Replacing the Golden Anchor for Price Stability

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I. Introduction

When policymakers discussed alternatives to the Bretton Woods exchange rate system in the late 1960's, a frequent concern was the loss of an "anchor" for price stability. For example, Paul Volcker (then an Under Secretary at the U.S. Treasury Department) highlighted these concerns in discussions leading up to the 1971 meeting at Camp David on changes to the international monetary system:

> *"Volcker believed that money needed an anchor, some price that was a fixed point, and that an exchange rate tied to gold served that purpose…He was convinced that fixed currencies imparted a necessary discipline on national policy makers, who otherwise would too easily resort to lax fiscal and monetary policies that would lead to inflation."* [1]
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> *Garten (2021), Three Days at Camp David, pg. 84*

While concerns about prices "unanchoring" initially focused on risks from easy monetary and fiscal policy, another risk to price stability has emerged in the last twenty-five years: increased globalization. As the global economy became more integrated in the 1990s and 2000s through trade, capital flows and supply chains, inflation became more sensitive to global factors (Forbes, 2019). When global shocks more frequently push CPI inflation far from central bank targets (as seen recently around the Covid pandemic), it could be even more important to have some type of anchor to achieve price stability.

Have countries been able to achieve price stability in the face of large global shocks without some type of anchor for price stability? Over the last twenty-five years, many advanced economies have allowed their exchange rate to float (albeit with different degrees of "dirty" intervention), while others have replaced the "golden" anchor with a new disciplining structure—such as pegging to the euro, adopting the euro, or a currency board. To understand the importance of maintaining some type of exchange rate anchor during the recent era of heightened globalization, this chapter compares advanced economies with flexible exchange rates to those that have adopted more rigid arrangements according to three metrics: (a) inflation rates; (b) inflation sensitivity to a common global factor; and (c) inflation sensitivity to

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[1] It is worth noting that fixed rates could also entail less price stability because the price level rather than the exchange rate must adjust to real shocks under a peg (an argument made by Keynes). This view presupposes that the central bank can and will engage in price-stabilization – anchoring inflation credibly through some means such as inflation target without pegging a nominal price. If credibility is lacking, however, it will also be difficult to fix the exchange rate absent some external political context, such as Bretton Woods or the euro. These concerns were also part of Volcker's hesitation to abrogate the Bretton Woods arrangement. By 1979, however, Volcker believed that the Fed could stabilize prices without a fixed nominal anchor.

specific global shocks. These comparisons suggest that over the last 25 years, inflation in advanced economies with floating exchange rates is not any less stable or more vulnerable to global shocks than countries that have some type of "anchor" through a link to the euro, adopting the euro, or a currency board. Advanced economies appear to have been able to replace the "anchor of gold" with inflation-targeting central banks combined with a variety of exchange rate arrangements.

II. Previous Literature: Inflation, Globalization and Exchange Rate Regimes

An extensive literature examines the advantages and disadvantages of flexible versus fixed exchange rates, a literature well summarized in Rogoff et al. (2004). Much of this literature focuses on how the exchange rate regime is correlated with subsequent growth, investment, interest rates, trade, and the likelihood of experiencing a crisis. A subset of these papers discusses one important advantage of pegged exchange rates—as a disciplining device for fiscal and monetary policy that stabilizes inflation (Giavazzi and Giovannini, 1989). The experience of countries in Latin America in the 1980s and 1990s supported the importance of exchange rate pegs to avoid high inflation (Edwards, 2001).

Empirical studies examining a broader set of countries and periods also generally find that fixed exchange rates correspond to lower inflation, even after controlling for other determinants of inflation (Ghosh, Gulde, and Wolf, 2003). Results, however, can be sensitive to how exchange rate regimes are defined and what other variables are controlled for (Rogoff et al., 2004). Also important, the relationship between the exchange rate regime and price stability is more consistently significant for emerging markets, with less consistent differences for advanced economies. This sensitivity of results to sample selection highlights a key issue in all of these analyses: selection bias. Countries which chose to peg their exchange rates in the post-Bretton Woods era tend to be different in many ways than countries with flexible exchange rates. This is also an issue in the comparisons below.

A more recent branch of literature focuses on how globalization has affected the inflation process. Over the fifty years since the breakdown of the Bretton Woods system, most countries have become more tightly integrated with the global economy through a range of channels. Several papers have explored how this increased global integration, and especially the period of "hyper-globalization" in the 1990s and 2000s, could have reduced inflation, including through the greater availability of low-cost imports and greater ease of shifting production to low-cost countries. More recently, attention has shifted to not only how globalization has affected the level of inflation, but its sensitivity to global shocks. For example, Forbes (2019) shows the greater sensitivity of CPI inflation to factors such as: oil prices, non-oil commodity prices, global slack, and supply chains. As these global shocks drive larger movements in CPI inflation, it has become more difficult to achieve price stability in any given year—for countries with all types of exchange rate arrangements.

