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# Considerations on Inflation, Economic Growth and the 2 Percent Inflation Target

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Robert Pollin

Hanae Bouazza

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# **Considerations on Inflation, Economic Growth and the 2 Percent Inflation Target**

By Robert Pollin and Hanae Bouazza  
Department of Economics and  
Political Economy Research Institute (PERI)  
University of Massachusetts Amherst

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Comments welcome  
Corresponding author: [pollin@econs.umass.edu](mailto:pollin@econs.umass.edu)

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**ABSTRACT:**

This paper considers two basic questions with respect to inflation control, inflation targeting, and overall macroeconomic performance. The initial question is: what has been the justification in research for establishing an inflation target, and specifically a low inflation rate target of 2 – 3 percent, as the organizing principle and overarching goal of macroeconomic policy? The second question is: do we actually observe stronger macroeconomic performances—as measured in standard terms of GDP growth—when macro policy operates within the framework of such low inflation targets? Our answers to these questions are straightforward. First, no serious body of research has been produced that provides a clear justification for a 2 – 3 percent inflation target as the central goal of macroeconomic policy. Further, there is no body of evidence showing that economies at any level of development consistently experience stronger economic growth outcomes when inflation is maintained at less than 3 percent as opposed to higher inflation rates, certainly within a 4 – 5 percent inflation range and, in some circumstances, somewhat higher rates still. These findings are significant insofar as they open space for considering the set of measures other than contractionary monetary policies as viable inflation control tools. It is possible that these other measures do not operate as forcefully as contractionary monetary policy in bringing inflation down to a 2 – 3 percent target range. But our findings suggest that it is not typically necessary to force down inflation to such low levels, especially given that contractionary monetary policies succeed in controlling inflation primarily through the channel of raising mass unemployment and weakening workers' bargaining power.

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## 1. INTRODUCTION

Sharply rising inflation rates emerged throughout the world coming out of the 2020- 2021 COVID lockdown. According to IMF data, the average inflation rate for the overall global economy rose from 3.8 percent in 2019, the year prior to the COVID pandemic onset, to 6.4 percent in 2021, as lockdown conditions from COVID started loosening, and 9.1 percent as of October 2022. Within the G-7 economies, inflation rose from 1.6 percent in 2019 to 5.6 percent in 2021 and to 6.8 percent as of October 2022. The comparable figures for the U.S. economy specifically are 2.1 percent in 2019, 7.4 percent in 2021 and 6.4 percent as of October 2022.<sup>1</sup>

To date, the predominant policy response to this global inflationary spike has been contractionary monetary policy. Specifically, this has entailed central banks raising the short-term interest rates that they control for the purpose of weakening aggregate demand and raising mass unemployment. With mass unemployment rising, worker bargaining power, and along with it, unit labor costs faced by businesses, would be expected to decline. Federal Reserve Chair Jerome Powell acknowledged these policy aims clearly, if demurely, in a major speech last August. Powell predicted then that there would “very likely be some softening of labor market conditions” resulting from the Fed having lifted the effective federal funds interest rate from 0.08 percent as of 3/15/22 to 3.83 percent as of 11/23/22.<sup>2</sup>

Despite this singular focus by the Fed and other central banks on contractionary monetary policies, this is by no means the only policy tool available that could effectively manage inflationary pressures. The Biden Administration itself has proposed enacting windfall profit taxes and stricter anti-trust enforcement. These would counter the excessive mark-ups over costs that corporations have been able to impose due to the supply-side disruptions coming out of the COVID lockdown and, soon after, the Russian invasion of Ukraine.<sup>3</sup> Additional policy tools include targeted price controls and tighter enforcement of speculation on commodities futures markets. Still more, infrastructure investments can serve to loosen supply-chain bottlenecks in the short run while raising productivity over the longer term. Advancing a green energy transition—including investments in both energy efficiency and renewable energy—will reduce dependency on volatile fossil fuel markets while also driving down CO<sub>2</sub> emissions. All of these alternatives to contractionary monetary policies offer the critical advantage that they can reduce inflationary pressures without forcing up unemployment rates.

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<sup>1</sup> <https://www.imf.org/external/datamapper/PCPIEPCH@WEO/ADVEC>

<sup>2</sup> <https://www.newyorkfed.org/markets/reference-rates/effr>. Pollin (2022) discusses the current policy moves by the U.S. Federal Reserve.

<sup>3</sup> Bivens (2022) presents evidence on corporate mark-up over costs for the U.S. Economy. See also the 11/28/22 *Financial Times* news story “Margins Are Still Too High.” This story reports that “Trade services ...measure gross margins of retailers and wholesalers, which have exploded in the past two years. The basic story here is that a combination of broken supply chains, rising input costs and high demand created pricing power for producers, who raised mark-ups. Those mark-ups...are fueling inflation,” <https://www.ft.com/content/c7ccc825-42b6-4110-81ef-9a91ee1d5a84>

But most mainstream economists and policymakers contend that these alternatives are not likely to be effective enough to bring inflation rates down to levels consistent with their economies' respective low-inflation targets.<sup>4</sup> More specifically, since the 1990s, policymakers have organized macroeconomic policy setting around the goal of sustaining inflation rates at low single-digit targeted rates. The argument in support of establishing low single-digit inflation-rate targets as the overarching macro policy framework is that it is the most effective way of maintaining healthy economic growth and macro stability. For most high-income economies, this stated inflation rate target since the 1990s has been in the range of 2 – 3 percent. Middle- and low-income economies have generally operated with modestly higher inflation targets.<sup>5</sup>

In this paper, we consider two basic questions with respect to inflation control, inflation targeting, and overall macroeconomic performance. The initial question is: what has been the justification in research for establishing an inflation target, and specifically a low inflation rate target of 2 – 3 percent, as the organizing principle and overarching goal of macroeconomic policy? Following from this, our second, and more fundamental question is: do we actually observe stronger macroeconomic performances—as measured in standard terms of GDP growth—when macro policy operates within the framework of such low inflation targets?

Our answers to these questions are straightforward. First, to our knowledge, no serious body of research has been produced that provides a clear justification for a 2 – 3 percent inflation target as the central goal of macroeconomic policy. And still more to the point, there is no body of evidence showing that economies at any level of development consistently experience stronger economic growth outcomes when inflation is maintained at less than 3 percent as opposed to higher inflation rates, certainly within a 4 – 5 percent inflation range and, in some circumstances, somewhat higher rates still.

These findings are significant insofar as they open space for considering the set of measures other than contractionary monetary policies as viable inflation control tools. It is possible that these other measures do not operate as forcefully as contractionary monetary policy in bringing inflation down to a 2 – 3 percent target range. But our findings suggest that it is not typically necessary to force down inflation to such low levels, especially given that contractionary monetary policies succeed in controlling inflation primarily through the channel of raising mass unemployment and weakening workers' bargaining power. Indeed, the need for imposing contractionary monetary policies, and accepting the heavy collateral damage of such policies, evaporates once we recognize that economies do not consistently sacrifice economic growth while operating with somewhat higher inflation rates.

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<sup>4</sup> The Harvard University economist Lawrence Summers described excess profit taxes as “dangerous nonsense” as an inflation control policy, comparable to Donald Trump proposing bleach injections to control COVID symptoms. Summers also described antitrust enforcement as ineffective “hipster economics” for controlling inflation because it could “prevent the exploitation of economies of scale or limit superstar firms.”  
<https://www.bloomberg.com/news/articles/2022-05-13/summers-compares-price-gouging-bill-to-trump-s-bleach-injections?srnd=premium>; <https://www.bloomberg.com/news/articles/2022-05-20/summers-warns-on-hipster-antitrust-push-eyeing-private-equity>

<sup>5</sup> Epstein and Yeldan (2009) provide an excellent overview of the history around the adoption of inflation targeting macro policies.

For the most part, this paper is an extension and update of the literature focused on the specific question of the relationship between inflation and economic growth. In particular, we build on the work of Bruno (1995) and Bruno and Easterly (1998) on this question. Bruno and Easterly examined the relationship between inflation and economic growth for 127 countries between 1960 and 1992. Their examination of this data set is historical and descriptive. They do not present a formal econometric model. Their key conclusion was that there is no robust evidence from their data sample demonstrating a consistent trade-off between economic growth and inflation. Rather, among their other conclusions, Bruno and Easterly found that for inflation rates below 20 percent “there is no obvious empirical evidence for significant long-run growth costs,” (1995, p. 38).

