidence interval.

We find that a deterioration of one standard deviation in the overall budget balance-to-GDP ratio leads to a persistent increase in consumer price inflation. Headline inflation accelerates by about 0.56 percentage points in the short term (after one year), which dissipates over the medium term (after 4 years). The inflationary impact of fiscal policy shocks is of a similar magnitude when we use the primary budget balance-to-GDP ratio as a measure of the fiscal policy stance, with an increase of 0.49 percentage points in headline inflation in the short term with no persistent effect over the medium term. The shock has a significant effect at 90 percent confidence level over one period but

Figure 4. Fiscal Shocks and Inflation: Advanced vs. Emerging



Note: The blue line depicts the response of inflation to a one standard deviation fiscal shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

fades away starting from the next period. Second, we repeat the exercise for core inflation (excluding food and energy) and observe a similar pattern, yet the impact of both shocks is much larger— 0.72 and 0.83 percentage points for overall and primary balance, respectively.[6]

Next, we split the full sample of countries into income groups—advanced economies and developing countries that include emerging market economies and low-income countries, which allows us to observe an intriguing pattern that fiscal policy shocks are primarily significant in developing countries.[7] As presented in Figure 4, headline inflation increases by 0.6 percentage points in the first year after a fiscal shock hits and rises to 0.74 percentage points on a cumulative basis after 4 years in developing countries, while there is a much smaller increase in headline inflation in advanced economies of 0.44 percentage points in the first year and 0.39 percentage points over the medium run. In addition, the impact of fiscal shocks on core inflation is more persistent in developing countries. A deterioration of one standard deviation in the overall budget balance is associated with an increase in core inflation in developing countries: 0.78 percentage points in the first year and 1.5 percentage points over the medium term. The magnitude of these effects is even greater when we measure fiscal shocks with the primary budget balance, which is associated with an increase of 0.89 percentage points in the first year and 1.71 percentage points over the medium term.

We also analyze the inflationary impact of fiscal policy in commodity-exporting countries[8] *vs.* others and find a significantly greater effect of fiscal shocks on inflation, especially over the medium run. A one standard deviation deterioration in the overall budget balance, for example, is associated with an increase of 0.4 percentage points in headline inflation in the first year and additional 0.58 percentage point in the second year, while the impact in non-commodity exporting countries is estimated to be only 0.64 percentage points in the first year with a correction by -0.13 in the second year (Appendix Figure A1). Commodity exporters exhibit higher dependence on commodity prices, which can be more volatile than other prices. With increasing commodity prices, government revenues tend to rise in these countries, which can lead to increased government spending and inflationary pressures. Similarly, there is a decline in commodity prices, governments may face budget constraints and cut expenditures, which in turn causes disinflation. We obtain comparable results when fiscal shocks are measured with the primary budget balance. However, in contrast to headline inflation, commodity-exporting countries experience a smaller or insignificant impact from fiscal shocks on core inflation, which excludes highly volatile but subsidized components such as food and energy prices.

Fiscal policy and inflation exhibit diverging trends over the sample period. The fiscal stance was moving in a cyclical manner over the past 50 years. At the same time, inflation was trending down over the past 20 years with declining dispersion across countries. This can be attributed to several factors, including globalization, increased competition, improved central bank policies, and technological advancements, which, in turn, have led to greater price transparency, increased trade, and greater efficiency in markets. Therefore, we study these fundamentally different periods separately and present results for 1970-2000 and 2001-2021 in Appendix Figure A2. The impact of

[6] Core CPI is available for about half of the sample, which may affect the precision of the estimated coefficients.

[7] The country classification is displayed in Appendix Table A3.

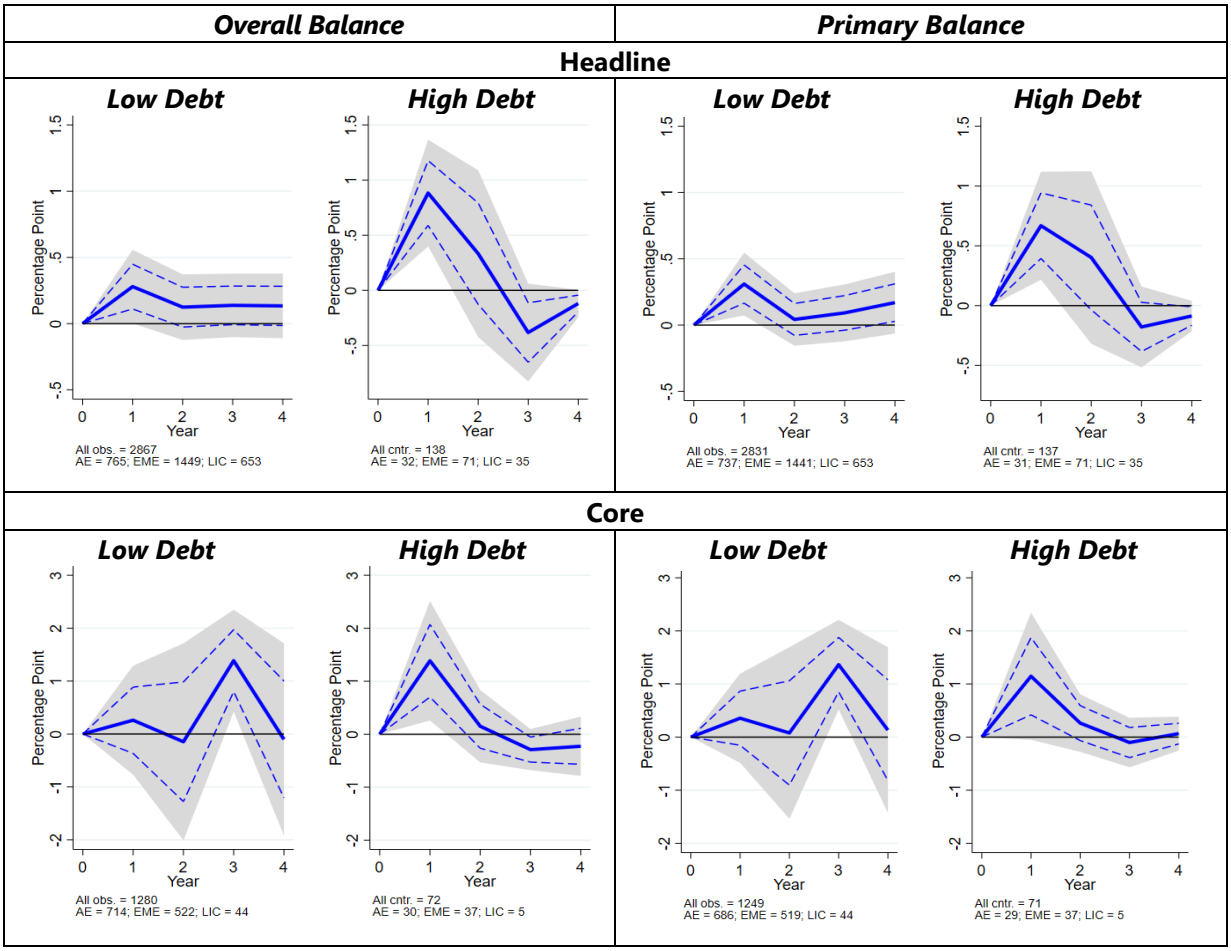
[8] Countries with the share of all commodities in total export over 35 percent are defined as a commodity exporter. Appendix Table A4 provides the list of commodity exporters in our sample.

fiscal shocks during the period 1970-2000 is estimated to be almost three times greater than that over the period 2001-2021: a fiscal shock measured by the overall budget balance leading to an increase of 1.64 percentage points in headline inflation in the first three decades of our sample compared to an increase of 0.45 percentage points in the last three decades.

We also explore the possibility of nonlinear effects of fiscal shocks on inflation by looking at two particular dimensions: (i) the public debt-to-GDP ratio as a proxy of fiscal space and (ii) the state of the economy at the time the fiscal shock hits.

First, as presented in Figure 5, we find that the response to fiscal policy shocks differs considerably according to the level of fiscal space. Both headline and core measures of consumer price inflation increase more due to a fiscal policy shock when a country has a more constrained fiscal space as measured by the public debt-to-GDP ratio. In high-debt states, a deterioration of one standard

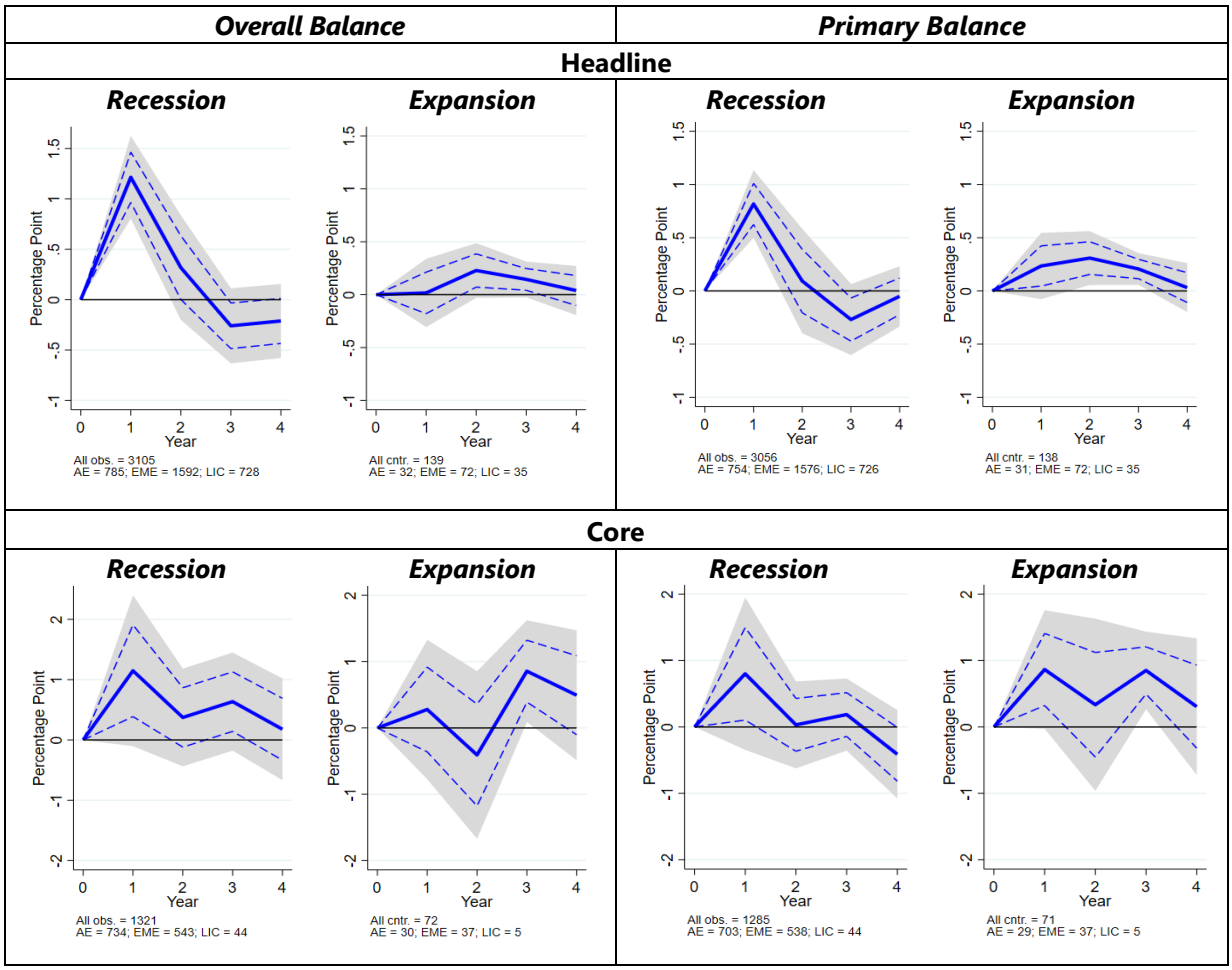
Figure 5. Fiscal Shocks and Inflation: Role of Fiscal Space (Public Debt)



