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A HISTORICAL ANALYSIS

by Isabel Vansteenkiste

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In 2009 all ECB publications feature a motif taken from the €200 banknote.

1 The views expressed in this paper are those of the author and do not necessarily reflect those of the European Central Bank (ECB). All errors in this paper are the sole responsibility of the author. The author wishes to thank Marcel Fratzscher for useful comments and suggestions.

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CONTENTS

Abstract

This paper empirically assesses which factors trigger prolonged periods of inflation for a sample of 91 countries over the period 1960-2006. The paper employs pooled probit analysis to estimate the contribution of the key factors to inflation starts. The empirical results suggest that for all cases considered a more fixed exchange rate regime and lower real policy rates increase the probability of an inflation start. For developing countries, other relevant factors include food price inflation, the degree of trade openness, the level of past inflation, the ratio of external debt to GDP and the durability of the political regime. For advanced economies, these factors turn out to be statistically insignificant but instead a positive output gap, higher global inflation and a less democratic environment were seen to be detrimental for triggering inflation starts. Finally, oil prices, M2 growth and government spending were never statistically significant.

Keywords: Panel Probit, Inflation, emerging markets.

JEL Classification: E31, E58.

Non-technical summary

It is generally perceived that inflation oils the wheels of the economy. However, too much oil can flood the engine. Indeed, while a little inflation is generally perceived to be a good thing for the economy, periods of high or hyper-inflation are seen to have negative repercussions which could cripple an economy as they lead to uncertainty, shorter planning horizons and possibly even a diversion of resources away from production. As a result, for policy makers, it is important to keep inflation at a low and stable level. In order to avoid future prolonged inflation episodes from occurring it can be important for policy makers to study the factors that have triggered inflation regimes in the past. Research on this topic has already been substantial and the literature generally has come up with a wide variety of explanations as to what starts an inflation episode. These explanations include inter alia policy mistakes; increases in oil and food prices; political factors; the international transmission of inflation, fiscal policy and the exchange rate regime choices.

In this paper, we present results from an empirical study of events associated with starts of prolonged inflation regimes in 91 countries, of which 63 developing countries and 28 advanced economies for the period 1960-2006. Such a broad-brush approach of pooling together countries is intended to complement the many previous analyses of inflation dynamics that have typically focussed on the experience of individual countries or a small group of them.

The empirical methodology, a pooled probit analysis, identifies predictors of turning points in inflation. The study is similar to the one conducted by Boschen and Weise (2003) for OECD countries and Domac and Yücel (2005) for emerging market economies, however, our sample period is longer (we include for all these economies information from 1960 to 2006) and we consider a wider range of variables and countries. As such our analysis provides a more complete analysis of possible factors that may have triggered prolonged periods of inflation and we are able to test whether the results are different across various groups of countries (for instance advanced versus emerging market economies) and over time.

What emerges from our study is that the origins of inflation episodes lie in a combination of policy mistakes, global shocks and structural factors. In more detail, too loose monetary policy and a fixed exchange rate regime, significantly increase the probability that a country will enter into a prolonged period of rising inflation. Increases in food prices have in the past also contributed to inflationary episodes and finally structural features of the economy, such as lower trade openness and a less democratic or shorter-lived political regimes, may also lead to a higher likelihood of an inflation episode taking off.

While the above-mentioned factors increase the probability that an inflation episode will take place, several other possible explanations were not supported in our analysis. First oil price shocks, while probably aggravating inflation, were not the triggering events for inflation episodes. Fiscal policy, money growth, and the terms of trade were also not correlated with inflation starts. However, at the same token, our results do not prove that these factors were not important in individual episodes or cannot be a factor in future episodes, only that they did not have systematic effects in our sample of inflation episodes.