This paper similarly presents descriptive evidence on the inflation/growth relationship. We do so while also recognizing the more formal econometric approaches exploring this relationship. But a major problem emerges in reviewing this more formal literature. It is that the conclusions reached by various authors diverge significantly from one another. This results primarily because their respective findings are highly sensitive to the specific data sets and estimating techniques being used. As such, in our view, the careful presentation of descriptive evidence in the matter of Bruno and Easterly’s work of roughly 25 years ago provides a dependable foundation for evaluating the inflation/growth relationship, both over time and with respect to economies at varying levels of development. In turn, these descriptive results provide, in our view, the most reliable framework for evaluating the claims on behalf of maintaining a 2-3 percent inflation target as the centerpiece for designing and implementing macroeconomic policy.

Section 2 of this paper describes both the establishment of low single-digit inflation targeting policies throughout the global economy as well as the literature that examines the inflation/growth relationship. Section 3 then presents our new results on the inflation/economic growth relationship for a sample of 130 countries over the years 1960 – 2021. We present these results through a series of 16 bar graphs that examine this relationship from alternative perspectives. Section 4 summarizes our findings and considers briefly some broader implications of our results.

In examining the relationship between inflation and economic growth, this paper does not address the critical set of larger issues associated with economic growth as a policy goal. These larger issues include the distribution of income within a given growth framework and the ecological costs and benefits of economic growth. We also do not consider here the significant problems with GDP statistics as an adequate proxy for measuring aggregate economic activity.<sup>6</sup> The aim of this paper is to provide some useful results through remaining focused on the narrower relationships between inflation, economic growth as conventionally measured, and inflation-targeting policies.

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<sup>6</sup> One of us has taken up many these issues detail elsewhere, e.g. in Pollin (2021) and Chomsky and Pollin (2020).

## 2. INFLATION TARGETS VS. GROWTH EMPIRICS

Inflation targeting emerged globally as the predominant framework for conducting monetary policy in the mid-1990s. As defined by former Federal Reserve Chair Alan Greenspan, an inflation target is “a rate of inflation that is sufficiently low that households and businesses do not have to take it into account in making everyday decisions.”<sup>7</sup>

The motivation for operating macro policy with low inflation targets is to establish price stability as the main goal of monetary policy and macro policy more generally. The operating assumption is that other macroeconomic policy goals—including economic growth, maximum employment and overall macro stability—can be most effectively achieved when price stability is recognized as the first priority.<sup>8</sup>

According to *Central Bank News*, 74 countries operate with explicit inflation targets as of 2022.<sup>9</sup> Among high-income countries, this includes the Euro Area, the US, UK, Japan, Canada, and Australia, all operating with 2 percent inflation targets. Middle-income countries generally operate with somewhat less stringent targets. These include China with a 3 percent target; Russia with a 4 percent target; Brazil with a 3.75 percent target and a range between 2.25 and 5.25; India with a 4 percent target and a 2 – 6 percent range; South Africa with a 3 – 6 percent target range; Mexico with a 3 percent target and a 2 – 4 percent range; and Indonesia with a 3 percent target and a 2 – 4 percent range. Targets vary more widely among lower-income countries. The Central Bank of West African States and Peru both operate with 2 percent targets and 1 – 3 percent ranges. Vietnam’s target is less than 4 percent. Honduras and Guatemala both operate with 4 percent targets and 3 – 5 percent ranges. Botswana operates with a 3 – 6 percent target.

In 1996, under then Chair Alan Greenspan, the U.S. Fed began operating on an informal basis with a 2 percent inflation target. In 2012, then Fed Chair Ben Bernanke made the implicit 2 percent inflation target explicit. As described by the Federal Reserve Bank of St. Louis’s FRED Blog in 2020, “In this framework, when inflation has approached or exceeded the traditional 2 percent target, even temporarily as it did in 2018, the Federal Open Market Committee has responded by raising the baseline federal funds rate to combat rising prices.”<sup>10</sup>

Despite this near universal embrace of low single-digit inflation targeting as the explicit goal of monetary policy, in fact, there was never a body of evidence justifying this framework as a means of achieving consistently superior macroeconomic outcomes. This becomes clear

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<sup>7</sup> Epstein, pp. 3-4.

<sup>8</sup> This becomes clear in reviewing the legal mandates of the range of central banks, as presented in the Bank of England’s 2012 publication *State of the Art of Inflation Targeting*: <https://www.bankofengland.co.uk/ccbs/state-of-the-art-of-inflation-targeting>

<sup>9</sup> <http://www.centralbanknews.info/p/inflation-targets.html>

<sup>10</sup> In 2020 under Chair Jerome Powell, the Fed modestly reframed its goal as an “average inflation of 2 percent over the long-run. According to the FRED Blog, “With this new framework, the FOMC is communicating that it will tolerate inflation above its target for a period of time to offset periods when inflation was below its target. In other words, the FOMC is targeting average inflation in the long run.”

through reviewing the work of Bruno and Bruno and Easterly as well as the related literature that was published in the mid- to late-1990s, i.e. at approximately the same time at which low single-digit inflation targeting policies began to be adopted globally.

Thus, with their full data sample of 127 countries between 1960 and 1992, Bruno and Easterly compiled descriptive evidence to explore non-linearities in the relationship between inflation and economic growth. They especially sought to observe the range of inflation rates within which inflation is positively associated with economic growth and, correspondingly, the thresholds at which higher inflation rates convert to becoming associated with declining growth. They found that, for the most part, average growth rates fell only slightly as inflation rates moved up to 20- 25 percent. As we noted above, for inflation rates below 20 percent, Bruno concluded that "there is no obvious empirical evidence for significant long-run growth costs," (1995, p. 38). Moreover, of particular importance for assessing the relationship between aggregate demand effects on inflation and growth, Bruno found that during 1960 – 72, economic growth, on average, increased as inflation rose, from negative or low rates to the 15 – 20 percent range. This was because, as Bruno explained, "in the 1950s and 1960s, low-to-moderate inflation went hand in hand with very rapid growth because of investment demand pressures in an expanding economy," (1995, p. 35). In other words, Bruno found that inflation that emerges in association with "investment demand pressures" does not appear to inhibit economic growth prospects.

Despite these findings, Bruno still makes clear in his single-authored paper that he does not advocate complacency with respect to inflation rates in the 20 percent region. According to Bruno, once inflation moves into the 20 percent region, it becomes difficult to contain. This is because, within the 20 percent inflation region, the systems of indexing wages and financial assets, as well as exchange rate adjustments, become more frequent. This then creates momentum towards accelerating inflation.

Neither Bruno alone nor Bruno and Easterly provide systematic evidence to support Bruno's concerns about inflation within the 20 percent region. Nevertheless, Bruno is clear in his conclusion that "getting inflation down to single digits is important even for longer-term reasons," (1995, p. 38). But even within this less systematic discussion on the dangers of inflation in the 20 percent range, it is still notable that Bruno never suggests that inflation needs to be pushed below a single-digit threshold—and specifically down into the 2 – 3 percent range advocated by current inflation-targeting proponents.

During this same period, various researchers examined the output growth-inflation relationship through more formal econometric techniques than those employed by Bruno and Easterly, while still aiming to identify, as with Bruno and Easterly, potential nonlinearities in the relationship. For example, in a 1998 paper, IMF economists Atish Ghosh and Steven Phillips combine panel regression techniques with non-linear treatment of the inflation-growth relationship. They also use a decision tree technique that, in their view, is more robust to outliers and nonlinearities than is standard regression analysis. Their model draws from a data sample of IMF member countries during 1960 – 1996. According to this model, they find evidence of a negative inflation threshold at 2.5 percent. But they acknowledge that thresholds of 5 and 10 percent generate statistical results similar to the 2.5 percent threshold.



A 2001 paper by IMF economists Moshin Khan and Abdelhak Senhadji offered two methodological innovations relative to Ghosh and Phillips. The first is their use of conditional least squares. Their second, and more straightforward, was to divide their data sample into industrial and developing economies. Khan and Senhadji find that the threshold level above which inflation significantly slows growth is 1-3 percent for industrial countries and 11 – 12 percent for developing countries. A 2004 paper by Burdekin et al. followed Khan and Senhadji in allowing for different threshold effects among the industrial and developing economies. Burdekin et al. also allow for nonlinearities in the growth-inflation relationship through utilizing spline estimation techniques. The results from this research diverge sharply from those of Khan and Senhadji. In terms of point estimates, Burdekin et al. found that the turning point for industrial countries was 8 percent, whereas that for developing countries was 3 percent.

In short, all of these studies broadly concur with Bruno and Easterly as to the presence of nonlinearities in the growth-inflation relationship. They also broadly concur with Bruno's conclusion that the negative effects of inflation will occur somewhere below a 20 percent threshold, most likely in the single-digit range. However, they diverge sharply as to where the turning point occurs within a range of roughly 12 percent inflation or less.