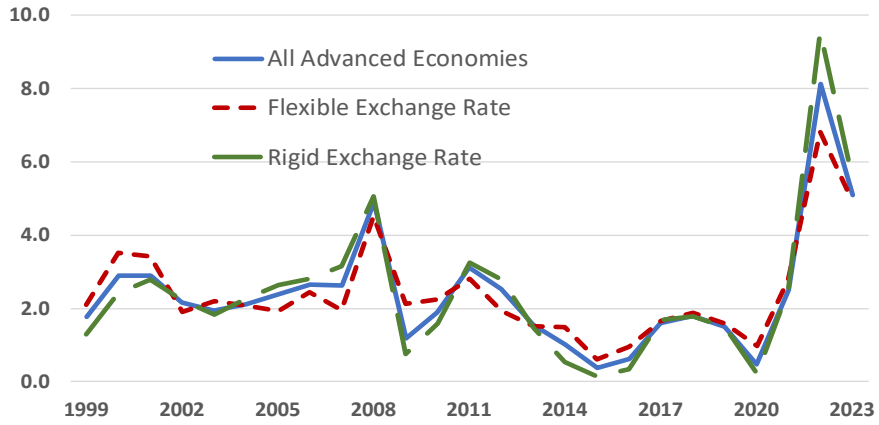
Is it easier to achieve price stability in the face of these large global shocks without some type of anchor for the exchange rate? To help answer this question, the remainder of this paper compares advanced economies with flexible exchange rates versus those with some type of exchange rate anchor (primarily through some type of link to the euro) in terms of: inflation rates, the sensitivity of inflation to a common global factor, and the sensitivity of inflation to specific global shocks.

III. Inflation Rates

As a preliminary look at whether some type of exchange rate "anchor" is important to achieve price stability in the post-Bretton Woods era, I begin with a simple comparison of inflation rates for advanced economies with different exchange rate regimes. Figure 1 graphs average, annual CPI inflation from 1999 through 2022 for a sample of 35 countries, and then the subset of economies with a "rigid" or "flexible" exchange rate regime.[2] Exchange rate regimes are defined based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (2020). An exchange rate is defined as flexible if it is any form of a float (independent float, free float, or managed float with no pre-determined path), and as "rigid" if it is a conventional peg (including a crawling peg), currency board, or no separate legal tender.[3] It is important to highlight that almost all of the advanced economics defined as having a "rigid" exchange rate have a currency linked to the euro (or use the euro) for most of this window, so this is largely a comparison of countries that are part of this European arrangement relative to other parts of the world. Although most of these "rigid" countries had adopted the euro by 2023, however, many started the sample period with different types of "anchors" to the euro—including various types of pegged arrangements and a currency board.[4] The only country in the sample of "rigid" exchange rates that does not have some type of link to the euro is Hong Kong—which maintains a currency board to the US dollar.

The graph shows that the average inflation performance of advanced economies with very different exchange rate regimes is very similar. In fact, the average CPI inflation rate from 1999-2022 was 2.41 for countries with a flexible exchange rate and 2.40 for countries with a rigid exchange rate. In other words, average inflation rates across these two groups was identical to one one-hundredth decimal point.

Figure 1
Average CPI Inflation by Exhange Rate Regime
Advanced Economies



Notes: A rigid exchange rate is defined as a conventional peg, currency board, or no separate legal tender. A flexible exchange rate is defined as any form of a float (independent float, free float, or managed float with no pre-determined path). The sample is the 35 advanced economies listed in Appendix A. Inflation is the annual CPI inflation rate, averaged across countries in the group.

Sources: Exchange rate definitions are based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (2020). Inflation data is from the IMF's *World Economic Outlook* (October, 2022), with forecasts for 2022.

[2] Inflation data is from the IMF's *World Economic Outlook* database (October 2022). Inflation data for 2022 are estimates as of that date. The sample is all advanced economies, based on IMF definitions, but excluding small islands. The sample of countries is in Appendix Table A.

[3] Appendix A lists countries by their exchange rate regime in 2019. In 2019, there are 21 countries with a rigid exchange rate regime, 13 countries with a flexible regime, and 1 (Singapore) that does not fall in either category.

[4] More specifically, Denmark's krone is pegged to the euro, while Cyprus, Estonia, Latvia, Lithuania, Malta, Slovak Republic, and Slovenia had national currencies that were linked to the euro through different arrangements in 1999 and then adopted the euro mid-way through the sample. The dates at which these countries adopted the euro are: Cyprus in 2008, Estonia in 2011, Latvia in 2014, Lithuania in 2015, Malta in 2008, Slovak Republic in 2009 and Slovenia in 2007. See Appendix Table A for the full list of countries.