1 Introduction

It is generally perceived that inflation oils the wheels of the economy. However, too much oil can flood the engine. Indeed, while a little inflation is generally perceived to be a good thing for the economy, periods of high or hyper-inflation are seen to have negative repercussions which could cripple an economy as they lead to uncertainty, shorter planning horizons and possibly even a diversion of resources away from production. As a result, for policy makers, it is important to keep inflation at a low and stable level. In order to avoid future prolonged inflation episodes from occurring it can be important for policy makers to study the factors that have triggered inflation regimes in the past. Research on this topic has already been substantial and the literature generally has come up with a wide variety of explanations as to what starts an inflation episode. These explanations include inter alia policy mistakes (see Taylor, 1992, 1997, De Long, 1997 and Sargent 1999); increases in oil and food prices (Blinder, 1982); political factors (Nordhaus, 1975, Lindbeck, 1976, Rogoff and Sibert, 1988, Hibbs, 1977 and Alesina, 1988); fiscal policy (Calvo, 1988, Friedman, 1994); the exchange rate regime (Mohanty and Klau, 2001) and the international transmission of inflation (Cassese and Lothian, 1982, Darby, 1983, Canzoneri and Gray, 1985, Turnovsky, Basar, and d 'Orey, 1988).

In this paper, we present results from an empirical study of the events associated with starts of prolonged inflation regimes in 91 countries, of which 63 developing countries and 28 advanced economies for the period 1960-2006. Such a broad-brush approach of pooling together countries is intended to complement the many previous analyses of inflation dynamics that have typically focussed on the experience of individual countries or a small group of them.

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What emerges from our study is that the origins of inflation episodes lie in a combination of policy mistakes, global shocks and structural factors. In more detail, too loose monetary policy and/or a fixed exchange rate regime, significantly increase the probability that a country will enter into a prolonged period of rising inflation. Increases in food prices have in the past also contributed to inflationary episodes and finally structural features of the economy, such as lower trade openness and a less democratic or shorter lived political regimes, may also lead to a higher likelihood of an inflation episode taking off.

While the above-mentioned factors increase the probability an inflation episode will take place, several other possible explanations were not supported in our analysis. First oil price shocks, while probably aggravating inflation, were not the triggering events for inflation episodes. Fiscal policy, money growth, and the terms of trade were also not correlated with inflation starts. However, our results do not prove that these factors were not important in individual episodes or cannot be a factor in future episodes, only that they did not have systematic effects in our sample of inflation episodes.

The remainder of the paper is organised as follows. In section 2, we present an overview of the existing literature. Section 3 presents the data an stylised facts. Section 4 discusses the empirical model and the estimation results. Section 5 concludes.

2 Literature survey

Inflation and price stability provide a recurrent topic for articles in the academic literature. Especially since the disturbing experience with seemingly run-away inflation in the mid and late 1970s in many developed economies and the episodes of hyperinflation in some developing economies, the main themes have been the desirability of price stability and early warnings against (perceived) inflationary developments. As a result, the nature of the mechanisms underlying the dynamics of inflation has been extensively discussed. A quick glance at the literature points to various sources of inflation regimes. Here we group the various factors that could trigger inflation episodes into 7 categories.

First, increased *levels of public debt and deficit* have long been considered an important factor in triggering inflation episodes. Friedman (1994) expresses the view that expansionary fiscal policy has generated inflation in the US by encouraging overly expansionary monetary policy. Such imbalances can lead to an increase in inflation either by triggering higher money growth, as in Sargent and Wallace (1981), or by triggering a balance of payments crisis and forcing an exchange rate depreciation, as in Leviathan and Piterman (1986). The interaction between inflation and the government budget constraint is also stressed in Razin and Sadka (1987) and Bruno and Fischer (1990). In spite of the theoretical links, the empirical evidence concerning the link between fiscal deficits and inflation has been rather elusive. At the level of any particular country, it may be difficult to establish a clear short term link between fiscal deficits and inflation. In fact, the correlation may be even negative during extended periods of time. Evidence suggests that the existence of a positive correlation in the long run is also not a clear-cut phenomenon (Agenor and Montiel 1999). For instance, Fischer et al. (2002) find that the relationship between fiscal deficit and inflation is only strong in high inflation countries—or during high inflation episodes—but they find no obvious relationship between fiscal deficits and inflation during low inflation episodes or for low inflation countries. A recent study by Catão and Terrones (2001), however, was successful in relating long-run inflation to the permanent component of the fiscal deficit scaled by the inflation tax base, measured as the narrow money to GDP ratio. Their findings suggest that a 1 percent reduction in the fiscal deficit to GDP ratio typically lowers inflation by 1.5 to 6 percentage points depending on the size of the money supply.