A somewhat later study co-authored by one of us in 2006 (Pollin and Zhu 2006) developed an alternative nonlinear regression analysis framework for estimating the growth-inflation relationship. This study examined the growth-inflation relationship for 80 countries at all levels of development over 1961 – 2000. The paper considered inflation experiences up to 40 percent inflation rates. It did not consider periods in which inflation exceeded 40 percent, assuming that these are hyperinflation periods, in which macroeconomic functionings have broken down. For the full set of 80 countries over the 40-year sample period, this study consistently found, up to the 40 percent inflation limit, that higher inflation is associated, at a statistically significant level, with moderate gains in GDP growth up to a roughly 15 – 18 percent threshold.

However, the findings diverged when countries in the full data set were divided according to income levels. The results were highly sensitive to the modeling specifications with the OECD economics, such that no consistent pattern emerged in identifying a turning point in the inflation-growth relationship. With the middle-income countries, by contrast, a consistent statistically significant positive relationship between growth and inflation emerged up until inflation rates at around 15 percent. With low-income countries, a positive relationship between growth and inflation was maintained up until about a 15 - 20 percent inflation rate through alternative estimating specifications, though these results were not all statistically significant. Finally, when estimating the growth-inflation relationship on a decade-by-decade basis, the results indicated that inflation and growth are more positively correlated when macro policy is explicitly aimed at stimulating growth as opposed to when macro policy is focused on austerity and maintaining low single-digit inflation rates.

Overall then, these econometric studies produced a wide range of results. The results are highly sensitive to the sample of countries and time period being examined as well as to the specific econometric techniques used for estimation. Still, we can conclude from these studies that no robust evidence emerged to support inflation targeting regimes with the inflation target set at low single-digit rates. At the same time, the wide range of results makes clear that an

undated reexamination of the evidence, working with the basic descriptive methods utilized by Bruno and Easterly, should be illuminating.

### **3. NEW RESULTS ON INFLATION/GROWTH RELATIONSHIP**

In this section, we present a series of bar graphs that illustrate the relationship between real GDP growth and inflation for a total of 130 countries, over the period 1960 – 2021.<sup>11</sup> The 130 countries in our full data sample are all the countries included in the World Bank Indicators data set whose populations are 4 million people or greater. Thus, our first filter with the data set is to exclude 87 countries from our sample whose populations are less than 4 million.<sup>12</sup>

As a second filter, we exclude country/year observations in which inflation rates exceed 40 percent. Following the 2006 Pollin/Zhu paper, we broadly define hyperinflation as being annual inflation rates in excess of 40 percent per year. We further assume that hyperinflations correspond with, and are detrimental to, favorable economic outcomes. We therefore leave aside the possibility that there may be some positive correspondence between inflation above 40 percent and economic growth.

We have reported inflation figures in the bar graphs in 9 categories. These include:

1. A negative inflation rate category;
2. A 0 – 2.5 percent inflation range;
3. A 2.5 – 5 percent inflation range;
4. 5-percentage point inflation ranges, including 5 – 10 percent, 10 – 15 percent, and 15 – 20 percent inflation ranges;
5. 10-percentage point ranges, including 20 – 30 percent and 30 – 40 percent inflation ranges.

We report real GDP growth figures as medians within each inflation-range category. We are reporting the medians rather than means in order to not overweight the impact of large outlier GDP growth observations in our sample. At the same time, the results do not differ significantly when mean GDP figures are matched within the various inflation range categories.

We present the low single-digit inflation categories in two smaller 2.5 percent inflation ranges—i.e. the 0 – 2.5 percent inflation range and 2.5 – 5 percent inflation range—to provide greater specificity on the growth/inflation relationship within the target rates under most countries' inflation-targeting regimes. As we reviewed above, virtually all high-income

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<sup>11</sup> All GDP figures in the paper are in inflation-adjusted real terms as opposed to nominal terms. The World Bank Indicators database describes their method of calculating real GDP growth as follows: "Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars," <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?view=chart>. To avoid repetition, we refer to "GDP growth" figures as meaning *real* GDP growth throughout.

<sup>12</sup> The full World Bank database includes 217 countries. We excluded from the database 87 countries in which population is less than 4 million as of the most current figures. This leaves 130 countries in our data sample.

countries currently operate with a 2 percent inflation target. Most middle- and low-income countries operate with targets that are only modestly higher.

Our first bar graph, Figure 1, shows results with the full set of 130 countries over the full time period 1960 – 2021. We then examine results for a series of subsamples within the full data set. We have organized these subsamples as follows:

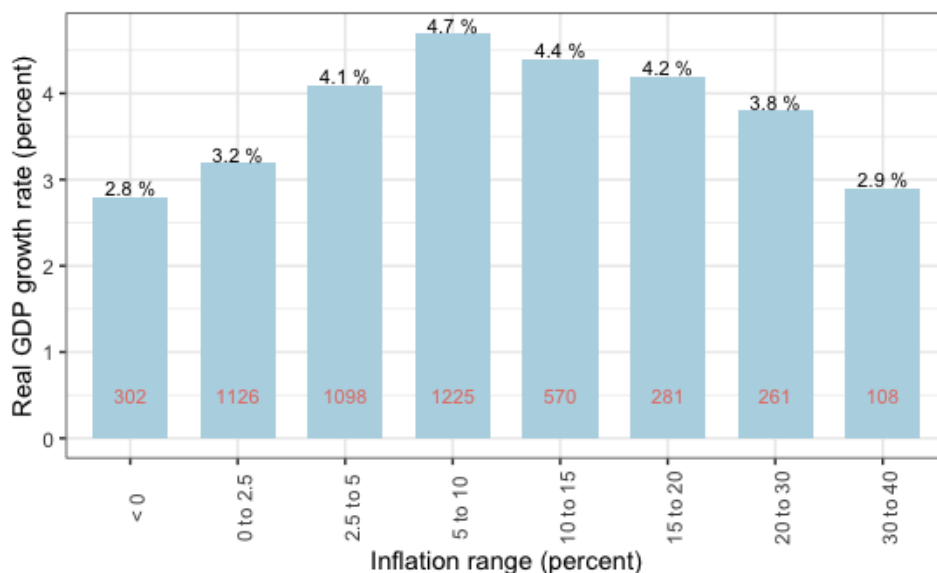
1. We group the full set of countries into four income-level categories, based on the World Bank's income categories. The World Bank's four income-level categories are: high-income countries; upper-middle income countries; lower-middle income countries; and low-income countries. Within our full sample, there are 37 high-income countries, 40 upper-middle income countries, 25 lower-income countries, and 28 low-income countries.
2. We show results on a decade-by-decade basis for the 6 full decades of our full data set, i.e. from 1960 – 69 through 2010 – 2019. We report results by decade for the full set of 130 countries as well as for the countries within each of the four income-level groupings.
3. We control for the impact of large oil price increases by excluding from the data sample years in which the average global price of oil rose by more than 30 percent. Of course, the aim here is to be able to observe the relationship between inflation and economic growth independent of the impact of oil price spikes. We present results with this oil price filter: a) for all 130 countries; b) for countries grouped according to the four income-level categories; and c) on a decade-by-decade basis.

We also generated a data subsample by excluding countries during specific years in which they were experiencing major armed conflicts. We defined "major armed conflicts" as periods in which 10,000 or more people had died within a given year on a given country's soil due to armed conflict. We found that filtering the data in this way did not provide any significant changes in the inflation-growth relationships relative to the results we had obtained without this armed conflict filter. We therefore have not presented the results with this armed conflict filter in the figures that follow.

### **Results for All Countries and All Years**

Figure 1 shows results for the full sample of countries for all years, 1960 – 2021. As we see with this first set of results, median GDP growth is 2.8 percent when inflation is negative and rises modestly, to 3.2 percent, when inflation ranges between 0 and positive 2.5 percent. We then see that median GDP growth rises to 4.1 percent during the years in which inflation ranges between 2.5 and 5 percent. Median GDP growth then rises again to 4.7 percent when the inflation range increases to 5 – 10 percent.

Figure 1. Inflation and Real GDP Growth:  
*All Countries, 1960 – 2021*  
130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Median GDP growth peaks during the years in which inflation ranges between 5 – 10 percent. But when the inflation range rises to 10 – 15 percent, the drop off in median GDP growth is modest, to 4.4 percent. Moreover, this median GDP growth figure is fully 1.2 percentage points higher than the 3.2 percent figure associated with the 0 – 2.5 percent inflation range. Even within the 15 – 20 percent inflation range, median GDP growth is at 4.2 percent, a percentage point higher than the 3.2 percent figure within the 0 – 2.5 percent inflation range.