Focusing on average inflation rates, however, can still miss large deviations of inflation from target if those deviations roughly balance between inflation being too high and too low. Countries that are lacking an "anchor" of through the exchange rate, however, also do not appear to have less stable inflation. If anything, countries with a more rigid exchange regime appear to have somewhat more volatile inflation—with inflation further above 2% targets from 2006-2008 and 2021-2022, but further below 2% from 2013-16 and in 2020. This is supported by calculations of the absolute deviation of inflation from 2% for each group of countries. The average deviation of inflation from 2% is 0.86 for countries with a flexible exchange rate and 1.28 for countries with a rigid exchange rate, i.e., about 50 percent greater for countries that are supposedly more "anchored" through the exchange rate.

These simple comparisons provide no evidence that countries which relinquished any type of exchange rate anchor in the post-Bretton Woods era had worse performance in terms of the level or volatility of CPI inflation.

IV. Inflation Sensitivity to a Shared Global Factor

As a second set of comparisons of countries with and without an exchange rate anchor, this section shifts from comparing the average rate and volatility of inflation to the sensitivity of inflation to shared global factors in today's more integrated global economy.

Forbes (2019) provides a long discussion of how globalization could be affecting the inflation process through increased trade flows, the greater heft of emerging markets and their impact on commodity prices, the greater ease of using supply chains to shift parts of production to cheaper locations, and a corresponding reduction in local worker bargaining power. Analysis in this paper shows that the shared global component of CPI inflation in advanced economies has more than doubled from 27% in 1990-94 to almost 57% in 2015-2017. Forbes (2019) then breaks this shared global component into specific global factors—such as energy prices, non-energy commodity prices, global slack, exchange rate movements and supply chains. This analysis, however, does not test if this shared global component in inflation varies across countries with different exchange rate regimes.

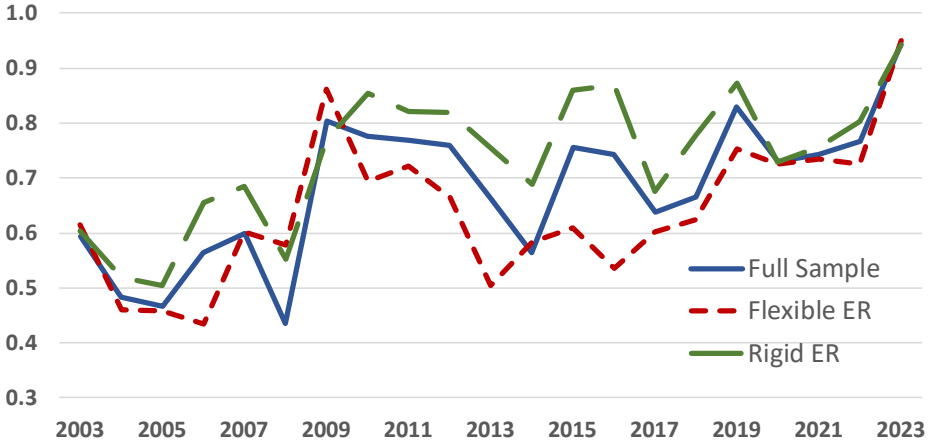
If inflation is increasingly driven by common global shocks, is it more important to have some type of anchor for prices? If large global shocks are more likely to cause inflation to deviate substantially from the inflation target, is it more important to have some mechanism to ensure this does not become embedded in price and wage setting? If so—has an anchor through the exchange rate become more important to achieve price stability in the face of these larger global shocks?

To test if having an "anchor" affects the sensitivity of countries to this shared global component of inflation, I update and improve on the analysis in Forbes (2019). More specifically, I calculate the first principal component of CPI inflation for sets of countries, but instead of calculating it as the average over fixed windows (as in Forbes, 2019), I estimate the first principal component as four-year rolling averages. I also use the same sample (see Appendix A) and CPI inflation data from Section II, which allows me to estimate the principal components through end-2022.[5]

[5] Since the principal components are calculated over four-year rolling averages, the data point for 2003 is the principal component for inflation over the previous four years (1999, 2000, 2001 and 2002); similarly, the data point for 2023 reflects the principal component for inflation over 2019-2022.