Note: The blue line depicts the response of inflation to a one standard deviation fiscal shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

deviation in the overall budget balance as a share of GDP translates into a 0.88 percentage points increase in headline inflation in the first year after the shock and results in 0.72 percentage points on a cumulative basis after 4 years. In low-debt states, on the other hand, the impact of fiscal policy shocks on inflation is statistically insignificant and smaller in magnitude. We observe similar patterns when the fiscal policy stance is measured by the primary budget balance-to-GDP ratio: the impact of a fiscal policy shock in a low-debt state is half of that in a high-debt state, 0.31 *vs.* 0.67 percentage points, respectively. These effects are even more pronounced on core inflation, which are statistically insignificant in low-debt states but over 1 percentage points in the first year in high-debt states. With respect to core inflation, the impact of fiscal shock becomes significant in the third year in countries with larger fiscal space. An increase in government spending is likely to stimulate demand and raise output. If the economy is operating close to its potential output with limited spare capacity and slack in the labor market, an increase in core inflation may be observed, although not immediately. We check

Figure 6. Fiscal Shocks and Inflation: Role of Business Cycles



Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

the robustness of these findings with an alternative measure of fiscal space (interest payments as a share of GDP) and obtain similar results, which are presented in Appendix Figure A2.

Second, we find that the inflation response to fiscal policy shocks depends on the state of the economy before the shock occurs. As presented in Figure 6, a deterioration of one standard deviation in the overall budget balance as a share of GDP leads to an increase of 1.2 percentage points during recessions but has virtually no impact during expansions in economic activity. Similar results emerge when we use the primary budget balance-to-GDP ratio as a measure of the fiscal policy stance. A slightly different picture is observed with regard to core inflation, where point estimates in the first year are higher in the recession but remain insignificant, except for the impact of primary balance in the expansionary phase, where the effect mounts up to 0.85 percentage points in the third year following the shock and becomes significant. These patterns can possibly be attributed to a slack often observed in the labor and product markets in recessions. In such circumstances, an increase in government spending or a decrease in taxes can stimulate demand and lead to an increase in prices. Additionally, during a recession, the central bank may have less room to respond to inflationary pressures through monetary policy, which can also magnify the impact of fiscal policy on inflation.

For greater granularity, we estimate the model for different monetary policy frameworks (i.e., inflation targeting) and exchange rate regimes (i.e., fixed *v.* floating).[9] Inflation targeting demonstrates to be effective in limiting some inflationary impact of fiscal policy shocks. The change in both headline and core inflation after an overall balance fiscal shock occurs remains insignificantly different from zero for countries targeting inflation. At the same time, these countries see a significant drop in core inflation in the third and fourth years. Primary balance shock results, however, in a positive significant increase on headline inflation in inflation-targeting countries, but no impact on core inflation. On the other hand, countries that do not follow the inflation targeting policy face a higher increase in headline and core inflation in all scenarios.

Next, we zoom into exchange rate regimes. As shown in Appendix Figure A5, countries with floating exchange rates are found to be more resilient to the inflationary impact of fiscal shocks. The effect of fiscal shocks is insignificant over the course of four-year period. In such countries, changes in the fiscal stance are more likely to be absorbed by changes in the exchange rate rather than through changes in domestic prices. For example, a larger fiscal deficit may cause a higher demand for imports, which in turn puts downward pressure on the exchange rate as more currency is needed to buy the same amount of foreign goods. The exchange rate can adjust by depreciating, thus, helping offset the initial fiscal shock by making exports cheaper and imports more expensive. On the other hand, countries that maintain a stable exchange rate against a foreign currency or a basket of currencies experience a prolonged impact of the shock. One year after the overall balance shock occurs, headline inflation increases by about 0.52 percentage points and remains significant at 0.34 percentage points in the following year, while core inflation jumps by 0.8

[9] To identify countries with floating and fixed exchange rate regimes, we use the dataset provided by Ilzetzki, Reinhart, and Rogoff (2019). We define floating regimes as countries with freely floating rates, while all other regimes are grouped under the fixed category. We exclude countries with freely falling rates, as these countries are likely to be under significant economic crises, which could bias the results for freely floaters.

percentage points. In case of fixed exchange rate regimes, there is no significant downward correction, so inflation remains high.

Another important instrument in determining the inflationary impact of fiscal policy shocks is whether a country implement a rule-based fiscal framework. Fiscal rules can constrain the government's ability to engage in discretionary fiscal policy and better anchor inflation expectations, which in turn limit the inflationary impact of fiscal policy shocks. Accordingly, we estimate the models for the sample of countries with and without fiscal rules.[10] These results, presented in Appendix Figure A6, show that countries with a fiscal rule generally experience a lower impact of fiscal shocks on inflation. For example, a one standard deviation deterioration in the overall budget balance is associated with an increase of 1.17 percentage points in headline inflation in the first year in countries without a fiscal rule compared to only 0.29 percentage points in countries with a fiscal rule.[11]

For robustness, we identify exogenous changes in fiscal policy using the narrative approach for a subset of 17 advanced economies over the period 1980–2011 and 14 emerging market economies over the period 1991–2017 and forecast errors—the difference between actual budget balance and its forecast—for 85 countries over a shorter period (2003–2021). These alternative identification approaches help deal with the potential feedback from the state of the economy to fiscal shocks. Since fiscal policy is usually designed to respond to the current state of the economy, using forecast errors would reduce the probability that fiscal shocks contain information about the current economic cycle. Most of the information about economic conditions in year *t* would be contained in the forecast, not in the forecast errors. These results, presented in Appendix Figure A7 and Appendix Figure A8, show that core inflation remains sensitive to fiscal shocks if measured by the forecast error as opposed to headline inflation. Due to the different sources of narrative-based measures, we estimate the impact of fiscal policy shocks on two separate samples: OECD countries and Latin American and Caribbean countries. Fiscal shocks in OECD countries appear to have virtually no impact on both headline and core inflation, but the impact of fiscal shocks on inflation is greater in statistical significance and magnitude (reaching over 1 percentage points) in Latin American countries. These alternative estimations confirm that our baseline results do not differ vastly from the responses after narratively identified shocks (or shocks identified by forecast errors. On the whole, we conclude that expansionary fiscal policy shocks matter more in developing countries with constrained fiscal space.

As an additional robustness check, we also estimate the impact of fiscal shocks on inflation using disaggregated and cyclically-adjusted data on revenues and non-interest expenditures, instead of an aggregate measure of the fiscal stance. Although data constraints reduce the number of countries in the sample, these estimations, presented in Appendix Figure A9, show opposing effects of revenue and expenditure shocks that tend to be found in the literature. In particular, we find that a one standard deviation shock to non-interest expenditures (i.e., an increase in the primary spending-to-GDP ratio) leads to higher headline inflation as it adds to aggregate demand.

[10] Data obtained from Davoodii et al. (2022) are available for the period between 1985 to 2021.

[11] Limited data on core inflation does not allow to make conclusive statements with regards to core inflation.

Finally, acknowledging the fact that the core CPI is only available for about half of the sample, we re-estimate baseline specification for headline CPI on the smaller sample, in which both inflation measures are available. Appendix Figure A10 demonstrates that results are not materially different from those taken as the baseline. Further, low-income countries often have much less developed financial systems, which can limit the effectiveness of monetary policy in controlling inflation, hence, the changes in fiscal policy can have a more significant impact on inflation in these countries. To purge the baseline estimates from this effect, we also exclude low-income countries from the sample and obtain broadly similar results presented in Appendix Figure A11.

VI. CONCLUSION

The world economy is in the midst of the worst inflation shock since the 1970s, with global inflation increasing from an average of 2.1 percent during the period 2010-2020 to 0 percent in 2022. While many developing countries are experiencing double-digit inflation rates, the problem is also threat to advanced economies with a long history of low and stable inflation. A confluence of factors—ranging from the strong rebound in aggregate demand caused by a titanic wave of fiscal stimulus in the wake of the COVID-19 pandemic to global supply constraints and shock waves through international commodity markets triggered by Russia's invasion of Ukraine—has contributed to the post-pandemic surge in inflation worldwide, but there are significant differences in the level of inflation and how the inflation process has changed across countries over time. In this paper, we examine international evidence on the relationship between fiscal policy shocks and inflation, using a large panel of 139 countries across the world over the period 1970-2021.

We investigate the dynamic impact of fiscal shocks on consumer price inflation by applying the LP method and estimate IRFs directly from local projections, which accommodate a panel structure and do not constrain the shape of IRFs. We identify fiscal policy shocks as a deterioration of one standard deviation in the overall or primary budget balance as a share of GDP and explore the possibility of state-dependent effects of fiscal policy shocks on consumer price inflation by looking at two dimensions: (i) the position of a given economy in the business cycle at the time the fiscal shock hits; and (ii) the level of public debt as a proxy of fiscal space at the time the fiscal shock occurs. For greater granularity, we also estimate the models for different types of monetary policy frameworks (i.e., inflation targeting), exchange rate regimes (i.e., fixed *vs.* floating) and the presence of fiscal rules.

The empirical analysis shows that consumer price inflation increases in response to fiscal policy shocks. A deterioration of one standard deviation in the overall budget balance-to-GDP ratio, for example, leads to an increase of 0.56 percentage points in headline inflation in the first year and by 0.71 percentage points on a cumulative basis over the medium term. The inflationary impact of fiscal policy shocks exhibits a similar magnitude when we use the primary budget balance as a measure of the fiscal stance but is estimated to be much larger on core inflation (excluding food and energy). The strength and persistence of inflation response, however, are not uniform across different types of countries and at different states of economic activity and fiscal space.

- First, splitting the sample in income groups, we find that although fiscal policy shocks have a significant impact on headline inflation in developing countries, the effect on core inflation is similar across all country groups.

- Second, the impact of fiscal policy shocks on inflation varies according to the level of fiscal space and economic conditions prevailing at the time of the shock. Inflation increases more in countries with constrained fiscal space and during economic expansions.

- Third, the inflationary impact of fiscal policy shocks is influenced by exchange rate regimes, monetary policy frameworks, and whether a country follows explicit fiscal rules. Countries with more flexible exchange rate regimes, inflation targeting, and fiscal rules are more resilient to inflationary pressures from fiscal shocks.

We confirm the baseline results by using the narrative approach and forecast errors (the difference between actual budget balance and its forecast), as well as cyclically-adjusted data on government revenues and non-interest expenditures, to identify exogenous changes in fiscal policy and obtain robust evidence on the inflationary impact of expansionary fiscal shocks. All in all, the empirical analysis presented in this paper have several important policy implications: (i) fiscal policy is a critical anchor of macroeconomic stability; (ii) fiscal policy should be used with care in aggregate demand management as it has significant effects on inflation, which are highly dependent on fiscal space and economic conditions; and (iii) flexible exchange rates and rule-based policymaking (inflation targeting for monetary policy and fiscal rules for fiscal policy) provide greater resilience to inflationary shocks.