In contrast to the "fiscal" view of inflation, the *"balance of payment" view* emphasises the role of the exchange rate in the determination of domestic prices. Conventional wisdom holds that countries that are prone to large external shocks should allow their exchange rate to move to correct the external imbalances. An important consequence of opting for a flexible exchange rate is that domestic prices are partly determined by the exchange rate. As a first-round effect, movements in the exchange rate directly affect inflation by changing the domestic currency price of imports. The second-round effect depends on how this initial shock is transmitted into other sectors through changes in costs and inflation expectations. Where the authorities opt for a fixed exchange rate regime, the exchange rate, of course, has no impact on inflation. In fact, the burden of adjustment to external shocks falls on fiscal policy. Empirical evidence is, however, ambiguous on whether a fixed or a flexible exchange rate leads to lower inflation. Some cross-sectional studies show that inflation is lower under pegged exchange rate regimes than under flexible regimes (Edwards, 1993 and Ghosh et al. 1995). But this result is typically true of fixed regimes that were not subjected to frequent adjustments. Others have attributed this result to lower rates of monetary growth in the fixed exchange regimes or what is called a "monetary disciplining effect" of the regime, and

to the fact that a part of excess money growth may appear as a balance of payments deficit in the absence of an offsetting change in the exchange rate (Fielding and Bleaney (2000)). The latter effect is, however, only temporary since the external deficit will eventually require a correction. Ultimately, the inflationary impacts of a fixed exchange rate regime depend on the credibility of the regime, particularly in the context of an open capital account and financial imperfections such as a weak banking system (Kaminsky and Reinhart, 1999). Others argue that the inflationary consequences of the exchange rate depend on the nature of external shocks – temporary or permanent – and whether or not a real depreciation is warranted (Chang and Velasco, 2000). As Siklos (1996) concludes, countries with fixed regimes often experience higher, rather than lower, average inflation because the regimes are not credible. On the other hand, Quirk (1994) argues that differences attributed to the various exchange rate regimes tend to narrow once adjustments are made for the influence of other factors. The country experiences, nevertheless, show that, irrespective of regime, the exchange rate is an important determinant of inflation, in particular in emerging market economies (Kamin and Klau, 2001).

A sound fiscal balance and the appropriate exchange rate regime, though important elements, are not however, sufficient conditions to rein in inflation. Indeed, other factors can be a trigger of inflation.

One of them is the *rate of wage inflation and the extent to which inflation persists*. Inflation persistence stems from both backward looking inflation expectations and indexation of wages and prices to past inflation. Thus, stopping high inflation has typically involved efforts to break the mechanisms that give inflation its own momentum (Sargent, 1982). In the case of high- to mederate-inflation economies, Dornbusch and Fischer (1993) note two specific features that could produce such effects. First, indexation encourages longer-term contracts, which make the inertia effect particularly strong. Second, the wage indexation mechanism may play a role in the transmission of exchange rate movements to inflation, since the frequency with which wages are revised tends to increase when the inflationary pressures are driven by exchange rate depreciation (Leviathan and Piterman (1986)). This has been an important factor in the inflation episodes of some of the Latin American and transition economies, where devaluation-induced inflation has had higher persistence effects than inflation driven by domestic factors.