Figure 2 shows the resulting estimates of this shared principal component for the full sample of advanced economies, and then just for the subsets of these economies with a flexible exchange rate or more rigid arrangement (i.e., the euro, linked to the euro or Hong Kong's currency board), all using the same definitions as in the last section. The shared global component of CPI inflation has increased over the last 25 years for each set of countries, agreeing with the results in Forbes (2019), with an even more striking increase in the more recent data. The shared global component of inflation for the full sample of advanced economies has increased from about 45-60% of CPI inflation in the mid-2000s, to 94% from 2019-2023. This increased comovement in inflation rates in advanced economies at the end of the sample reflects the impact of the large, common global shocks during the Covid-19 pandemic.

Figure 2
First Principal Component of CPI Inflation
By Exchange Rate Regime in Advanced Economies



Notes: First principal component is calculated as four-year rolling averages, so the statistic for 2003 is the principal component from 1999 through that start of 2003 (i.e., end-2002). A rigid exchange rate is defined as a conventional peg, currency board, or no separate legal tender. A flexible exchange rate is defined as any form of a float (independent float, free float, or managed float with no pre-determined path). The sample is the 35 advanced economies listed in Appendix A. Inflation is the annual CPI inflation rate.

Sources: Exchange rate definitions are based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (2020). Inflation data is from the IMF's *World Economic Outlook* (October, 2022), with forecasts for 2022.

The figure, however, provides no evidence that countries lacking some type of anchor are more vulnerable to this shared global factor. In fact, inflation in countries with flexible exchange rates appears to be less tightly linked to this shared global factor in inflation. The first principal component for countries with more rigid exchange rate arrangements is consistently higher than that for countries with more flexible rates, especially from 2010 through the end of the sample. More specifically, the first principal component explains 74% of inflation for rigid regimes over the full period, as compared to 64% for countries with flexible rates; since 2010, the shared component is 80% for countries with rigid exchange rates and 67% for countries with flexible rates. Granted, this greater comovement for countries with more rigid regimes partly reflects that most of this sample is European countries (that are either in the Euro area or have some type of peg to the Euro), and these countries are more likely to share other common characteristics and be more tightly linked through trade and capital flows as part of a common market.[6]

[6] The only "rigid" country that is not linked to the euro is Hong Kong. Since Hong Kong's currency is tied to the US dollar through its currency board arrangement, and the US dollar is highly correlated with the global financial cycle, it is also not surprising this country is closely linked to the shared global factor.

An additional challenge with this principal component analysis is that it does not provide information on what is driving these different patterns across time and exchange rate regime. A larger principal component, or an increase over time, could be explained by: larger global shocks (e.g., greater commodity price volatility), a greater sensitivity to global shocks (e.g., through global supply chains), stronger direct linkages between economies (e.g., from greater trade or financial integration), or more similarity in other country characteristics (e.g., in their economic structures or policy reaction functions).

V. Inflation Sensitivity to Specific Global Shocks

To further explore what is driving this increased global comovement in inflation rates and any differences linked to the exchange rate regime, this section shifts to directly estimating the impact of specific global shocks on CPI and core inflation.

To begin, I utilize a version of the New Keynesian Phillips curve developed in Forbes, Gagnon and Collins (2022) to analyze inflation in a cross-section of countries. This model builds on the standard, hybrid version of the Phillips curve developed in Galí and Gertler (1999) and Galí and Lopez-Salido (2005), which includes controls for domestic slack, inflation expectations, and lagged inflation. Then it adds controls for a series of more disaggregated global variables and allows for different forms of non-linearity in the relationship between slack and inflation.[7] In the analysis below, I will focus on specifications that include four of these global variables: oil price inflation, non-oil commodity price inflation, world slack, and the growth in global value chains (as originally discussed in Forbes, 2019). I will also focus on a non-linear specification called the "low-inflation bend model," in which the Phillips curve is normally steep but becomes flat when slack is high and inflation is low (as originally discussed in Gagnon and Collins, 2019).

The resulting regressions will therefore take the following form:

$$\pi_{it} = \alpha_i + \beta_1 SLACK_{it}^{D} + \beta_2 SLACK_{it}^{D} \times NL\_DUMMY_{it} + \beta_3 \pi_{it}^{e} + \beta_4 \pi_{it-1}^{4} + \gamma_1 SLACK_{t}^{W} + \gamma_2 POIL_{it}^{W} + \gamma_3 PCOMM_{it}^{W} + \gamma_4 GVC_{t}^{W} + \varepsilon_{it} . \quad (1)$$

Variables are defined as:

- π_{it} is quarterly consumer price index (CPI) inflation or core inflation (CPI excluding food and energy) at a seasonally-adjusted annual rate[8];
- π^{e}_{it} is medium-run inflation expectations, measured by the five-year-ahead forecast for CPI inflation from the International Monetary Fund's (IMF) *World Economic Outlook*;
- π^{4}_{it-1} is a four-quarter average of CPI or core inflation, lagged one quarter;
- $SLACK^{D}_{it}$ is domestic economic slack (the negative of the output gap), measured as the principal component of seven variables;[9]

[7] The estimates reported below use the same data and model as Forbes, Gagnon and Collins (2022), with two changes: the sample only includes advanced economies (to be consistent with the preceding analysis) and the model does not include a control for the real exchange rate (to better test for the role of exchange rate regimes).