REFERENCES

Aisen, A., and F. Veiga (2006). "Does Political Instability Lead to Higher Inflation? A Panel Data Analysis," *Journal of Money Credit and Banking*, Vol. 38, pp. 1379–1390.

Alesina, A., and L. Summers (1993). "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence," *Journal of Money, Credit, and Banking*, Vol. 25, pp. 151–162.

Auerbach, A., and Y. Gorodnichenko (2013). "Output Spillovers from Fiscal Policy," *American Economic Review*, Vol. 103, pp. 141–146.

Badinger, H. (2009). "Globalization, the Output–Inflation Tradeoff and Inflation," *European Economic Review*, Vol. 53, pp. 888–907.

Banerjee, R., V. Boctor, A. Mehrotra, and F. Zampolli (2022). "Fiscal Deficits and Inflation Risks: The Role of Fiscal and Monetary Regimes," BIS Working Papers No. 1028 (Basel: Bank for International Settlements).

Barro, R., and D. Gordon (1993). "Rules, Discretion and reputation in a Model of Monetary Policy," *Journal of Monetary Economics*, Vol. 12, pp. 101–121.

Binici, M., S. Centorrino, S. Cevik, and G. Gwon, 2022, "Here Comes the Change: The Role of Global and Domestic Factors in Post-Pandemic Inflation in Europe," IMF Working Paper No. 22/241 (Washington, DC: International Monetary Fund).

Brito, R., and B. Bystedt (2010). "Inflation Targeting in Emerging Economies: Panel Evidence," *Journal of Development Economics*, Vol. 91, pp. 198–210.

Brumm, H. (2006). "The Effect of Central Bank Independence on Inflation in Developing Countries," *Economics Letters*, Vol. 90, pp. 189–193.

Campillo, M., and J. Miron (1997). "Why Does Inflation Differ Across Countries?" NBER Working Paper No. 5540 (Cambridge, MA: National Bureau of Economic Research).

Catao, L., and M. Terrones (2005). "Fiscal Deficits and Inflation," *Journal of Monetary Economics*, Vol. 52, pp. 529–554.

Celasun, O., R. Gelos, and A. Prati (2004). "Obstacles to Disinflation: What Is the Role of Fiscal Expectations?" *Economic Policy*, Vol. 19, pp. 441–481.

Cevik, S., and T. Zhu (2020). "Trinity Strikes Back: Monetary Independence and Inflation in the Caribbean," *Journal of International Development*, Vol. 32, pp. 375–380.

Cochrane, J. (2019). "The Theory of the Price Level," Hoover Institution.

Cukierman, A. (1992). *Central Bank Strategy, Credibility, and Independence: Theory and Evidence* (Cambridge, MA: The MIT Press).

Cukierman, A., and F. Lippi (1999). "Central Bank Independence, Centralization of Wage Bargaining, Inflation and Unemployment: Theory and Some Evidence," *European Economic Review*, Vol. 43, pp. 1395–1434.

Cukierman, A., S. Webb, and B. Neyapti (1992). "Measuring the Independence of Central banks and Its Effect on Policy Outcomes," *World Bank Economic Review*, Vol. 6, pp. 353–398.

David A., and D. Leigh (2018). "A New Action-based Dataset of Fiscal Consolidation in Latin America and the Caribbean." IMF Working Paper No. 18/94 (Washington, DC: International Monetary Fund).

Davoodi, H., P. Elger, A. Fotiou, D. Garcia-Macia, A. Lagerborg, R. Lam, and S. Pillai (2022). "Fiscal Rules and Fiscal Councils: Recent Trends and Performance during the COVID-19 Pandemic," IMF Working Paper No. 22/11 (Washington, DC: International Monetary Fund).

Devries P., J. Guajardo, D. Leigh, and A. Pescatori (2011). "A New Action-based Dataset of Fiscal Consolidation," IMF Working Papers No. 11/128 (Washington, DC: International Monetary Fund).

Driscoll, J., and A. Kraay (1998). "Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data," *Review of Economics and Statistics*, Vol. 80, pp. 549–560.

Fischer, S., R. Sahay, and C. Vegh (2002). "Modern Hyper- and High Inflations," *Journal of Economic Literature*, Vol. 40, pp. 837–880.

Galí, J., and M. Gertler (1999). "Inflation Dynamics: A Structural Econometric Analysis," *Journal of Monetary Economics*, Vol. 44, pp. 195–222.

Gruben, W., and D. McLeod (2002). "Capital Account Liberalization and Inflation," *Economic Letters*, Vol. 77, pp. 221–225.

Gupta, A. (2008). "Does Capital Account Openness Lower Inflation," *International Economic Journal*, Vol. 22, pp. 471–487.

Ha, J., A. Kose, and F. Ohnsorge (2021). "One-Stop Source: A Global Database of Inflation," WB Policy Research Working Paper No. 9737 (Washington, DC: World Bank).

Hodrick, R., and E. Prescott (1997). "Post-War Business Cycles: An Empirical Investigation," *Journal of Money, Credit, and Banking*, Vol. 29, pp. 1–16.

Ilzetzki, E., C. Reinhart, and K. Rogoff (2019). "Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?" *Quarterly Journal of Economics*, Vol. 134, pp. 599–646.

Jaimovich, D., and U. Panizza (2010). "Public Debt Around the World: A New Dataset of Central Government Debt," *Applied Economic Letters*, Vol. 17, pp. 19–24.

Jeenas, P. (2018). "Monetary Policy Shocks, Financial Structure, and Firm Activity: A Panel Approach," Department of Economics and Business Working Paper (Barcelona: Universitat Pompeu Fabra).

Jordà, O. (2005). "Estimation and Inference of Impulse Responses by Local Projections," *American Economic Review*, Vol. 95, pp. 161–182.

Jordà, O., and A. Taylor (2016). "Estimation and Inference of Impulse Responses by Local Projections," *Economic Journal*, Vol. 126, pp. 219–255.

Kydland, F., and E. Prescott (1977). "Rules Rather Than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy*, Vol. 85, pp. 473–492.

Lane, P., 1997, "Inflation in Open Economies," *Journal of International Economics*, Vol. 42, pp. 327–347.

Leeper, E. (1991). "Equilibria Under 'Active' and 'Passive' Monetary and Fiscal Policy," *Journal of Monetary Economics*, Vol. 27, pp. 129-147.

Levy Yeyati, E., and F. Sturzenegger (2001). "Exchange Rate Regimes and Economic Performance," *IMF Staff Papers*, Vol. 47, pp. 62-98.

Neyapti, B. (2003). "Budget Deficits and Inflation: The Roles of Central Bank Independence and Financial Market Development," *Contemporary Economic Policy*, Vol. 21, pp. 458–475.

Panizza, U. (2008). "Domestic And External Public Debt In Developing Countries," UNCTAD Discussion Paper No. 188 (Geneva: United Nations Conference on Trade and Development).

Ramey, V., and S. Zubairy (2018). "Government Spending Multipliers in Good Times and in Bad: Evidence from US Historical Data," *Journal of Political Economy*, Vol. 126, pp. 850–901.

Rogoff, K. (1985). "The Optimal Degree of Commitment to an Intermediate Monetary Target," *Quarterly Journal of Economics*, Vol. 100, pp. 1169–1189.

Rogoff, K. (2003). "Globalization and Global Disinflation," *Federal Reserve Bank of Kansas City Economic Review*, Vol. 88, pp. 45–78.

Romelli, D. (2022). "The Political Economy of Reforms in Central Bank Design: Evidence from a New Dataset," *Economic Policy*, Vol. 37, pp. 641–688.

Romer, D. (1993). "Openness and Inflation: Theory and Evidence," *Quarterly Journal of Economics*, Vol. 108, pp. 869–903.

Romer, C., and D. Romer (2019). "Fiscal Space and the Aftermath of Financial Crises: How It Matters and Why," NBER Working Paper No. 25768 (Cambridge, MA: National Bureau of Economic Research).

Samarina, A., M. Terpstra, and J. De Haan (2014). "Inflation Targeting and Inflation Performance: A Comparative Analysis," *Applied Economics*, Vol. 46, pp. 41–56.

Sargent, T., and N. Wallace (1981). "Some Unpleasant Monetarist Arithmetic," *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 5, pp. 1–17.

Shambaugh, J. (2004). "The Effects of Fixed Exchange Rates on Monetary Policy," *Quarterly Journal of Economics*, Vol. 119, pp. 301–352.

Sims, C. (2011). "Stepping on a Rake: The Role of Fiscal Policy in the Inflation of the 1970s," *European Economic Review*, Vol. 55, pp. 48–56.

Végh, C. (1989). "Government Spending and Inflationary Finance: A Public Finance Approach," IMF Staff Papers, Vol. 36, pp. 657–77.

Walsh, C. (2008). "Central Bank Independence," in S. Durlauf and L. Blume, eds., *The New Palgrave Dictionary of Economics* (New York: Palgrave Macmillan).

Zhang, Z., and S. Wang (2022). "Do Actions Speak Louder Than Words? Assessing the Effects of Inflation Targeting Track Records on Macroeconomic Performance" IMF Working Paper No. 22/227 (Washington, DC: International Monetary Fund).

Appendix Table A1. Summary Statistics

Variables	(1) min	(2) p25	(3) p50	(4) p75	(5) max	(6) mean	(7) sd	(8) N
Headline Inflation	-9.86	1.59	3.35	6.77	96.87	5.39	7.23	3,130
Core Inflation	-29.92	1.22	2.27	4.84	61.44	3.98	6.82	1,475
Overall Balance	-32.12	-4.63	-2.33	0.00	43.30	-1.88	5.88	3,130
Primary Balance	-30.51	-2.62	-0.50	1.59	36.14	-0.11	5.27	3,089
Δ Real GDP	-54.24	1.63	3.70	5.74	86.83	3.51	4.89	3,130
Δ Real GDP per capita	-0.80	0.00	0.02	0.04	1.90	0.02	0.07	3,130
Δ Trade to GDP	-81.83	-2.85	0.68	4.08	64.47	0.54	8.74	3,130
Δ Money	-0.51	0.05	0.10	0.18	1.54	0.13	0.13	3,130
CB Independence	-76.02	-0.91	0.64	2.72	148.50	1.05	6.86	3,130
Δ Credit to GDP	0.14	0.48	0.63	0.80	0.93	0.63	0.19	3,130
Output Gap (norm.)	-9.23	-0.34	0.00	0.37	7.13	0.00	1.00	3,130
Gross Debt (norm.)	-1.50	-0.68	-0.23	0.45	6.07	0.00	1.00	2,980
Interest Exp. (norm.)	-0.95	-0.64	-0.27	0.26	6.54	0.00	1.00	1,695

Appendix Table A2. Panel Unit Root Tests

Panel A. Dependent Variables

Im-Pesaran-Shin Test		Headline Inflation t-stat.	Headline Inflation p-val.	Core Inflation t-stat.	Core Inflation p-val.
No serial correlation		-18.72	0.00	-12.17	0.00
Serially correlated errors	AIC, Lag 1	-26.82	0.00	-18.43	0.00
	AIC, Lag 1, Demean	-26.00	0.00	-17.66	0.00
	AIC, Lags 2	-23.49	0.00	-17.86	0.00
	AIC, Lags 2, Demean	-24.20	0.00	-17.30	0.00
	AIC, Lags 3	-22.62	0.00	-15.87	0.00
	AIC, Lags 3, Demean	-23.47	0.00	-14.50	0.00
	AIC, Lags 4	-23.14	0.00	-16.87	0.00
	AIC, Lags 4, Demean	-23.60	0.00	-14.86	0.00
Num. of panels		134		66	
Avg. num. of periods		23.02		21.50	

Note: $Z_{\tilde{t}}$ and the respective p-value is reported in the first row. The remaining rows display $W_{\tilde{t}}$ and their respective p-values. Countries with fewer than 10 non-missing consecutive observations are excluded to perform the IPS test.