Median GDP growth drops off to 3.8 percent when inflation ranges between 20 – 30 percent. Still, even within this 20 – 30 percent inflation range, the median GDP growth rate is still higher than the median GDP growth rate when inflation ranges between 0 – 2.5 percent. Not until inflation ranges between 30 – 40 percent does median GDP growth, at 2.9 percent, fall below the 3.2 percent GDP growth figure within the 0 – 2.5 percent inflation range.

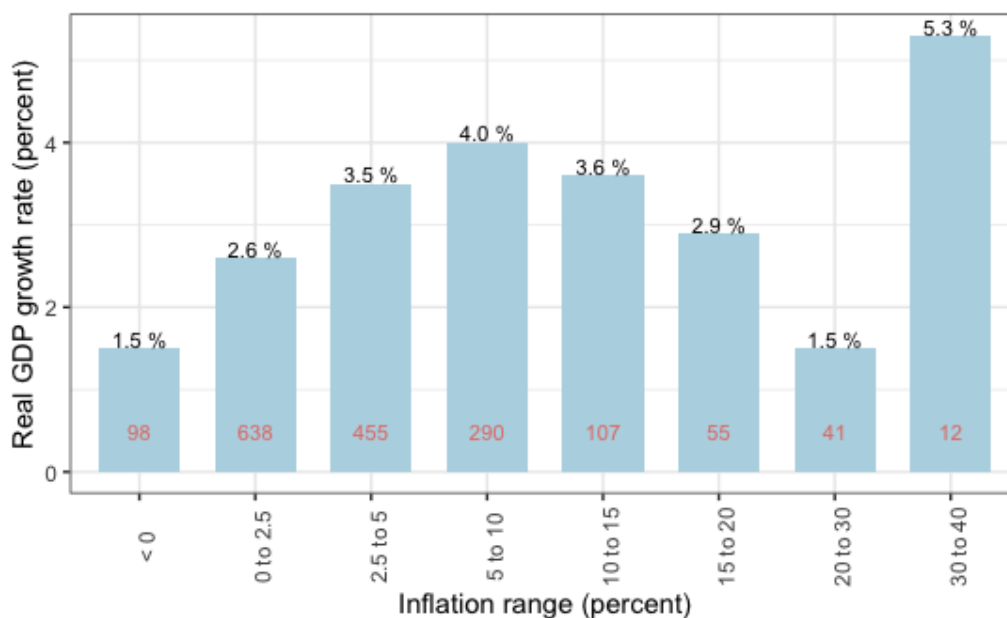
Overall, these initial results are similar to the Bruno-Easterly findings. That is, they offer no empirical support on behalf of a low single-digit inflation target policy framework to the extent that promoting GDP growth is one of the primary goals of macroeconomic policy. Of course, these results are highly aggregated, both over time and by combining all countries, at all income levels, into a single data sample. We now turn to considering the growth/inflation relationship within a series of more disaggregated data sets.

## Results For Four Income-Level Categories

Figures 2 – 5 show results for each of the four income-level categories over the full 1960 – 2021 period. The results are broadly similar to those for the full sample.

Figure 2 reports figures for the high-income economies. It shows that median GDP growth is at 2.6 percent for these economies when inflation ranges between 0 – 2.5 percent. Median GDP growth then rises to 3.5 percent when inflation moves into the 2.5 – 5 percent range and rises again to 4.0 percent when inflation ranges between 5 – 10 percent. Median GDP growth declines to 3.6 percent in the 10 – 15 percent range and declines again, to 2.9 percent in the 15 – 20 percent range. But this GDP growth figure within the 10 – 15 percent inflation range is still higher than that for the 0 – 2.5 percent inflation range. Median GDP growth does decline to 1.5 percent within the 20 – 30 percent inflation range. GDP growth rises sharply in the 30 – 40 percent inflation range, but there are only 12 observations within this category.

Figure 2. Inflation and Real GDP Growth:  
*High-Income Countries, 1960-2021*  
37 countries in sample

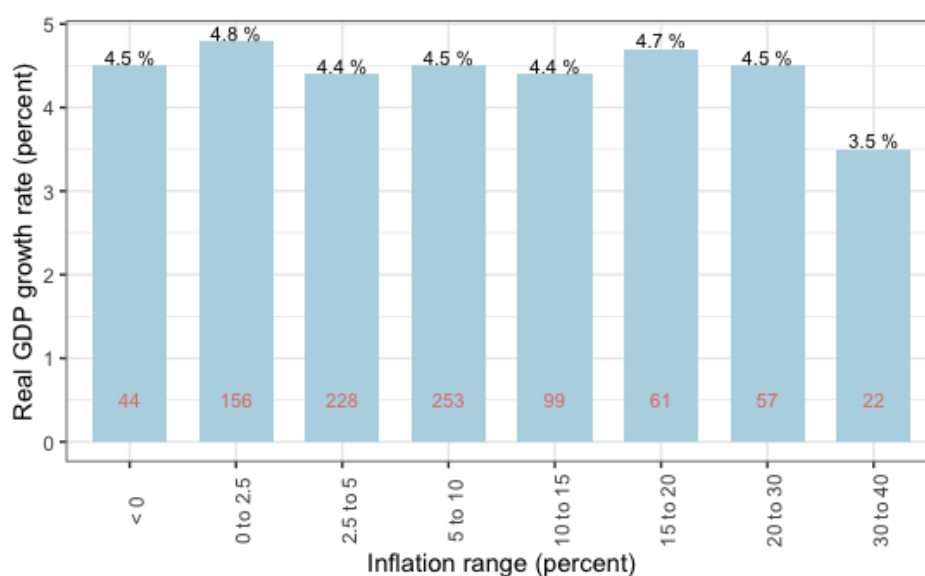


Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 3 shows results for the upper middle-income countries for the full 1960 – 2021 period. The pattern here is somewhat different than for the sample as a whole and for the high-income countries. That is, we see here that median GDP growth remains within a small band of 4.4 – 4.8 percent—i.e. basically remains stable—through the 20 – 30 percent inflation range. GDP growth does decline to 3.5 percent in the 30 – 40 percent inflation range, but here again, this category includes a relatively small number of observations.

Figure 3. Inflation and Real GDP Growth:  
*Upper-Middle Income Countries, 1960-2021*  
40 countries in sample

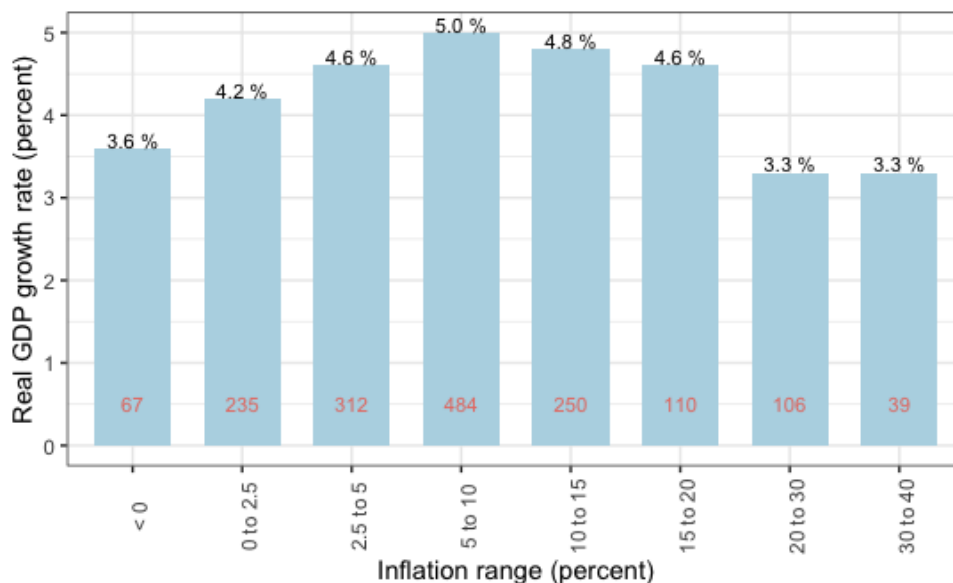


Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 4 shows the results for lower middle-income countries. The pattern here is broadly similar to that for the high-income countries. That is, median GDP growth for the low middle-income economies is 4.2 percent at the 0 – 2.5 percent range, then rises to 4.6 percent when moving into the 2.5 – 5 percent inflation range. Median GDP growth then rises again to 5.0 percent in the 5 – 10 percent inflation range, and declines only 4.8 percent in the 10 – 15 percent inflation range and to 4.6 percent in the 15 – 20 percent inflation range. Median GDP growth does then drop off in the 20 – 30 percent and the 30 – 40 percent inflation ranges.