[8] Adjustments are also made for several large VAT increases: Australia in 2000q3, Japan in 1997q2 and 2014q2, New Zealand in 2010q4, and United Kingdom in 2010q1 and 2011q1.

[9] This builds on Albuquerque and Baumann (2017) and Hong et al. (2018), which show the importance of measuring different dimensions of slack. The principal component is calculated following Forbes (2019), which uses three "gaps" based on OECD data (for output, unemployment, and participation) and four "gaps" calculated using data from Hong

- NL_DUMMY_{it} is a dummy variable to capture nonlinearities; this dummy equals 1 when slack is positive and inflation is low, and 0 otherwise (to generate the "low-inflation bend model");[10]
- $SLACK^{W}_{t}$ is world economic slack, measured as a weighted average of the estimated output gap in advanced economies and China;
- $POIL^{W}_{it}$ is the quarterly annualized change in world oil prices (from Datastream) relative to country *i*'s CPI inflation;
- $PCOMM^{W}_{it}$ is the quarterly annualized change in world nonfuel commodity prices (from Datastream) relative to country *i*'s CPI inflation;
- GVC^{W}_{t} is the principal component of four variables capturing the growth in global value chains;
- α_i refers to the coefficients on a full set of country fixed effects.[11]

The regression sample includes a cross-section of 27 advanced economies from 1996Q1 through 2017Q4 (using 1995 data for initial lagged inflation).[12]

Table 1 reports a series of results for equation (1) estimating CPI inflation. Column (1) shows results for the standard New Keynesian model (without controls for global variables and without any nonlinearity in the relationship with slack). Column (2) adds the four global variables, and column (3) adds the dummy variable to allow the relationship with slack to change for countries with positive slack (i.e., an output gap) and low inflation. In each of these specifications, coefficients have the expected sign and are usually significant. Countries have significantly higher inflation if they have less slack, higher lagged inflation, or higher inflation expectations. The relationship with slack is nonlinear and close to zero when there is positive slack and low inflation, but otherwise the Phillips curve is steep. Inflation is also significantly higher when there is higher inflation in oil prices and non-oil commodity prices, and significantly lower when there is more world slack and faster growth in global value chains.

Next, shifting to the main focus of this paper, columns (4) and (5) test if a country's exchange rate regime affects its sensitivity to the four global variables. These specifications include an interaction term for each of the global variables with a dummy equal to one if the country has a flexible exchange rate (column 4) or a rigid exchange rate (column 5).[13] These new estimates at the bottom of Table 1 (in bold) are striking in that almost all are insignificant. This suggests that countries with a flexible exchange rate are not significantly more affected by the global shocks that affect inflation in the full set of countries. As a cross-check, countries with more rigid exchange rate regimes were also not impacted in a significantly different way. The only variable that is occasionally significant is for the interaction of global value chains with the flexible exchange rate dummy; this positive coefficient is equal in value, but of opposite

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et al. (2018) as percent deviations from the "normal" level (for hours worked per person employed, the share of involuntary part-time workers, the share of temporary workers, and the share of self-employed workers).

[10] We define inflation as low when it is less than 3%, but Forbes et al. (2022) shows that the results are robust to using thresholds ranging from 2-4%.

[11] The four variables in the principal component are: (1) relative growth of merchandise trade volumes relative to global GDP; (2) traded intermediate goods as a share of global GDP; (3) share of these traded intermediate goods that are "complex" in the sense that they cross country borders at least twice; and (4) the dispersion in PPI indices. The first three components are from Li, Meng and Wang (2019) and the fourth is based on OECD data.

[12] The country sample is the same as in the previous sections (see Appendix A), except excludes eight countries due to data limitations: Cyprus, Estonia, Hong Kong, Lithuania, Malta, Singapore, Slovenia and South Korea.

[13] Exchange rate regimes are based on the fine classifications in Ilzetzki et al. (2019), with flexible exchange rates defined as classifications 10-13 and rigid exchange rates as classifications 1-4. The analysis in earlier sections of the paper used the IMF's AREAR to classify exchange rate regimes in order to have more updated classifications than available in Ilzetski et al. (2019).

sign, to the coefficient on global value chains for the full sample. This indicates that global value chains had no significant impact on inflation in countries with flexible exchange rates (but lowered inflation in countries with rigid rates).