Another important factor is role that *relative prices* play in the inflation process. In classical models of inflation, relative price changes do not affect aggregate inflation, since industry level price variations are expected to be mutually offsetting in nature; only aggregate demand changes have implications for the rate of inflation. However, the role of relative prices in inflation has received increasing attention since Ball and Mankiw (1994 and 1995) demonstrated that firms react differently to a large price shock than to a small price shock. Since firms face costs in adjusting prices they would react to a large shock by revising prices but ignore small shocks. Hence the impact of a relative price shock on inflation depends on its distribution: the more it is skewed to either side the greater the impact on the overall inflation. In addition, the size of the overall price impact, even if the shock is only temporary, depends on how important the sector in question is for overall consumer inflation. For example, food and energy account for a relatively larger share of the consumer price index. A sharp rise in prices of these commodities not only raise short run inflation, by virtue of their high weight in the consumer price index, but can also lead to a sustained rise in the inflation rate if it raises inflation expectations.

Inflation could however also be the result of *an overheating economy*. Whatever its cause,

excess demand arises if monetary growth remains higher than needed to support growth. A straightforward implication of this is that inflation will rise until real demand falls to the level consistent with potential output. As a result, changes in the output gap, should, therefore explain most of the policy-driven changes in inflation.

Political determinants of inflation have also received considerable attention in the literature. Political business cycle models developed by Nordhaus (1975) and Lindbeck (1976) envision that central banks pursue an expansionary monetary policy in the period leading up to an election in order to increase the governing party's chances for reelection. The empirical evidence on the political business cycle hypothesis is mixed. McCallum (1978) and Alesina (1988) reject the hypothesis. A recent study by Alesina and Roubini (1997) finds that while elections have no impact on output and unemployment, they do affect inflation. Political underpinnings of inflation remain closely linked with two competing schools of thought: populist approaches and state-capture approaches. The variants of existing theories under the umbrella of the populist view put forward that in the presence of conflicts over the distribution of economic gains and losses, politicians responding to public demands increase government expenditures by resorting to inflationary finance. In light of this conjecture, the populist view asserts that inflation is less likely if governments with consolidated, autonomous—even dictatorial—powers can avoid these pressures (Nelson 1993; Haggard and Kaufmann 1992; O'Donnell et al. 1986). State-capture approaches, on the other hand, contend that price instability is not a result of demand for inflationary financing by the public, but by incumbent politicians and their elite patrons, who receive at least two kinds of private benefits from money creation (Hellman et al. 2000). First, credits issued by the central bank can be directed to favored firms or sectors either directly or through the commercial banks. Second, resulting inflation lowers real interest rates and erodes the real value of outstanding liabilities— both the loans held by borrowers and the deposits held by banks—that have to be repaid.

Empirical evidence also indicates that average rates of inflation are significantly lower in more *open economies*. Romer (1993) has argued that this arises from the fact that unanticipated monetary expansions cause real exchange rate depreciations, and since the harms of real depreciations are greater in more open economies, the benefits of surprise inflation are a decreasing function of the degree of openness. Lane (1995) however argues that Romer's explanation of the influence of openness on inflation is a limited one, because it applies only to countries large enough to affect the structure of international relative prices. He claims the openness-inflation relations is rather due to imperfect competition and nominal price rigidity in the nontraded sector. The idea is that a surprise monetary expansion, given predetermined prices in the nontraded sector, increases production of nontradables. This expansion is socially beneficial because of the inefficient monopolistic underproduction in the nontraded sector in the equilibrium before the shock. The more open an economy, the smaller is the share of nontradables in consumption and the less important the correction of the distortion in that sector. Assuming the existence of a government that cares about social welfare, this generates an inverse relationship between openness and the incentive to unleash a surprise inflation, even for a country too small to affect its terms of trade. Lane shows that the inverse relationship between openness and inflation is strengthened when country size is held constant; that is, independent of the size of the country, openness impacts negatively on inflation, consistent with the small country explanation of the relationship advanced in his paper. The result is robust to the inclusion of other control variables, such as per capita income, measures of central bank independence and political stability.

Finally, one earlier strand of the literature was concerned with how *US inflation* was trans-

mitted abroad under the Bretton Woods system of fixed exchange rates. Brunner and Meltzer (1977), Cassese and Lothian (1982), and Darby (1983) found evidence of the international transmission of inflation from the U.S. during the Bretton Woods period. Canzoneri and Gray (1985) and Turnovsky, Basar, and d'Orey (1988) have developed models in which expansionary policies abroad could cause the home country to inflate even in a flexible exchange rate regime.