Panel B. Control Variables

Im-Pesaran-Shin Test (AIC, Lags 2)	t-stat.	p-val.
Overall Balance	-13.64	0.00
Primary Balance	-12.00	0.00
Δ Real GDP	-28.80	0.00
Δ Real GDP per capita	-30.47	0.00
Δ Credit to GDP	-28.78	0.00
Δ Trade to GDP	-37.48	0.00
Δ Money	-24.14	0.00
Num. of panels	134	
Avg. num. of periods	22.96	

Note: Countries with fewer than 10 non-missing consecutive observations are excluded to perform the IPS test. Results for CB Independence are not computed due to insufficient number of time periods. *Other results are available upon request.*

Appendix Table A3. Country Income Classification

Country	Group	Country	Group	Country	Group
Albania	EM	Gabon	EM	New Zealand	AE
Algeria	EM	Gambia, The	LIC	Niger	LIC
Angola	EM	Georgia	EM	Nigeria	LIC
Antigua and Barbuda	EM	Germany	AE	North Macedonia	EM
Argentina	EM	Ghana	LIC	Norway	AE
Australia	AE	Greece	AE	Oman	EM
Austria	AE	Guatemala	EM	Pakistan	EM
Azerbaijan	EM	Guinea	LIC	Panama	EM
Bahamas, The	EM	Haiti	LIC	Paraguay	EM
Bahrain	EM	Hungary	EM	Peru	EM
Bangladesh	LIC	Iceland	AE	Philippines	EM
Belarus	EM	India	EM	Poland	EM
Belgium	AE	Indonesia	EM	Portugal	AE
Benin	LIC	Iran, Islamic Rep.	EM	Qatar	EM
Bolivia	EM	Iraq	EM	Romania	EM
Bosnia and Herzegovina	EM	Ireland	AE	Russian Federation	EM
Botswana	EM	Italy	AE	Rwanda	LIC
Brazil	EM	Jamaica	EM	Saudi Arabia	EM
Brunei Darussalam	EM	Japan	AE	Senegal	LIC
Bulgaria	EM	Jordan	EM	Seychelles	EM
Burkina Faso	LIC	Kazakhstan	EM	Sierra Leone	LIC
Burundi	LIC	Kenya	LIC	Singapore	AE
Cambodia	LIC	Korea, Rep.	AE	Slovak Rep.	AE
Cameroon	LIC	Kuwait	EM	Slovenia	AE
Canada	AE	Kyrgyz Republic	LIC	South Africa	EM
Central African Rep.	LIC	Lao PDR	LIC	Spain	AE
Chad	LIC	Latvia	EM	Sri Lanka	EM
Chile	EM	Lebanon	EM	Sweden	AE
China	EM	Libya	EM	Switzerland	AE
Colombia	EM	Lithuania	AE	Tanzania	LIC
Comoros	LIC	Luxembourg	AE	Thailand	EM
Congo, Dem. Rep.	LIC	Macao SAR, China	EM	Togo	LIC
Congo, Rep.	LIC	Malaysia	EM	Tunisia	EM
Costa Rica	EM	Maldives	EM	Türkiye	EM
Croatia	EM	Mali	LIC	Uganda	LIC
Cyprus	AE	Malta	AE	Ukraine	EM
Czech Republic	AE	Mauritania	LIC	United Arab Emirates	EM
Côte d'Ivoire	LIC	Mauritius	EM	United Kingdom	AE
Denmark	AE	Mexico	EM	United States	AE
Dominica	EM	Moldova	LIC	Uruguay	EM
Dominican Rep.	EM	Mongolia	EM	Uzbekistan	LIC
Ecuador	EM	Montenegro	EM	Vietnam	LIC
Egypt, Arab Rep.	EM	Morocco	EM	Yemen, Rep.	LIC
Equatorial Guinea	EM	Myanmar	LIC	Zambia	EM
Estonia	AE	Namibia	EM	Zimbabwe	EM
Finland	AE	Nepal	LIC		
France	AE	Netherlands, The	AE		

Note: Only countries in the sample are displayed in the table. The sample consists of 139 countries.

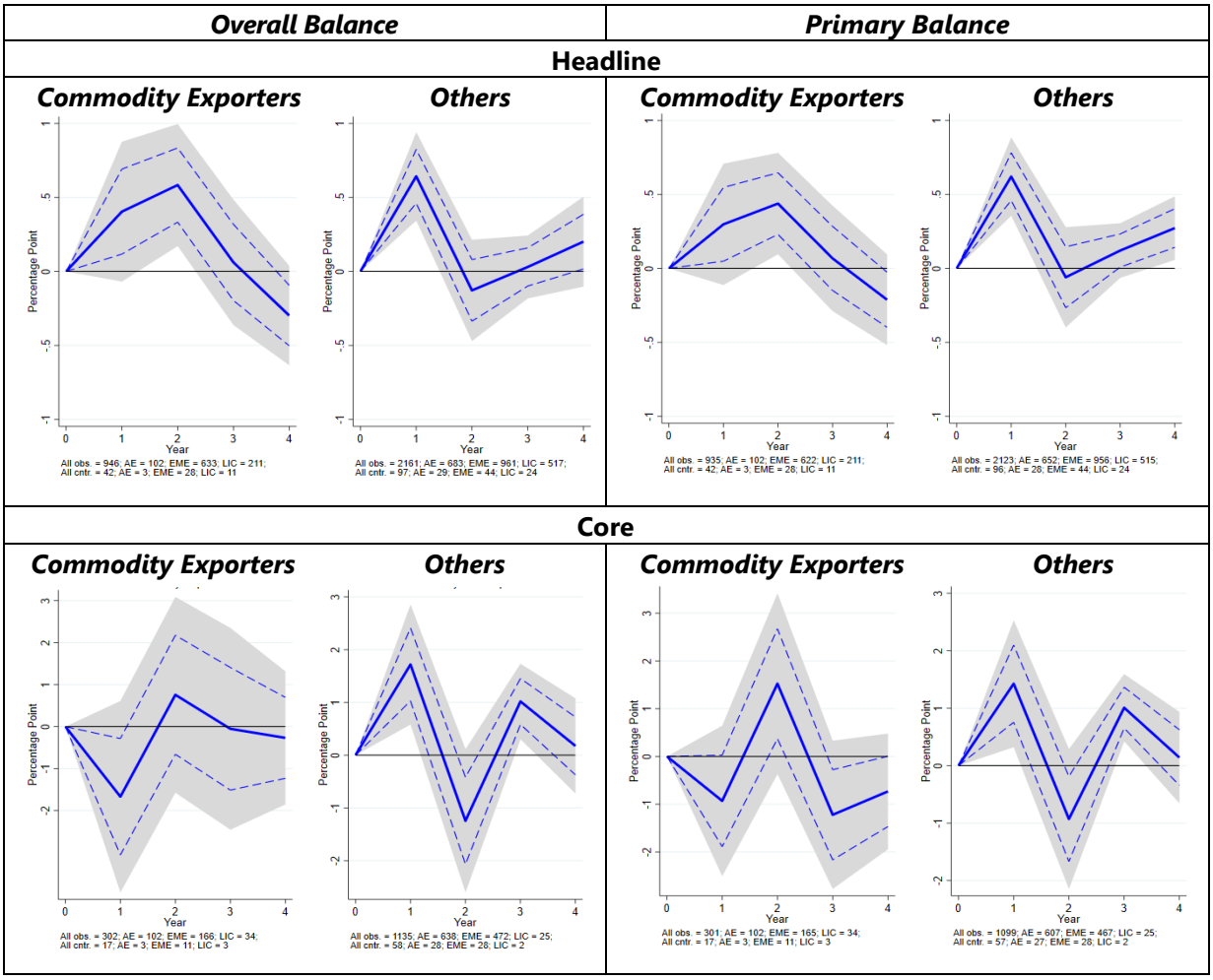
Appendix Table A4. Overall Balance and Headline CPI: Full Specification

	(1)	(2)	(3)	(4)
	Δ HCPI, t+1	**Δ HCPI, t+2**	**Δ HCPI, t+3**	**Δ HCPI, t+4**
Overall balance growth, t-1	**0.564*** **	0.233	-0.033	-0.056
	(0.172)	(0.186)	(0.133)	(0.150)
Overall balance growth, t-2	-0.056	-0.162	0.053	-0.102
	(0.177)	(0.127)	(0.118)	(0.084)
Overall balance growth, t-3	-0.180	-0.007	-0.080	0.151
	(0.137)	(0.126)	(0.076)	(0.092)
Real GDP growth, t-1	-0.020	-0.281	**-0.285***	**-0.403*** **
	(0.195)	(0.172)	**(0.163)**	**(0.140)**
Real GDP growth, t-2	**-0.309***	-0.164	**-0.349** **	-0.122
	(0.179)	(0.149)	**(0.160)**	(0.135)
Real GDP growth, t-3	-0.071	**-0.328** **	-0.063	0.268
	(0.152)	**(0.163)**	(0.169)	(0.226)
Real GDP per capita	**60.523** **	-6.875	**-27.009*** **	**-18.260** **
	(23.136)	(7.919)	**(6.040)**	**(8.525)**
Credit to GDP growth	**0.331** **	**-0.310*** **	**-0.164** **	-0.077
	(0.128)	**(0.112)**	**(0.068)**	(0.088)
Trade openness growth	**-0.534*** **	-0.080	0.112	-0.060
	(0.120)	(0.089)	(0.111)	(0.077)
Money growth	**-31.994** **	-0.510	**25.176*** **	**11.383** **
	(13.946)	(13.100)	**(6.694)**	**(4.628)**
CB independence	14.444	**18.189***	10.410	6.344
	(9.606)	**(9.344)**	(6.248)	(4.037)
Dep. Var., t-1	**1.367*** **	**1.528*** **	**1.604*** **	**1.361*** **
	(0.291)	**(0.225)**	**(0.206)**	**(0.394)**
Dep. Var., t-2	**1.316*** **	**1.385*** **	**1.603*** **	**1.588*** **
	(0.252)	**(0.249)**	**(0.227)**	**(0.191)**
Dep. Var., t-3	**0.520*** **	**0.576*** **	**0.601*** **	**0.538*** **
	(0.179)	**(0.154)**	**(0.113)**	**(0.162)**
Num. of observations	3,107	3,006	2,902	2,785
Num. of countries	139	139	139	139
R squared	0.243	0.235	0.291	0.222

Note: Country and year fixed effects are included in all specifications but not displayed. Driscoll–Kraay standard errors are reported in parenthesis.