Table 1
Phillips Curve Regressions of Headline CPI Inflation

	(1) Standard	(2) + Global Variables	(3) + Nonlinear PC Term	(4) + Flexible ER Interactions	(5) + Rigid ER Interactions
Domestic Slack	-0.22***	-0.17***	-0.33***	-0.33***	-0.33***
	(0.04)	(0.05)	(0.08)	(0.07)	(0.07)
Non-linear PC Term			0.39***	0.41***	0.41***
			(0.11)	(0.10)	(0.11)
Inflation Expectations	0.81***	0.71***	0.74***	0.76***	0.74***
	(0.13)	(0.14)	(0.13)	(0.15)	(0.14)
Lagged Inflation	0.40***	0.45***	0.48***	0.47***	0.47***
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
World Slack		-0.10**	-0.11*	-0.15**	-0.08
		(0.05)	(0.05)	(0.06)	(0.06)
World Oil Prices		0.03***	0.04***	0.04***	0.04***
		(0.00)	(0.00)	(0.00)	(0.01)
Nonfuel Commodity Prices		0.05***	0.05***	0.05***	0.04***
		(0.01)	(0.01)	(0.01)	(0.01)
Global Value Chains		-0.08**	-0.11***	-0.20***	-0.05
		(0.04)	(0.04)	(0.06)	(0.04)
Intercept	-0.41*	-0.36	-0.78***	-0.81***	-0.52
	(0.23)	(0.23)	(0.23)	(0.22)	(0.38)
World Slack * ER Dummy				**0.08**	**-0.04**
				(0.07)	**(0.06)**
World Oil Prices * ER Dummy				**-0.00**	**0.00**
				(0.01)	**(0.01)**
Nonfuel Commodity Prices * ER Dummy				**-0.00**	**0.00**
				(0.02)	**(0.02)**
Global Value Chains * ER Dummy				**0.20****	**-0.11**
				(0.08)	**(0.06)**
ER Dummy				0.01	-0.43
				(0.21)	(0.36)
R-squared	***0.269***	***0.351***	***0.366***	***0.370***	***0.368***
Observations	***2342***	***2342***	***2342***	***2342***	***2342***
Countries	***27***	***27***	***27***	***27***	***27***

Notes: Regressions of CPI inflation (quarterly, seasonally adjusted) from 1996q1-2017q4. Sample is 27 advanced economies. ER Dummy is equal to 1 if country has a flexible exchange rate in column (4) or rigid exchange rate in column (5). The "Nonlinear PC term" is a dummy equal to 1 if domestic slack is positive and CPI inflation is less than 3%. A country is defined as having a flexible exchange rate if it is classified in regime 10 – 13, or having a rigid exchange rate if it is classified in regime 1-4, all according to the fine classifications in Ilzetski et al. (2019). See text for other variable definitions. All estimates have robust standard errors in parentheses, with * p < 0.10, ** p < 0.05, *** p < 0.01.

These results suggest that CPI inflation is not more sensitive to global shocks in countries lacking some type of an exchange rate anchor. But does this apply to core inflation (excluding food and energy prices)? Movements in core inflation tend to be more persistent, and central banks are more concerned if a global shock becomes embedded in core than in the more volatile CPI inflation.

To test this, Table 2 replicates the analysis from Table 1, except replaces CPI inflation with core inflation.[14] The results in columns (1) – (3) without controls for the exchange rate regime agree with those in Forbes et al. (2019). Countries have higher core inflation if they have: higher inflation expectations, higher lagged inflation, and less slack, with the effect of slack nonlinear and close to zero for countries with positive slack and low inflation. The new results in columns (4) and (5) that also

[14] The specification follows Forbes (2019) and Forbes et al. (2022) by combining commodity prices into one variable instead of breaking out the individual effects of oil and non-oil prices.

control for the exchange rate regime are very similar to the results for CPI inflation. Countries with a flexible (or rigid) exchange rate regime do not have a significantly different sensitivity of inflation to global shocks, except for sensitivity to changes in global value chains (to which countries with more rigid regimes are more sensitive).