While, as the discussion in this section shows, a wide range of papers touch in some way on the topic of this paper, two empricial studies are closest to our analysis. Both papers relied on a panel probit model to test for a range of explanatory variables. For OECD economies,. Boschen and Weise (2003) performed the analysis over the period 1960-1994 and considered 6 competing explanations for inflation starts: policy mistakes, time consistent monetary policy and the Phillips curve, price shocks, the political business cycle, fiscal policy and international transmission of inflation. The results of the paper suggest that the policy mistake hypothesis, coupled with the international transmission of inflation and elections are important features that trigger outbreaks of inflation across the countries studied. At the same time, however, some other factors turn out to be insignificant, namely increases in the natural rate of unemployment, oil and food price shocks, government debt policy and the political orientation of the ruling party.

Considering 24 inflation episodes in 15 emerging market economies between 1980 and 2001, Domac and Yücel (2004) performed a similar analysis. In this paper, the authors consider the following possible drivers of inflation starts: the output gap, the change in food production, the change in oil prices, political factors and capital flows. All factors, except the change in the oil price, appear to be statistically relevant for triggering inflation episodes.

3 Data and stylised facts

3.1 Defining the prolonged inflation regimes

Prior to proceeding with the empirical investigation, it is important to clarify the definition of a prolonged inflation episode. To this end, we rely on Ball (1994) and Boschen and Weise (2003) and start by constructing a series for trend inflation by calculating the 36 month moving average of the monthly consumer price inflation rate.[1] Next, we turn to the determination of trough and peak dates of inflation, which are identified as dates at which trend inflation is lower (higher) than in the preceding and succeeding year. An inflation episode is then defined as a period of time over which trend inflation (as measured in month-on-month changes) rises by at least 1 percent from trough to peak and which is preceded by four or more quarters of stable or declining trend inflation. In this paper, we determine inflation episodes over the period January 1960-January 2008 for 91 countries, of which 63 are emerging or developing economies (for a detailed description of the countries and the source of the data, see Appendix A and B).

Applying the methodology described above, we find in total 147 inflation episodes.[2] Following Boschen and Weise (2003), we define the start date for an inflation episode as the year

[1] We also ran the regressions defining the inflation episode as periods in which trend inflation rises by at least 1 percent from trough to peak whereby trend inflation is defined as the 48 month moving average of the monthly consumer price inflation rate. This did not substantially change the main conclusions of the paper.

[2] Note that we did not include inflation episodes here in the discussion which are still on-going.

Table 1: Summary Statistics for Inflation Episodes

	full sample	60s	70s	80s	90s	00s
number of episodes	147	20	53	38	27	9
length (months)	55	83	61	42	41	46
initial inflation rate	10.50	3.07	5.14	19.93	15.44	3.96
ending inflation rate	68.75	42.99	35.50	157.34	44.19	21.47
rise in inflation	58.25	39.92	30.36	137.41	28.76	17.51