*** p<0.01, ** p<0.05, * p<0.1*

Appendix Figure A1. Fiscal Shocks and Inflation: Commodity Exporters vs. Others



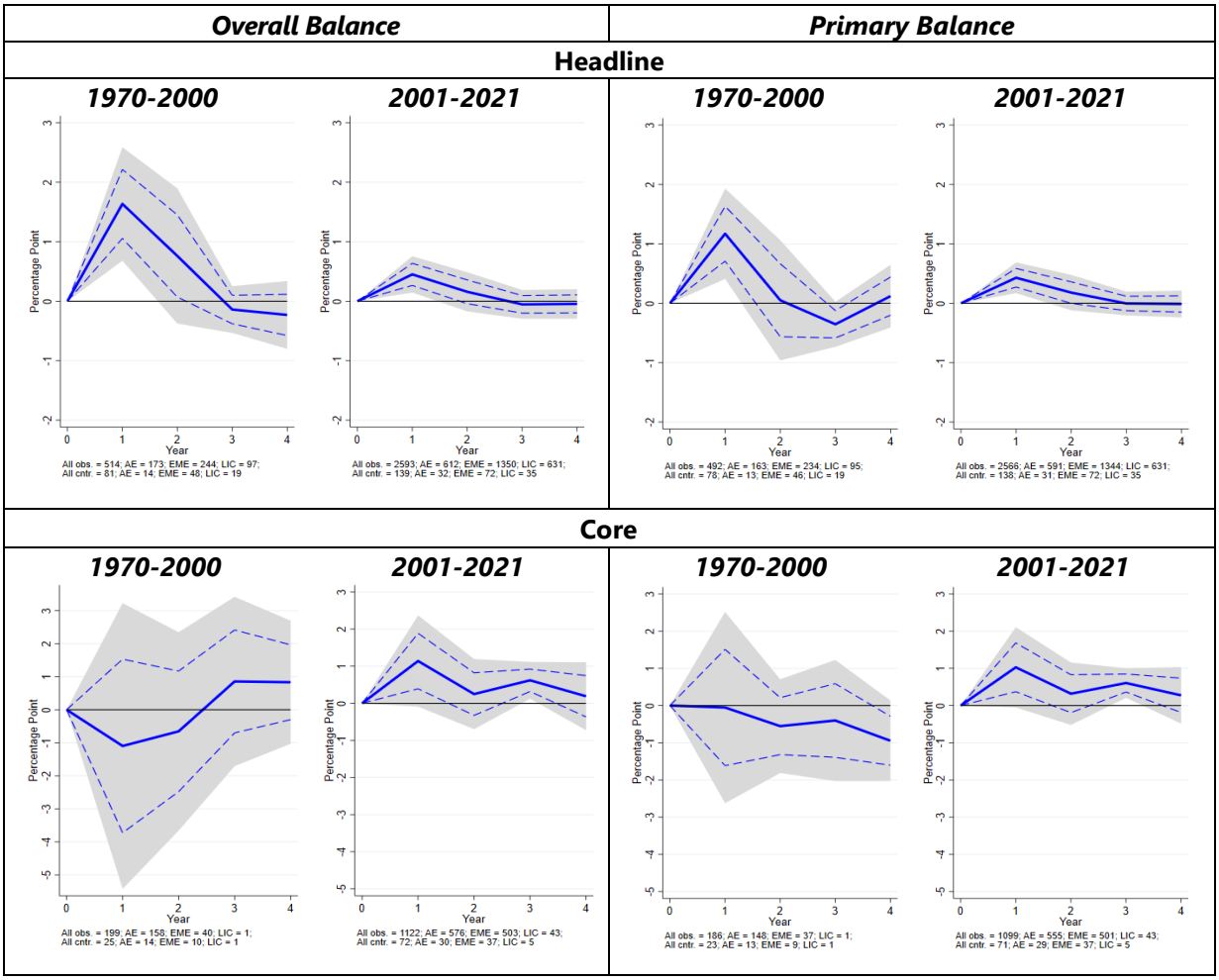
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Table A5. Commodity Exporters

Algeria	Chile	Indonesia	Oman
Angola	Colombia	Iran, Islamic Rep.	Peru
Australia	Congo, Dem. Rep.	Iraq	Qatar
Azerbaijan	Congo, Rep.	Kazakhstan	Russian Federation
Bahrain	Côte d'Ivoire	Kuwait	Saudi Arabia
Bolivia	Ecuador	Libya	South Africa
Botswana	Equatorial Guinea	Mauritania	United Arab Emirates
Brunei Darussalam	Gabon	Mexico	Venezuela
Cameroon	Ghana	Mongolia	Yemen, Rep.
Canada	Guinea	Nigeria	Zambia
Chad	Guyana	Norway	

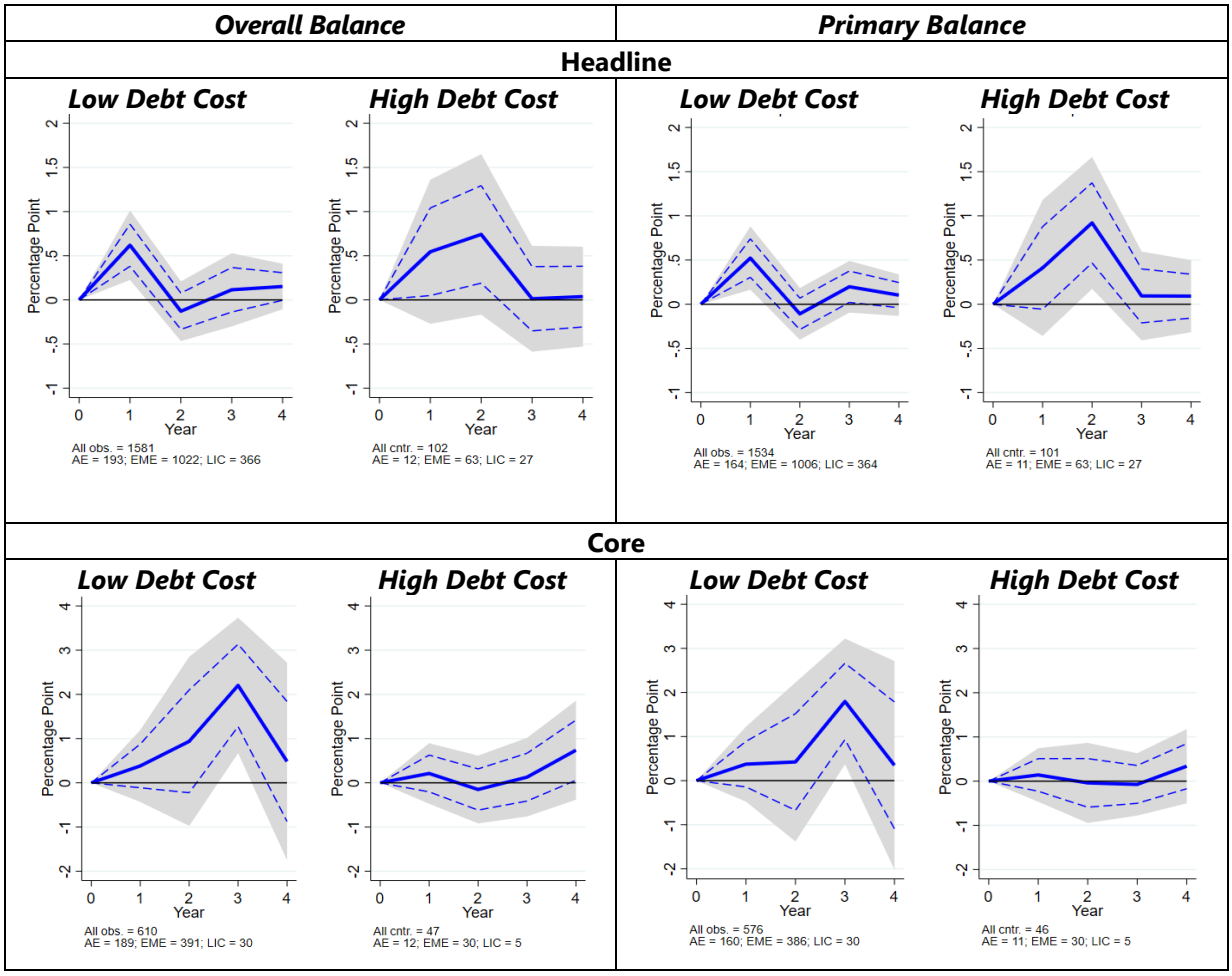
Note: Only countries in the sample are displayed in the table.

Appendix Figure A2. Fiscal Shocks and Inflation: Periods of High and Low Inflation Dispersion



Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Figure A3. Fiscal Shocks and Inflation: Role of Fiscal Space (Cost of Debt)



Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. The cost of debt is calculated as the ratio of interest payments to gross debt in the same period. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Table A6. Overall Balance and Headline CPI—Fiscal Space: Alternative Parameters

State = Gross Debt		(1)	(2)	(3)	(4)
		Headline Inflation			
		t+1	t+2	t+3	t+4
Overall Balance					
γ=0.1	*Low Debt*	**-2.965****	-4.122	**3.982****	2.197
		(1.299)	(3.987)	**(1.887)**	(1.849)
	High Debt	**4.015****	4.642	**-4.143***	-2.158
		(1.526)	(4.333)	**(2.071)**	(1.817)
γ=0.5	*Low Debt*	-0.322	-0.664	**0.802****	0.501
		(0.245)	(0.719)	**(0.368)**	(0.409)
	High Debt	**1.406*****	1.200	**-0.983***	-0.475
		(0.472)	(1.081)	**(0.551)**	(0.370)
γ=1	*Low Debt*	-0.003	-0.231	**0.404***	0.305
		(0.155)	(0.330)	**(0.208)**	(0.241)
	High Debt	**1.134*****	0.783	-0.606	-0.301
		(0.368)	(0.708)	(0.381)	(0.196)
γ=5	*Low Debt*	0.258	0.095	0.147	0.147
		(0.164)	(0.146)	(0.148)	(0.150)
	High Debt	**0.918*****	0.396	-0.385	-0.148
		(0.291)	(0.476)	(0.271)	(0.089)
γ=10 (baseline)	*Low Debt*	0.279	0.124	0.138	0.134
		(0.169)	(0.150)	(0.146)	(0.148)
	High Debt	**0.883*****	0.334	-0.382	-0.119
		(0.294)	(0.459)	(0.269)	(0.075)
Num. of observations		2,867	2,763	2,655	2,536

Country and year fixed effects are included in all specifications but not displayed. Driscoll–Kraay standard errors are reported in parenthesis.