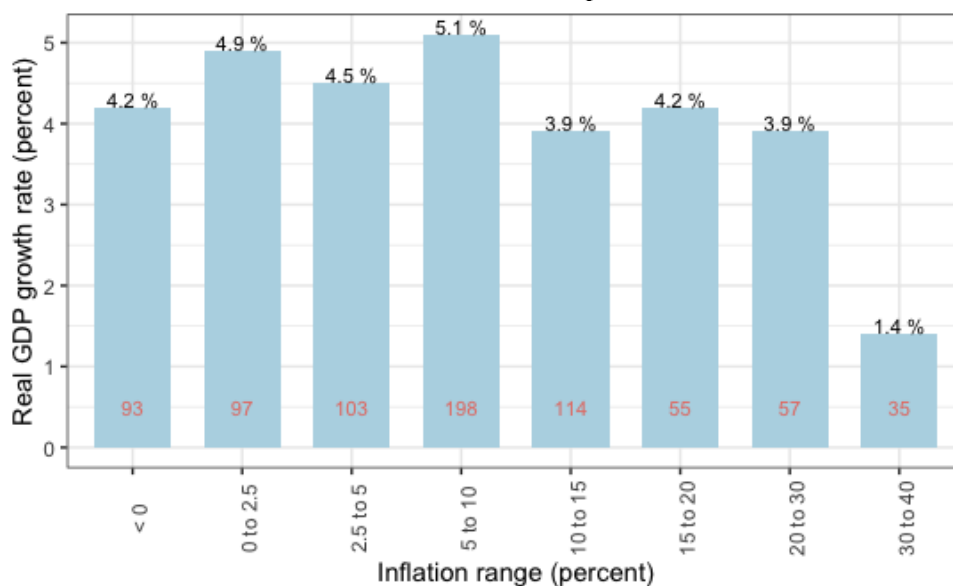
Figure 4. Inflation and Real GDP Growth:  
**Lower-Middle Income Countries, 1960-2021**  
 25 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 5. Inflation and Real GDP Growth:  
**Low-Income Countries, 1960-2021**  
 28 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

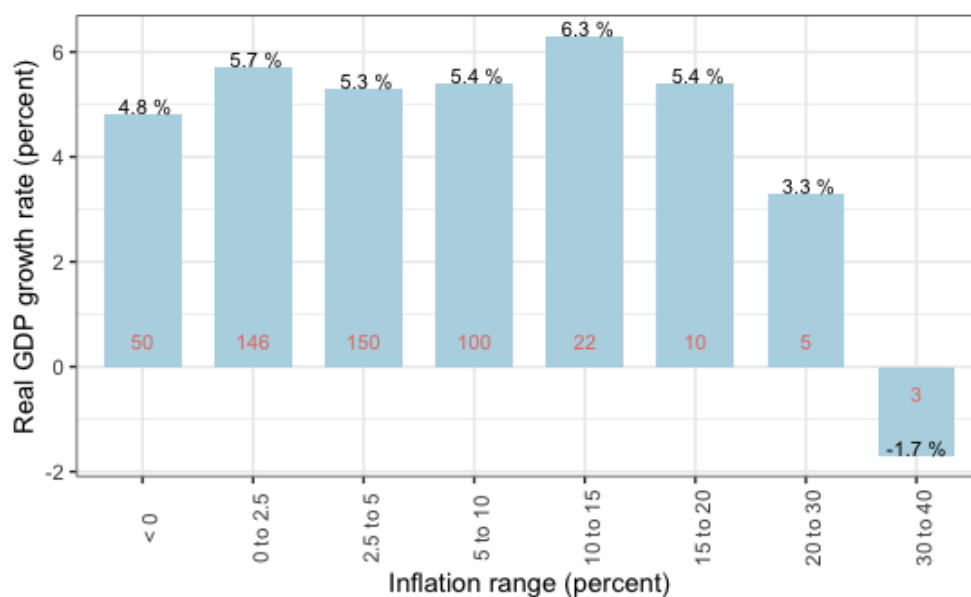
Figure 5 reports results for the low-income countries within the full sample. Here we see a pattern similar to the upper-middle countries. That is, median GDP growth is at 4.9 percent within the 0 – 2.5 percent inflation range, then falls modestly to 4.5 percent in the 2.5 – 5 percent inflation range, then rises to 5.1 percent in the 5 – 10 percent inflation range. Median GDP growth for the low-income countries then fluctuates modestly between 3.9 – 4.2 percent through the 20 – 30 percent inflation range before dropping off sharply, to 1.4 percent in the 30 – 40 percent inflation range.

### Decade-by-Decade Results

In Figures 6 – 10, we present results for the full sample of countries divided on a decade-by-decade basis. We do not present here the additional set of figures for each country-income grouping on a decade-by-decade basis. Suffice it to say that the aggregate decade-by-decade figures provide a sufficiently representative set of perspectives for these results by decade.

Figure 6 reports the results for 1960 – 69 for the full sample. We find here that median GDP growth is modestly higher, at 5.7 percent, within the 0 – 2.5 percent inflation range than in the 2.5 – 5 percent and 5 – 10 percent ranges. But moving into the 10 – 15 percent inflation range, median GDP growth rises to 6.3 percent, before declining to 5.4 percent in the 15 – 20 percent inflation range. Median GDP growth falls at the 20 – 30 and 30 – 40 inflation ranges, but here again, the sample sizes at these inflation ranges are small.

Figure 6. Inflation and Real GDP Growth:  
*All Countries, 1960-1969*  
130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

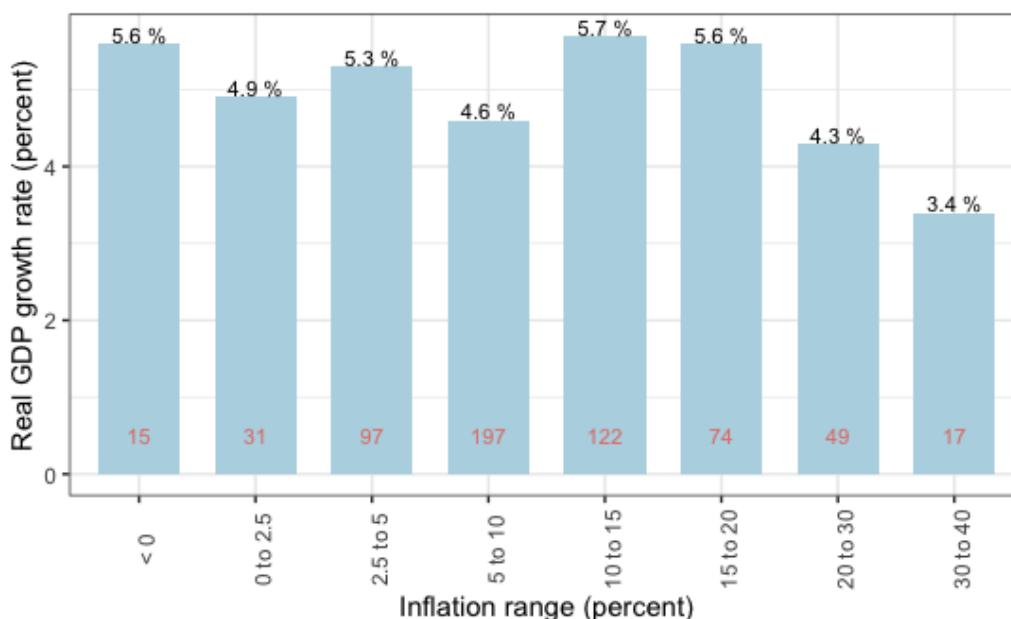


We report the results for 1970 – 79 in Table 7. We find here that that median GDP growth is modestly lower within the 0 – 2.5 percent inflation range, at 4.9 percent, than within the 2.5 to 5 percent inflation range, where median GDP growth is 5.3 percent. Median GDP growth then fluctuates between 4.3 percent and 5.7 percent up to the 20 – 30 percent inflation ranges.

Table 8 shows our results for 1980 – 89. Over this decade, median GDP growth rises from 3.5 percent at the 0 – 2.5 percent inflation range to 3.9 percent within the 2.5 – 5 percent inflation range. Median GDP growth then declines, to 3.5 percent and 3.0 percent until the 10 – 15 percent inflation range before rising to 4.2 percent at the 15 – 20 percent inflation range. Median GDP growth peaks at 3.9 percent during the 2 – 5 and 15 – 20 percent inflation ranges. Median GDP growth then declines at the 20 – 30 percent and 30 – 40 inflation ranges.

Figure 9 reports figures for the 1990 – 1999 decade. Over this decade, median GDP growth is 3.1 percent within the 0 – 2.5 percent inflation range, then rises sharply to 5.3 percent within the 2.5 – 5 percent range. Median GDP growth does decline in the 5 – 10 percent and 10 – 15 percent inflation range but with GDP growth still running between 4.4 – 4.5 percent, i.e. at roughly 1.3 percentage points higher than when inflation ranged between 0 – 2.5 percent.