Table 2
Phillips Curve Regressions of Core CPI Inflation

	(1) Standard	(2) + Global Variables	(3) + Nonlinear PC Term	(4) + Flexible ER Interactions	(5) + Rigid ER Interactions
Domestic Slack	-0.18***	-0.17***	-0.26***	-0.26***	-0.26***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Non-linear PC Term			0.25***	0.27***	0.27***
			(0.04)	(0.04)	(0.04)
Inflation Expectations	0.78***	0.77***	0.76***	0.77***	0.76***
	(0.17)	(0.17)	(0.15)	(0.16)	(0.15)
Lagged Inflation	0.49***	0.50***	0.53***	0.52***	0.52***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)
World Slack		-0.03	-0.03	-0.08	-0.00
		(0.04)	(0.04)	(0.05)	(0.05)
World Commodity Prices		0.01**	0.01*	0.01*	0.01
		(0.01)	(0.01)	(0.01)	(0.01)
Global Value Chains		-0.00	-0.02	-0.10*	0.04
		(0.03)	(0.03)	(0.05)	(0.03)
Intercept	-0.64**	-0.63**	-0.86***	-0.88***	-0.70**
	(0.30)	(0.28)	(0.28)	(0.29)	(0.33)
World Slack * ER Dummy				**0.09**	**-0.06**
				(0.06)	**(0.07)**
World Commodity Prices * ER Dummy				**-0.01**	**0.01**
				(0.01)	**(0.01)**
Global Value Chains * ER Dummy				**0.18****	**-0.12****
				(0.06)	**(0.06)**
ER Dummy				-0.02	-0.30
				(0.18)	(0.33)
R-squared	***0.371***	***0.374***	***0.382***	***0.386***	***0.384***
Observations	***2342***	***2342***	***2342***	***2342***	***2342***
Countries	***27***	***27***	***27***	***27***	***27***

Notes: Regressions of core CPI inflation (quarterly, seasonally adjusted) from 1996q1-2017q4. Sample is 27 advanced economies. ER Dummy is equal to 1 if country has a flexible exchange rate in column (4) or rigid exchange rate in column (5). The "Nonlinear PC term" is a dummy equal to 1 if domestic slack is positive and CPI inflation is less than 3%. A country is defined as having a flexible exchange rate if it is classified in regime 10 – 13, or having a rigid exchange rate if it is classified in regime 1-4, all according to the fine classifications in Ilzetski et al. (2019). See text for other variable definitions. All estimates have robust standard errors in parentheses, with * p < 0.10, ** p < 0.05, *** p < 0.01.

This series of results suggests that inflation in countries with flexible exchange rates is not more sensitive to changes in oil prices, non-oil commodity prices, world slack, or global value chains. There are a number of ways in which the exchange rate regime could interact with global shocks—with the direction of the effect unclear. For example, if countries do not have some type of anchor to stabilize prices, then sharp movements in inflation from global shocks could be more likely to become engrained in price and wage setting, leading to larger deviations of inflation from targets. On the other hand, countries with more flexible exchange rates could experience currency movements that partially counteract the impact of global shocks on inflation, leading to smaller deviations of inflation from targets. Testing these specific channels is beyond the scope of this chapter, but these results suggest that despite the large and growing role of global shocks in inflation dynamics, these shocks have not undermined price stability by more in advanced economies that have adopted flexible exchange rates (as compared to those that have maintained some type of exchange rate anchor).

VI. Conclusions

Fifty years after the breakdown of the Bretton Woods system of exchange rates linked to gold, have countries found a way to stabilize prices without some type of anchor for the exchange rate? The analysis in this paper is a resounding yes—at least for advanced economies. Although all advanced economies abandoned exchange rate regimes anchored to gold, some opted for new anchors (primarily through some type of link to the euro), while others opted to allow their exchange rates to float freely. The countries that opted to allow their exchange rates to float have not experienced more price instability than countries that have maintained some type of anchor. Countries with floating exchange rates have averaged the same rate of inflation since 1999 as countries with more rigid regimes and experienced smaller (instead of larger) deviations from 2 percent inflation targets. Countries with floating exchange rates are no more sensitive to the shared global component in CPI inflation, and not significantly more sensitivity to individual global shocks—such as from oil prices, non-oil commodity prices, world slack, and global value chains. In fact, the analysis above suggests that countries with flexible exchange rates may have had slightly greater price stability—such as in their deviation of inflation from two percent and in their sensitivity to shared global movements in inflation and global value chains—although this primarily reflects differences between countries that are currently in the Euro area versus non-European countries.

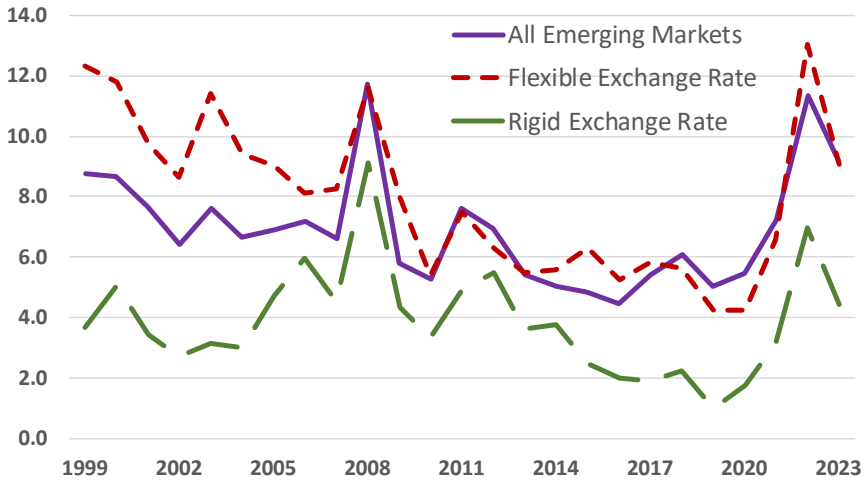
Advanced economies—whatever their exchange rate regime—appear to have found a new anchor – independent, inflation-targeting central banks. Central banks in these countries have been able to provide price stability, even in the presence of large global shocks that have frequently driven inflation from targets.