* p<0.05 ** p<0.01 *** p<0.001

Appendix Table A7. Primary Balance and Headline CPI—Fiscal Space: Alternative Parameters

		(1)	(2)	(3)	(4)
State = Gross Debt		***Headline Inflation***			
		t+1	t+2	t+3	t+4
	Primary Balance				
γ=0.1	*Low Debt*	-0.273	-5.265	**2.578***	2.045
		(1.545)	(4.336)	**(1.470)**	(1.789)
	High Debt	1.132	5.758	**-2.650***	-1.932
		(1.781)	(4.708)	**(1.570)**	(1.752)
γ=0.5	*Low Debt*	0.167	-0.879	0.532	0.507
		(0.291)	(0.763)	(0.321)	(0.407)
	High Debt	0.718	1.383	-0.616	-0.408
		(0.521)	(1.150)	(0.424)	(0.370)
γ=1	*Low Debt*	0.202	-0.336	0.272	0.325
		(0.170)	(0.329)	(0.197)	(0.242)
	High Debt	**0.729***	0.847	-0.367	-0.248
		(0.384)	(0.729)	(0.300)	(0.207)
γ=5	*Low Debt*	**0.297****	0.020	0.100	0.178
		(0.141)	(0.119)	(0.134)	(0.144)
	High Debt	**0.692****	0.448	-0.191	-0.108
		(0.273)	(0.460)	(0.211)	(0.092)
γ=10 (baseline)	*Low Debt*	**0.309****	0.042	0.092	0.169
		(0.144)	(0.120)	(0.130)	(0.142)
	High Debt	**0.668****	0.403	-0.179	-0.087
		(0.275)	(0.438)	(0.206)	(0.077)
Num. of observations		2,831	2,728	2,621	2,503

Country and year fixed effects are included in all specifications but not displayed. Driscoll–Kraay standard errors are reported in parenthesis.

* p<0.05 ** p<0.01 *** p<0.001

Appendix Table A8. Overall Balance and Headline CPI—Business Cycle: Alternative Parameters

State = Output Gap		(1)	(2)	(3)	(4)
		Headline Inflation			
		t+1	t+2	t+3	t+4
Overall Balance					
γ=0.1	*Recession*	**6.676*** **	-2.177	-2.264	-1.359
		(2.460)	(1.474)	(1.503)	(1.338)
	Expansion	**-5.433** **	**2.625** **	2.124	1.177
		(2.413)	**(1.302)**	(1.319)	(1.467)
γ=0.5	*Recession*	**2.220*** **	-0.246	-0.594	**-0.508***
		(0.618)	(0.458)	(0.420)	**(0.255)**
	Expansion	**-0.955***	**0.704** **	**0.476***	0.319
		(0.554)	**(0.266)**	**(0.252)**	(0.330)
γ=1	*Recession*	**1.734*** **	0.026	-0.400	**-0.383***
		(0.402)	(0.370)	(0.303)	**(0.203)**
	Expansion	-0.452	**0.450** **	**0.289** **	0.192
		(0.330)	**(0.170)**	**(0.143)**	(0.205)
γ=5	*Recession*	**1.278*** **	0.306	-0.289	-0.239
		(0.265)	(0.330)	(0.239)	(0.226)
	Expansion	-0.035	0.241	0.170	0.057
		(0.207)	(0.156)	(0.101)	(0.142)
γ=10 (baseline)	*Recession*	**1.215*** **	0.319	-0.259	-0.211
		(0.249)	(0.315)	(0.226)	(0.223)
	Expansion	0.017	0.228	0.144	0.039
		(0.196)	(0.157)	(0.103)	(0.141)
Num. of observations		3,105	3,004	2,899	2,781

Country and year fixed effects are included in all specifications but not displayed. Driscoll–Kraay standard errors are reported in parenthesis.

* p<0.05 ** p<0.01 *** p<0.001

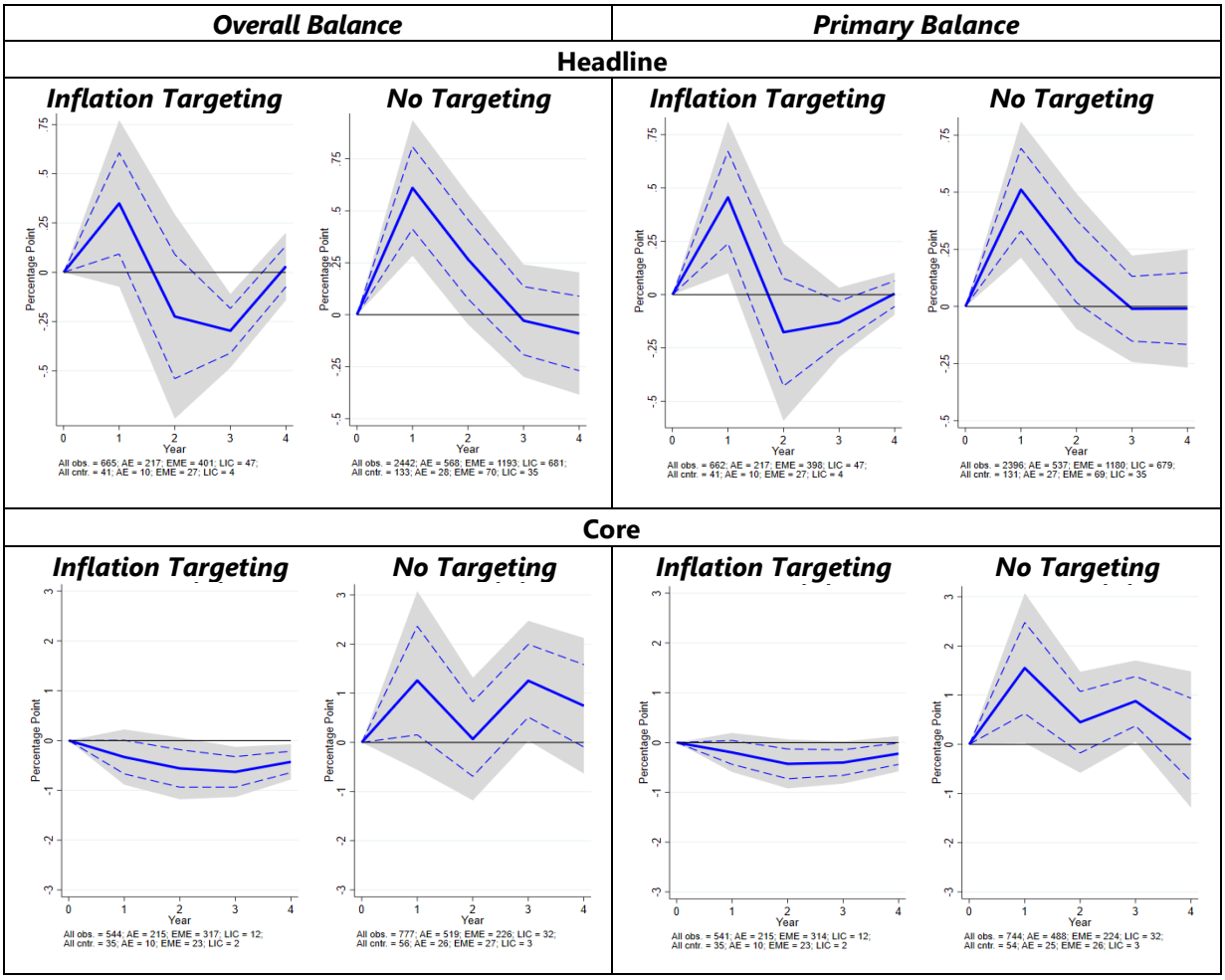
Appendix Table A9. Primary Balance and Headline CPI—Business Cycle: Alternative Parameters

		(1)	(2)	(3)	(4)
State = Output Gap		***Headline Inflation***			
		t+1	t+2	t+3	t+4
	Primary Balance				
γ=0.1	*Recession*	2.529	**-3.013***	**-2.573***	-0.781
		(1.818)	**(1.609)**	**(1.407)**	(1.173)
	Expansion	-1.475	**3.343****	**2.508***	0.737
		(1.856)	**(1.449)**	**(1.252)**	(1.327)
γ=0.5	*Recession*	**1.093****	-0.521	-0.651	-0.313
		(0.426)	(0.467)	(0.389)	(0.198)
	Expansion	-0.035	**0.863*****	**0.606****	0.265
		(0.453)	**(0.296)**	**(0.247)**	(0.304)
γ=1	*Recession*	**0.960*****	-0.217	-0.433	-0.229
		(0.276)	(0.359)	(0.277)	(0.156)
	Expansion	0.102	**0.567*****	**0.391*****	0.184
		(0.291)	**(0.181)**	**(0.138)**	(0.187)
γ=5	*Recession*	**0.819*****	0.065	-0.309	-0.083
		(0.199)	(0.307)	(0.220)	(0.176)
	Expansion	0.229	**0.334****	**0.244*****	0.052
		(0.197)	**(0.153)**	**(0.090)**	(0.137)
γ=10 (baseline)	*Recession*	**0.817*****	0.093	-0.269	-0.051
		(0.193)	(0.298)	(0.203)	(0.172)
	Expansion	0.234	**0.309***	**0.206****	0.031
		(0.189)	**(0.154)**	**(0.091)**	(0.140)
Num. of observations		3,056	2,956	2,852	2,735

Country and year fixed effects are included in all specifications but not displayed. Driscoll–Kraay standard errors are reported in parenthesis.

* p<0.05 ** p<0.01 *** p<0.001

Appendix Figure A4. Fiscal Shocks and Inflation: Role of Inflation Targeting



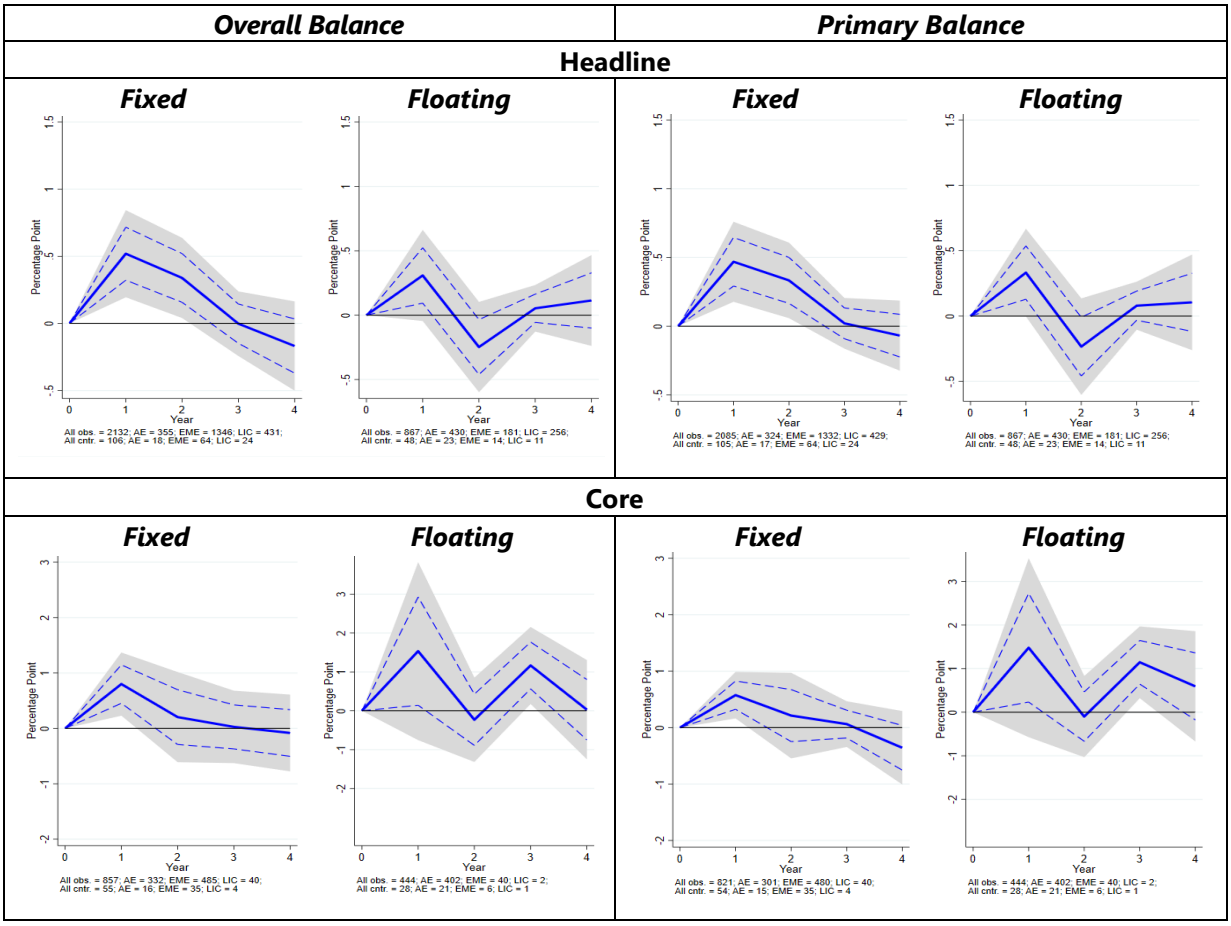
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Table A10. Countries Targeting Inflation