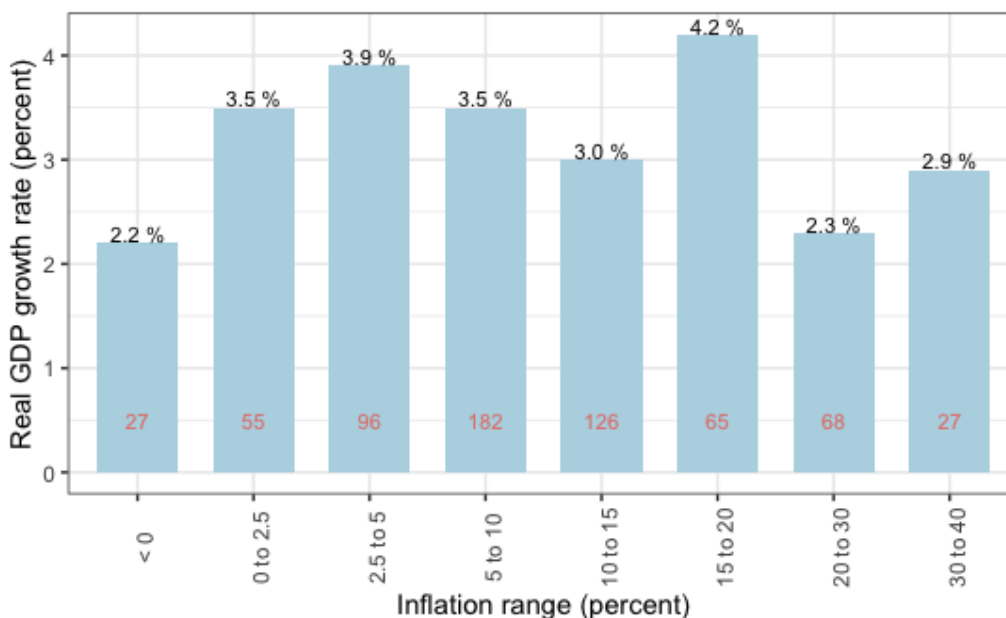
Figure 7. Inflation and Real GDP Growth:  
*All Countries, 1970-1979*  
130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

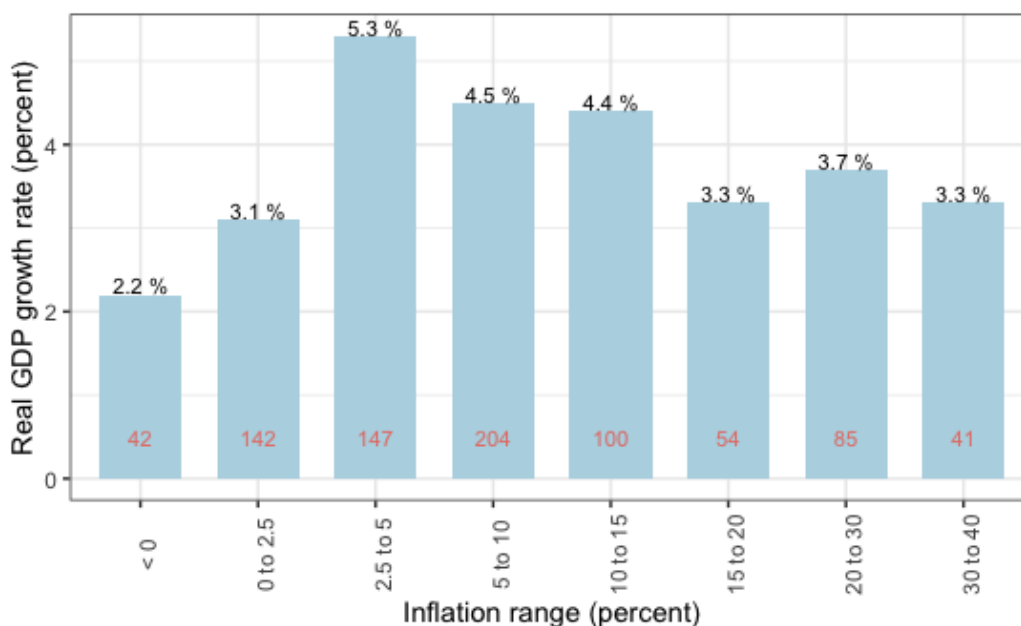
Figure 8. Inflation and Real GDP Growth:  
*All Countries, 1980-1989*  
 130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 9. Inflation and Real GDP Growth:  
*All Countries, 1990-1999*  
 130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

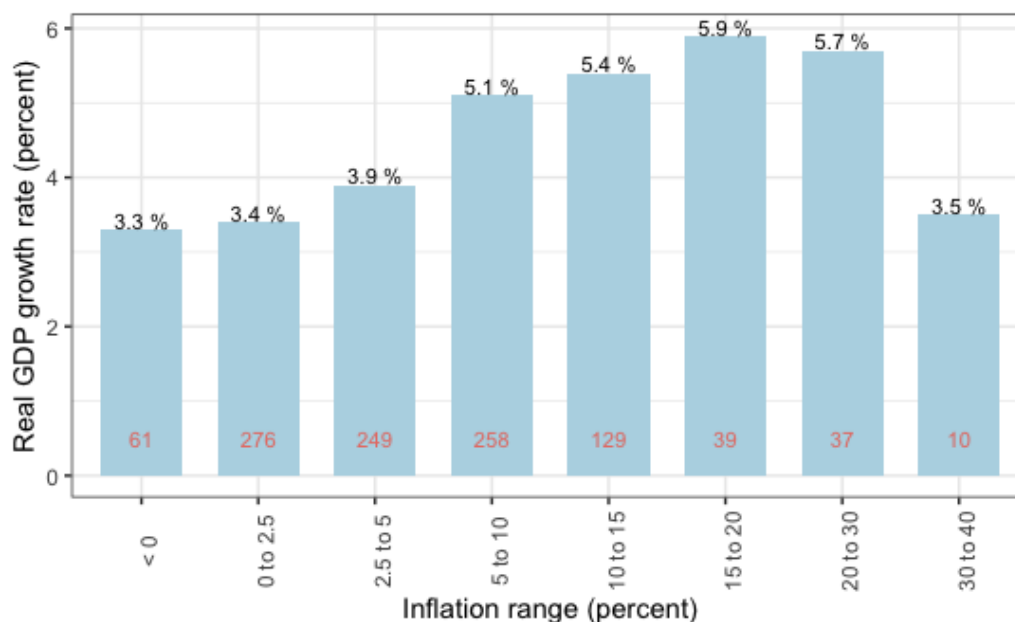
Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 10 reports results for the 2000 – 2009 decade. Similar to the 1990s decade, it shows median GDP growth rising when the inflation range increases above the 0 – 2.5 percent range. We see that median GDP growth is at 3.4 percent within the 0 – 2.5 percent range, then rises to 3.9 percent in the 2.5 to 5 percent range. Median GDP growth then rises to between 5.1 and 5.9 percent within the higher inflation ranges up to the 20 – 30 percent inflation range. Median GDP growth then falls off in the 30 – 40 percent inflation range. But this figure is still slightly higher than the 3.4 percent growth figure at the 0 – 2.5 percent inflation range.

Figure 11 shows results for the final full decade, 2010 – 2019. Here again we see that median GDP growth is lower within the 0 – 2.5 percent inflation range than in the higher inflation ranges up to the 15 – 20 percent inflation range. That is, median GDP growth is at 2.8 percent within the 0 – 2.5 percent inflation range, 3.7 percent within the 2.5 to 5 percent inflation range, 4.9 percent within the 5 to 10 percent inflation range, 4.2 percent within the 10 – 15 percent inflation range and 3.0 percent at the 15 – 20 percent inflation range.

Overall, on a decade-by-decade basis, there is some evidence from the 1960s - 1980s that low single-digit inflation can be associated with GDP growth rates equivalent to those within higher inflation ranges. For the 1980s onward, there is no evidence that low single-digit inflation is associated with higher GDP growth rates. To the contrary, we observe consistently from the 1990s onward that GDP growth averages are higher when inflation moves into the 2.5 – 5 percent range and higher.