These results, however, are subject to one important caveat: they may only apply to the advanced economies included in this analysis. Many emerging markets and developing economies have been less successful at keeping inflation around their targets and experienced more price volatility. Simple comparisons of inflation rates in this group of countries suggest the exchange rate regime may be more correlated with price stability than in advanced economies.

For example, Figure 3 replicates the analysis in Figure 1, except with a large sample of 130 emerging markets and developing economies.[15] Countries with more rigid exchange rates consistently had lower inflation, and inflation closer to the 2%-4% targeted in many emerging markets and developing economies. The average absolute deviation of inflation from 2% was about 6% for the economies with flexible exchange rates, versus only 2% for those with rigid exchange rates. This is a sharp contrast to Figure 1 for advanced economies, which showed no meaningful difference in inflation rates between countries with flexible versus more rigid exchange rate arrangements, and a smaller deviation from 2% for those with flexible rates.

[15] The sample is all countries in the IMF's *World Economic Outlook* (Oct. 2022) that are not classified as an advanced economy and have data on inflation and the exchange rate regime.

Figure 3
Average CPI Inflation by Exchange Rate Regime
Emerging Markets and Developing Economies



Notes: A "rigid" exchange rate is defined as a conventional peg, currency board, or no separate legal tender. A "flexible" exchange rate is defined as any form of a float (independent float, free float, or managed float with no pre-determined path). The sample is 130 emerging or developing economies (based on IMF definitions) . Inflation is the annual CPI inflation rate, averaged across countries in the group.

Sources: Exchange rate definitions are based on the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (2020). Inflation data is from the IMF's *World Economic Outlook* (October, 2022), with forecasts for 2022.

Fifty years after the breakdown of the Bretton Woods system, advanced economies seem to have successfully replaced the anchor of "gold" with that of the "stone columns" that frequently grace the facades of independent central banks. This is an impressive achievement given the increased role of global shocks in driving movements in inflation.. Many emerging markets have also made noteworthy progress in being able to use monetary policy countercyclically, e.g., being able to lower interest rates to support incomes and employment in response to negative shocks without undermining price stability (see English et al., 2021 and Ha et al., 2019). Nonetheless, the progress in emerging markets and developing nations has been less consistent, and at least some countries in this group still have work to do to establish price stability. On a more positive note, the experience of the advanced economies suggests that price stability can be established in this group of countries in the absence of a golden anchor and through a variety of exchange rate mechanisms.

Appendix Table A

Countries by Exchange Rate Classification in 2019

Floating Exchange Rate	Rigid Exchange Rate		Other
Australia	Austria	Lithuania	Singapore
Canada	Belgium	Luxembourg	
Czech Republic	Cyprus	Malta	
Iceland	Estonia	Netherlands	
Israel	Denmark	Portugal	
Japan	Finland	Slovak Republic	
New Zealand	France	Slovenia	
Norway	Germany	Spain	
South Korea	Greece		
Sweden	Hong Kong		
Switzerland	Ireland		
United Kingdom	Italy		
United States	Latvia		

Notes: A "rigid" exchange rate is a conventional peg, currency board, or no separate legal tender. A "flexible" exchange rate is any form of a float (independent float, free float, or managed float with no pre-determined path). The sample is 35 advanced economies, based on IMF definitions, and excluding small island nations. Most of the countries defined as having a rigid exchange rate had adopted the euro by 2019. The two exceptions are: Denmark (with the krone pegged to the euro) and Hong Kong (with a currency board to the US dollar). Many of the other countries in this group, however, did not have the euro as legal tender at the start of the sample, with different arrangements linking their national currencies to the euro over the sample period. The dates at which these countries adopted the euro are: Cyprus in 2008, Estonia in 2011, Latvia in 2014, Lithuania in 2015, Malta in 2008, Slovak Republic in 2009 and Slovenia in 2007.

Sources: Exchange rate definitions are based on the International Monetary Fund's *Annual Report on Exchange Arrangements and Exchange Restrictions* (2020).

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