Country	Period	Country	Period	Country	Period
Albania	2001-end	Iceland	2001-end	Romania	2005-end
Argentina	2016-2017	India	2016-end	Russia	2014-end
Australia	1993-end	Indonesia	2005-end	Seychelles	2014-end
Brazil	2000-end	Japan	2013-end	South Africa	2000-end
Canada	1993-2008	Kazakhstan	2015-end	Sri Lanka	2017-2019
Chile	1999-end	Kenya	2013-end	Sweden	1993-end
Colombia	1999-end	Mexico	2001-end	Thailand	2000-2019
Costa Rica	2018-end	Moldova	2010-end	Turkey	2006-end
Czech Republic	1998-end	New Zealand	1994-end	Uganda	2011-end
Dominican Rep.	2012-end	Norway	2001-end	Ukraine	2015-end
Georgia	2009-end	Paraguay	2011-end	United Kingdom	1992-end
Ghana	2007-end	Peru	2002-end	United States	2012-end
Guatemala	2005-end	Philippines	2002-end	Uruguay	2004-end
Hungary	2001-end	Poland	1998-end		

Note: Only countries in the sample are displayed in the table. Years are based on the presence in the sample.

Appendix Figure A5. Fiscal Shocks and Inflation: Role of Exchange Rate Regime



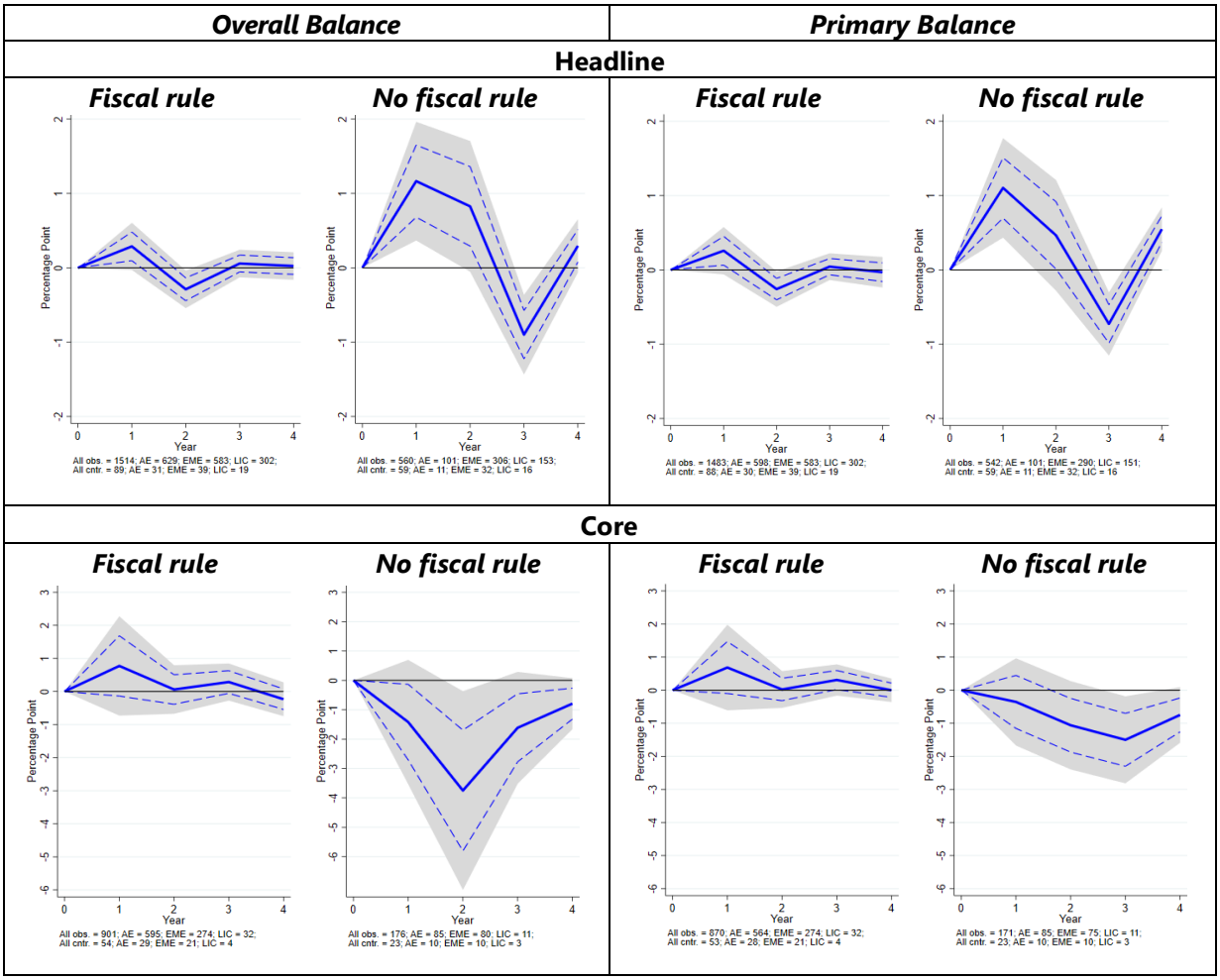
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Table A11. Countries with Floating Exchange Rate (in the Sample)

Country	Period	Country	Period	Country	Period
Antigua and Barbuda	1994-end	Estonia	2011-end	Mexico	2016-end
Australia	1983-end	Equatorial Guinea	2006-end	Montenegro	2006-end
Austria	2002-end	Finland	2002-end	Netherlands	2002-end
Belgium	2002-end	France	2002-end	Niger	1999-end
Benin	1994-end	Gabon	1994-end	Panama	1998-end
Burkina Faso	1994-end	Germany	2002-end	Portugal	2002-end
Brazil	2003-2007	Greece	2002-end	Senegal	1998-end
Cameroon	2004-end	Ireland	2002-end	Slovenia	2007-end
Canada	2002-end	Italy	2002-end	Slovak Republic	2007-end
Central Afr. Rep.	1994-end	Japan	1994-end	South Africa	2000-end
Chad	1999-end	Latvia	2014-end	Spain	2002-end
Congo, Rep.	1994-end	Lithuania	2015-end	Togo	1994-end
Côte d'Ivoire	2001-end	Luxembourg	2002-end	Turkey	2004-2007
Cyprus	2008-end	Malaysia	1997	United Kingdom	2009-end
Dominica	2007-end	Mali	2004-end	United States	1993-end
Ecuador	2000-end	Malta	2008-end	Zimbabwe	2010-2017

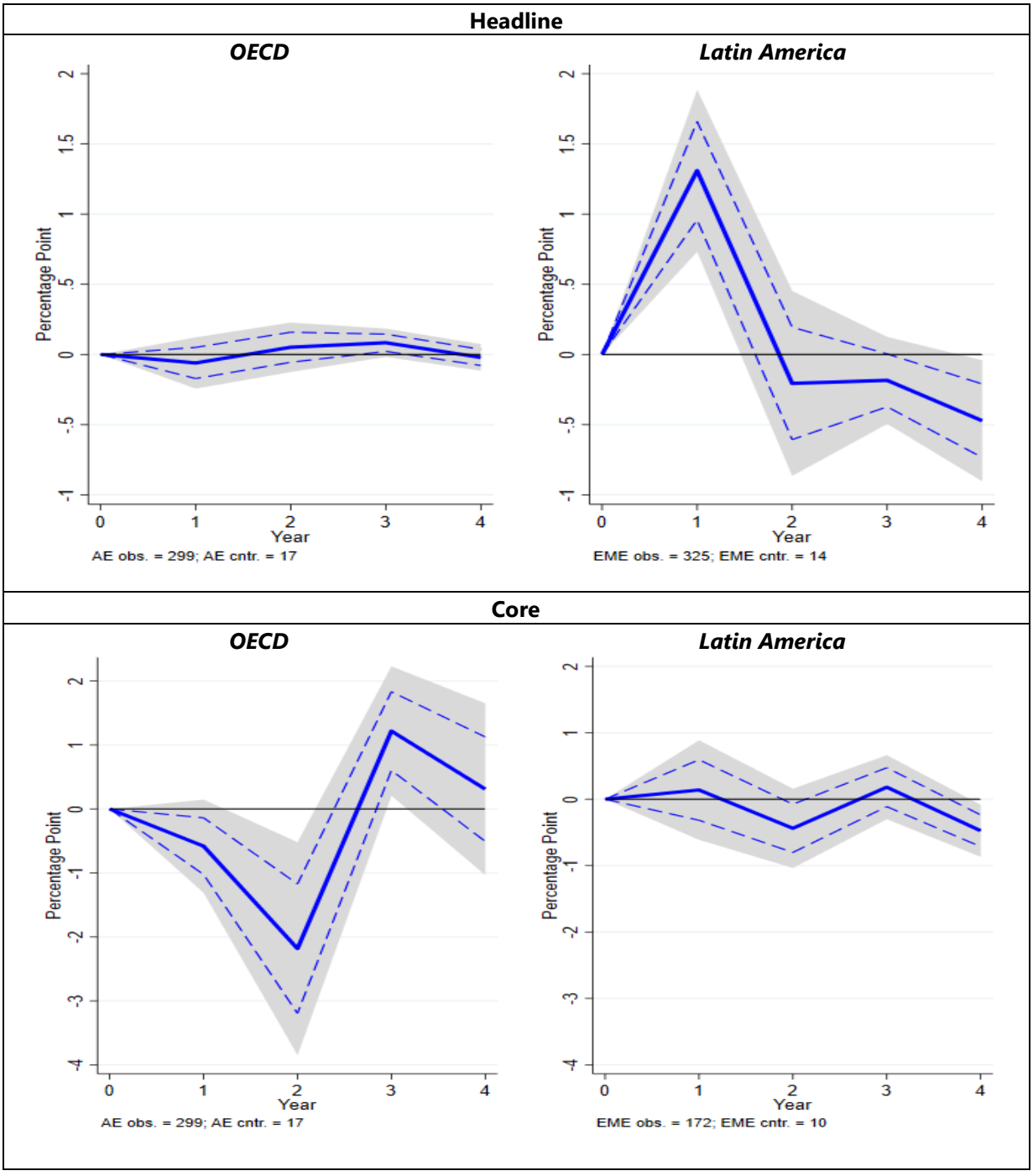
Note: Only countries in the sample are displayed in the table. Years are based on the presence in the sample.