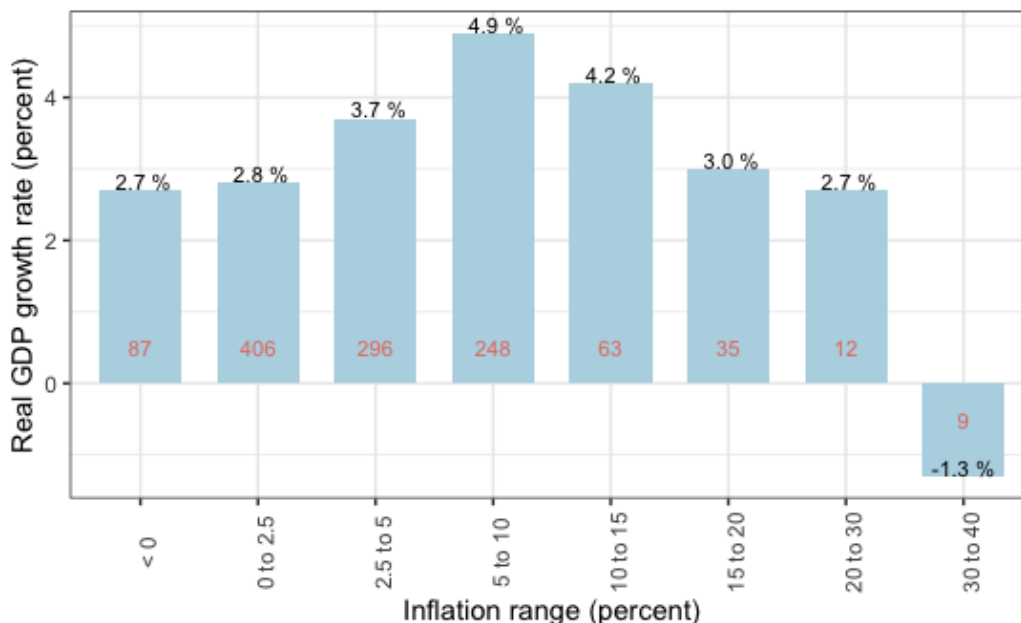
Figure 10. Inflation and Real GDP Growth:  
*All Countries, 2000-2009*  
 130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 11. Inflation and Real GDP Growth:  
*All Countries, 2010-2019*  
 130 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

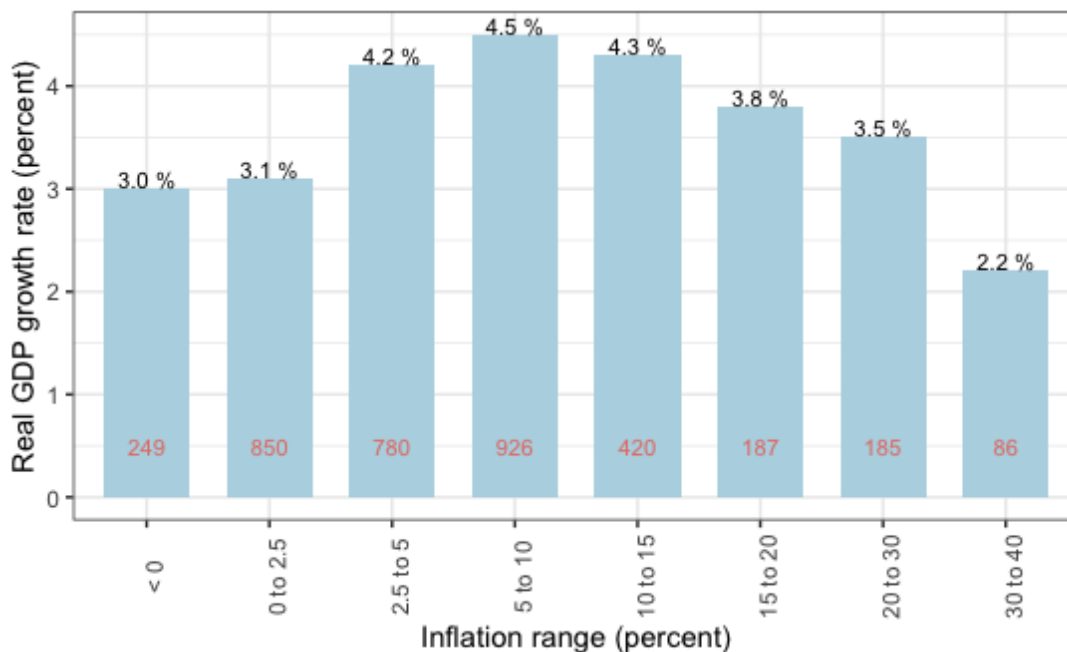
## Results with High Oil Price Years Excluded

In Figures 12 – 16, we present results for the full 1960 – 2021 period in which we exclude from the data sample the years in which the average global price of oil rose by 30 percent or more. This has meant excluding 12 years from the sample: 1973, 1974, 1979, 1990, 1999, 2000, 2004, 2005, 2008, 2011, 2018, and 2021.

Focusing only on the years in which oil prices did not rise by 30 percent or more, we still find that the general patterns in the relationship between inflation and GDP growth remain broadly aligned with the full data set that includes the high oil price increase years.

Figure 12 first shows the results for this truncated sample, including all countries at all income levels in years without oil price spikes. We see that median GDP growth is at 3.0 – 3.1 percent when inflation is both negative and ranges between 0 – 2.5 percent. Median GDP growth then rises to 4.2 percent as the inflation range rises to 2.5 – 5 percent. Median GDP growth then remains at approximately this higher rate as the inflation range rises to 5 – 10 percent and 10 -15 percent. Median GDP growth does then fall when inflation ranges between 15 – 20 percent and between 20 – 30 percent. But even at these higher inflation ranges, median GDP growth is still higher than when inflation is within the 0 – 2.5 percent range.

Figure 12. Inflation and Real GDP Growth:  
 All Countries, 1960-2021  
 Excluding Years in Which Average Global Oil Price Rises by 30% or More  
 130 countries in sample

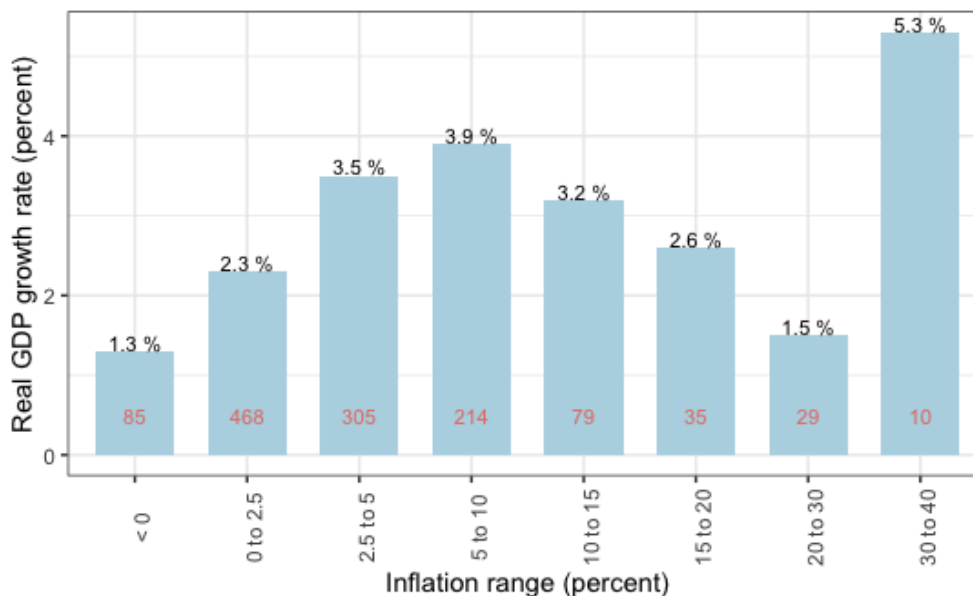


Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figures 13 – 16 report results for the oil-truncated sample for each of the four country income-level categories. The patterns here basically replicate those that we saw with the full sample of years in Figures 2 – 5, i.e. the results that we saw without having excluded the years in which that oil prices spiked. That is, with both the high-income and lower-middle income countries, median GDP growth is consistently higher through the 15 – 20 percent inflation range relative to the 0 – 2.5 percent range. With the upper-middle-income countries, no strong patterns emerge for median GDP growth through the 5 – 10 percent inflation range relative to the 0 – 2.5 percent range. There is a drop off in median GDP growth at the 10 – 5 percent inflation range, to 3.9 percent, but then rises to between 4.1 – 4.2 percent at the 15 – 20 percent and 20 – 30 percent inflation ranges. For the low-income countries, median GDP growth is modestly higher, at 5.2 percent in the 0 – 2.5 percent inflation range relative to the 4.7 percent and 5.0 percent growth figures as inflation rises to between 2.5 – 5 percent and 5 – 10 percent. Median GDP growth then declines to between 3.8 – 3.9 percent until the 20 – 30 percent inflation range.