Appendix Figure A6. Fiscal Shocks and Inflation: Role of Fiscal Rule



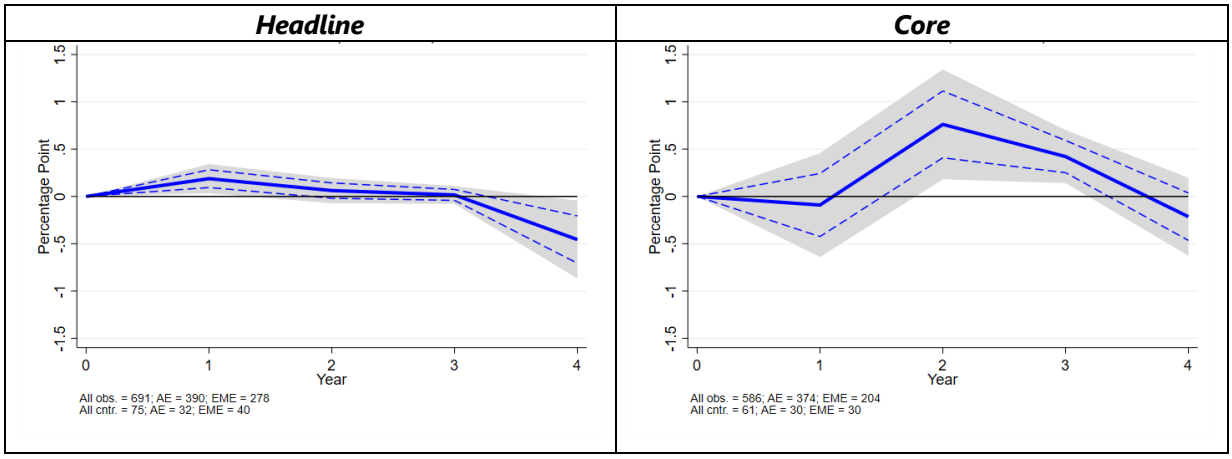
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval. The sample spans the period 1985 - 2021.

Appendix Figure A7. Fiscal Shocks and Inflation: Narrative Approach



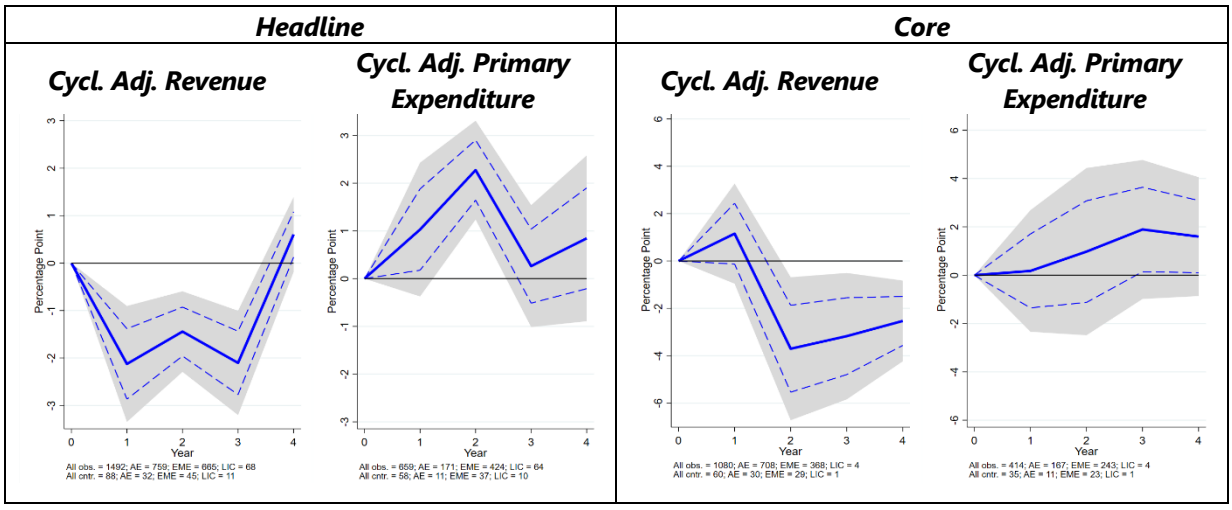
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval. The OECD sample consists of 17 countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, the United Kingdom, the United States) between years 1980-2011. The Latin America sample consists of 14 countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Paraguay, Peru, Uruguay, Jamaica) between years 1991-2017.

Appendix Figure A8. Fiscal Shocks and Inflation: Forecast Error Approach



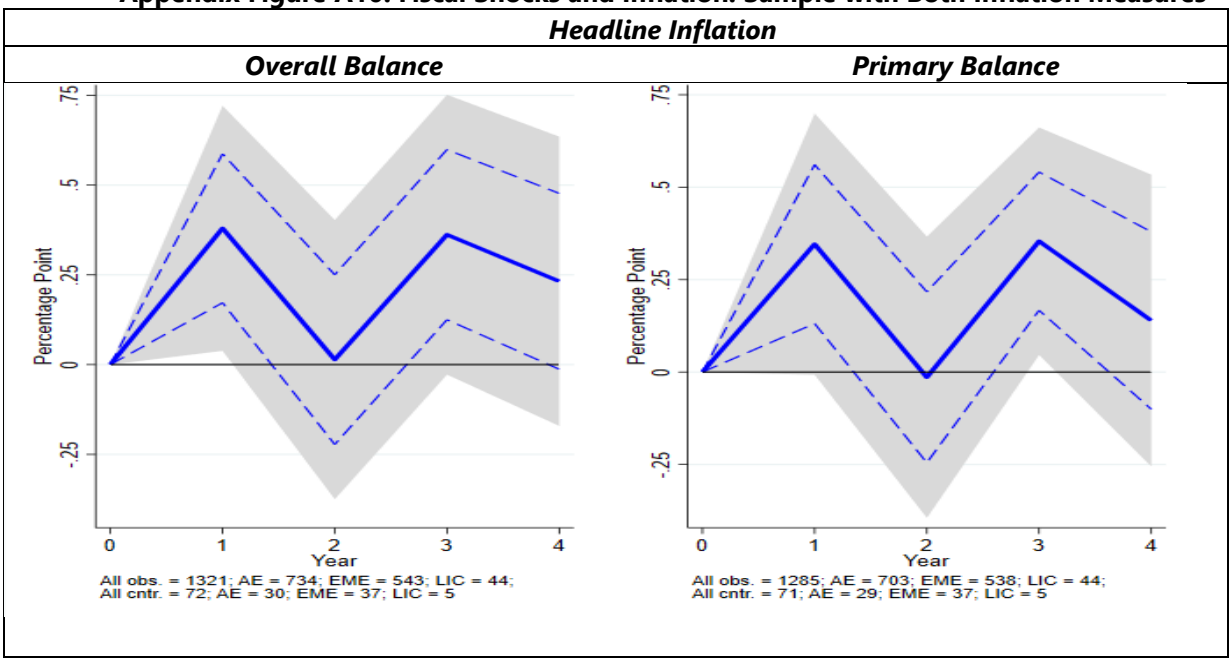
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Figure A9. Fiscal Shocks and Inflation: Disaggregated Approach



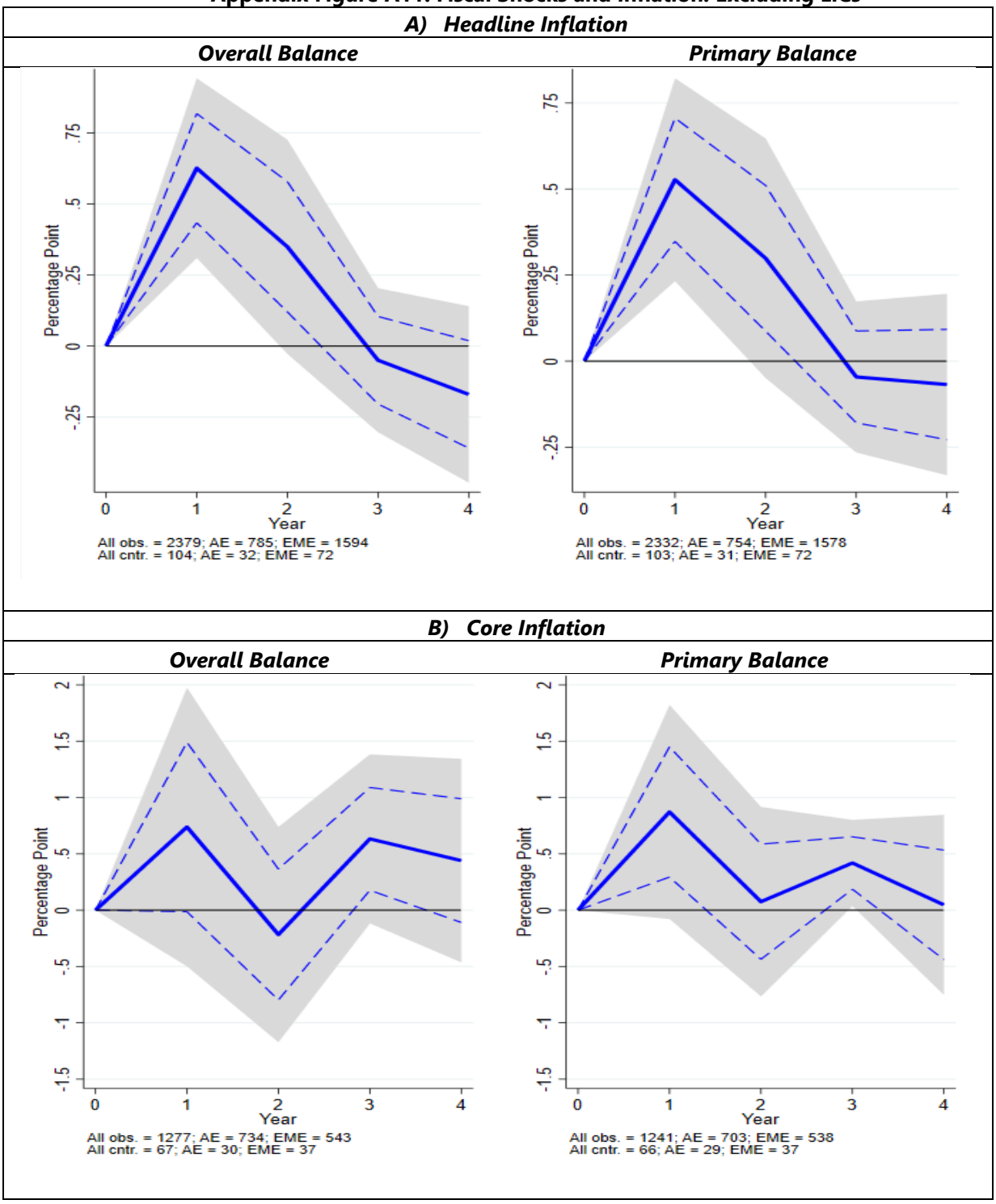
Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Figure A10. Fiscal Shocks and Inflation: Sample with Both Inflation Measures



Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.

Appendix Figure A11. Fiscal Shocks and Inflation: Excluding LICs



Note: The blue line depicts the response of inflation to a one standard deviation negative fiscal policy shock computed by the LP method. Standard errors are corrected for heteroskedasticity, spatial and serial correlation by the Driscoll–Kraay procedure. The shaded area corresponds to the 90 percent confidence interval; the dashed lines correspond to the 68 percent confidence interval.