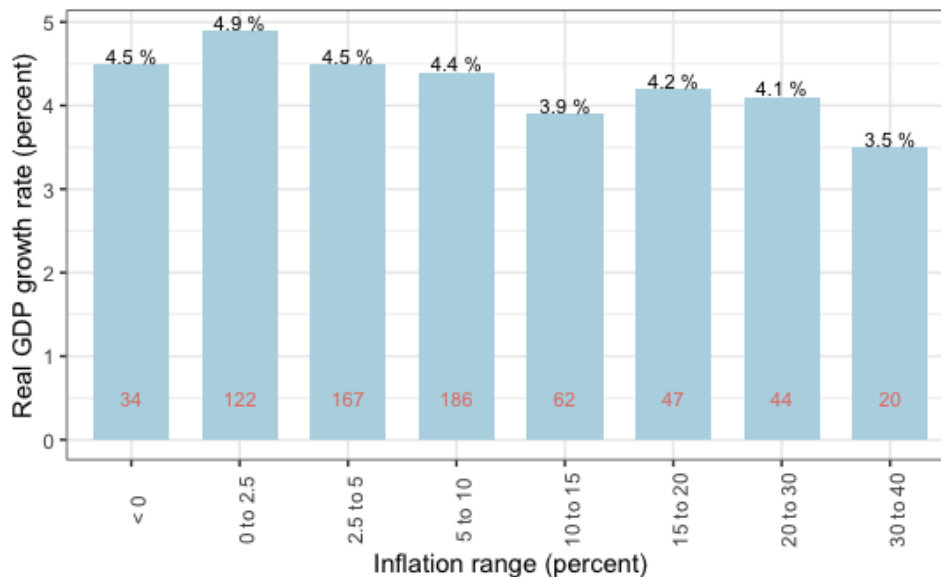
Figure 13. Inflation and Real GDP Growth:  
**High-Income Countries, 1960-2021**  
*Excluding Years in Which Average Global Oil Price Rises by 30% or More*  
 37 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

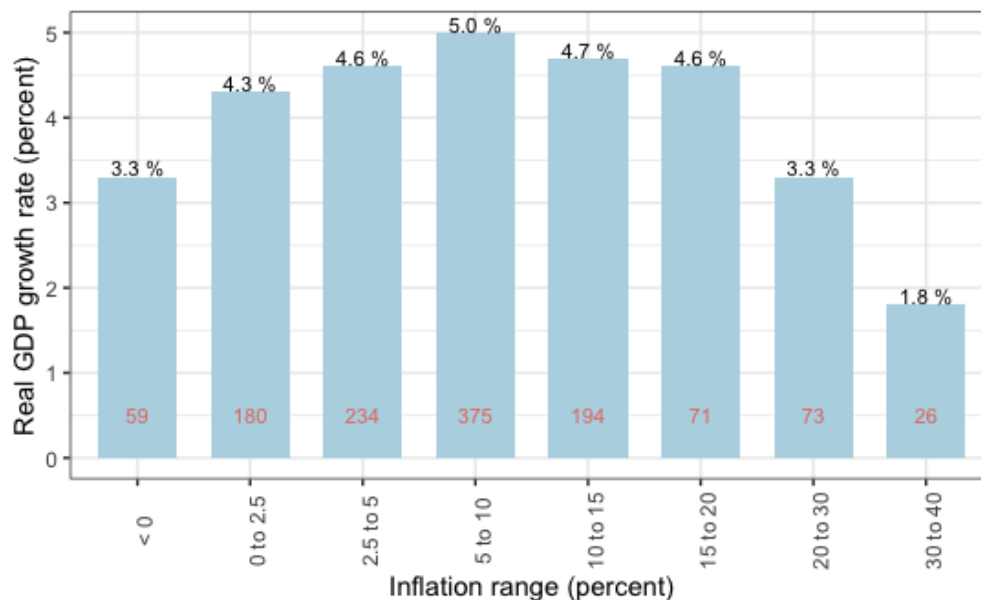
Figure 14. Inflation and Real GDP Growth:  
**Upper-Middle Income Countries, 1960-2021**  
*Excluding Years in Which Average Global Oil Price Rises by 30% or More*  
 40 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

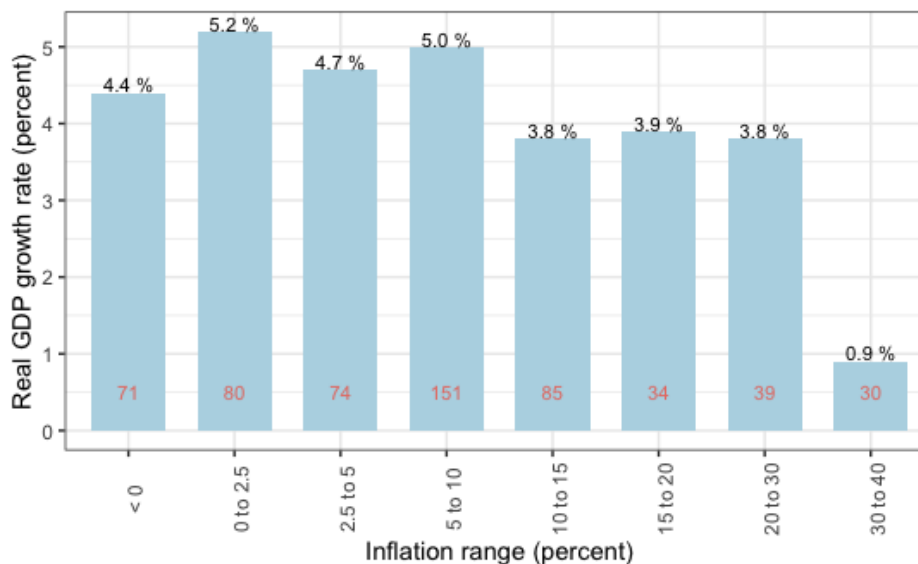
Figure 15. Inflation and Real GDP Growth:  
**Lower-Middle Income Countries, 1960-2021**  
 Excluding Years in Which Average Global Oil Price Rises by 30% or More  
 35 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

Figure 16. Inflation and Real GDP Growth:  
**Low- Income Countries, 1960-2021**  
 Excluding Years in Which Average Global Oil Price Rises by 30% or More  
 28 countries in sample



Source: World Bank Indicators: <https://data.worldbank.org/indicator>

Notes: Full sample includes all countries in World Bank Indicators database with populations of at least 4 million people. Real GDP growth figures are medians within each inflation range. Figures inside bars are the number of observations within each inflation range.

#### **4. CONCLUSIONS**

Overall, we find no consistent evidence supporting the conclusion that economies at any income level will achieve significant GDP benefit when they maintain inflation within low single digits, i.e. between the 0 – 2.5 percent inflation range. To the contrary, the evidence we review here suggests that, in general, economies are more likely to achieve higher GDP growth rates in association with inflation ranges in the range of 2.5 – 5 percent, 5 – 10 percent and, for the most part, 10 – 15 percent. These results are in line with those reported by Bruno and Easterly 25 years ago.

There are some modest exceptions to this general pattern, in particular with upper-middle and low-income countries. But even with these country groupings, there is no strong evidence that inflation in the 0 – 2.5 percent range is consistently associated with stronger GDP growth performances. Rather, the results for these two country groupings show that GDP growth is not consistently lower when inflation ranges between 0 – 2.5 percent relative to higher inflation ranges.

Certainly, with the high-income economies, the evidence suggests that they are paying a significant penalty in terms of foregone GDP growth when policymakers set an inflation target at 2 percent as the central goal of macroeconomic policy.

It is beyond the scope of this paper to evaluate the likely effectiveness under current conditions of the range of alternative inflation control policies, either in general or within any given country setting. What we have shown is that the macro policy framework that is currently dominant worldwide—of maintaining an inflation target in the 2 – 3 percent range—cannot be supported insofar as a primary goal of macro policy is to promote economic growth. This conclusion can help open the discussion that explores alternative inflation control policies, in particular, those that do not entail raising mass unemployment as a critical inflation-control fulcrum. As noted at the outset, these alternative possibilities include windfall profit taxes, stricter enforcement of existing anti-trust and commodities futures market speculation regulations, targeted price controls, along with accelerated investments in infrastructure and the green energy transition.

The results presented here also lead us to raise another question: whether promoting economic growth is actually a primary aim of macro policy. The contributions by Gerald Epstein and collaborators (Epstein 2019, Epstein and Yeldan 2009), among others, has long suggested that the primary aim of macro policy, and inflation-targeting policy in particular, is rather to support corporate profitability and especially the profits of finance capital. Moreover, this literature shows how a low single-digit inflation target is consistent with this policy goal of protecting corporate profitability. The results presented here give additional credence to this alternative perspective on the purpose of inflation-targeting policies. As such, our results could also contribute to advancing a macro policy framework that is in fact committed to increasing broadly-shared well-being as opposed to the narrow interests of the most privileged segments of society.



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