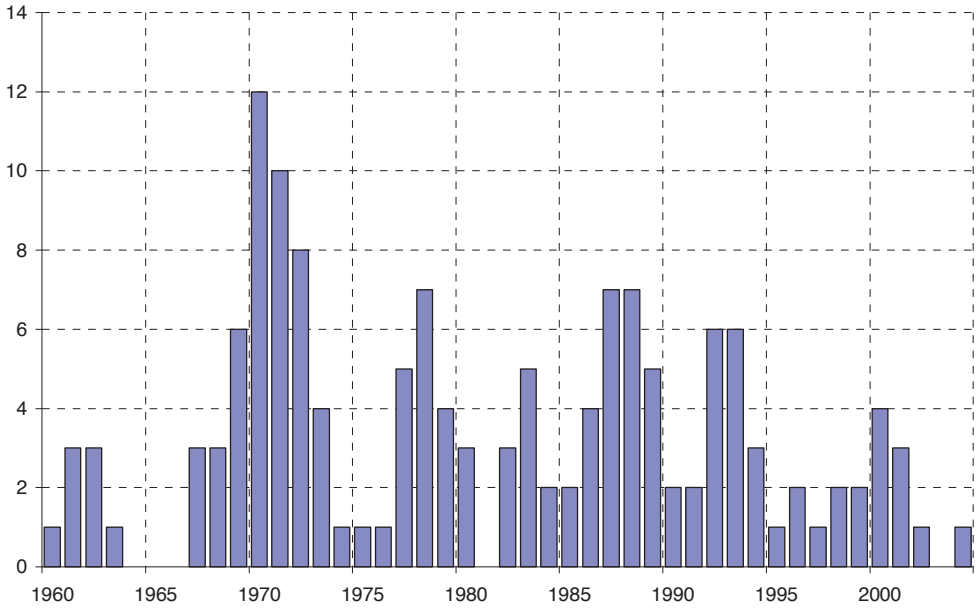

Figure 1: Number of inflation episode starts per year

following the year in which the trough took place. Table 1 and Figure 1 present the summary statistics for the inflation episodes. As can be seen in the table, over the full sample, the average length of an inflation episode is roughly 55 months (so nearly 3 years), and 139 of them last for more than 24 months. The average rise in inflation, from trough to peak, is about 58 percent (in year-on-year terms). However, the average length of the inflation episode and rise in inflation has changed significantly over time. Indeed, in the sixties, there were few inflation episodes but they tended to last long (on average around 7 years) but with the average increase only 40% (so below the sample average). The highest average number of inflation episodes occurred in the seventies (with 12 episodes starting in 1970 only). However, the average rise in inflation was higher during the eighties; Being around 137% in year-on-year terms as opposed to 30% in the seventies. More recently, the number of inflation episodes has fallen and so has the average rise in the inflation rate during an inflation episode. This is in line with the general perceived tendency that average inflation across the globe has been falling during the nineties and the start of the twenty-first century.

We employ probit analysis to investigate the factors associated with the start of the above highlighted inflation episodes between 1960 and 2005. In our estimations, we consider a wide range of explanatory variables which could trigger the start of an inflation episode. In our empirical analysis, we try to consider explanatory variables for each of the categories discussed in section 2, namely: fiscal policy, exchange rate policy, trade openness, inflation persistence/wage indexation, relative price shocks, international transmission of price shocks, demand shocks and political factors.

In more detail, as regards the first category, we include in our regressions the annual rate of growth in government consumption. Ideally, the regression analysis would include fiscal deficit as a % of GDP and fiscal debt as a % of GDP, however, for both series, insufficient data points were available and hence the series have not been included in the analysis.

As regards the consideration for the exchange rate regime, we include in our regression a proxy for the de facto exchange rate regime based on the classification by Reinhart and Rogoff (2004). We use their fine classification which divides the exchange rate regime into 14 categories, whereby a higher number indicates a more flexible exchange rate regime.

Next, trade openness is proxied in the regressions by the ratio of exports plus imports over GDP while inflation persistence is proxied by including the lagged inflation rate into the regressions. As for the relative price shocks, we consider both oil prices and food prices, using Brent oil prices as the reference for crude oil and the IMF IFS food price index as a proxy for developments in international food prices. To measure the impact of international price developments on domestic ones, we include US headline inflation in the regressions. The degree of overheating in the economy is measured through the output gap, which is computed using the HP filter for all countries. We however also include the real policy rate as a proxy for potentially loose/tight monetary policy. The importance of political determinants is measured by including two variables, namely democracy and durability in the regressions. The variables are derived from the Polity IV database and the first variable takes three different values, from 1-3. The operational indicator of democracy is a weighted average of the scores of the competitiveness of political participation, the openness and competitiveness of executive recruitment and constraints on the chief executive. A higher value indicates a more democratic regime. Regime durability in turn measures the number of years since the most recent regime change. The first year during which a new regime is established is set as a baseline year and durability is assigned the value of zero for that year. Each subsequent year adds one to the value of the variable.

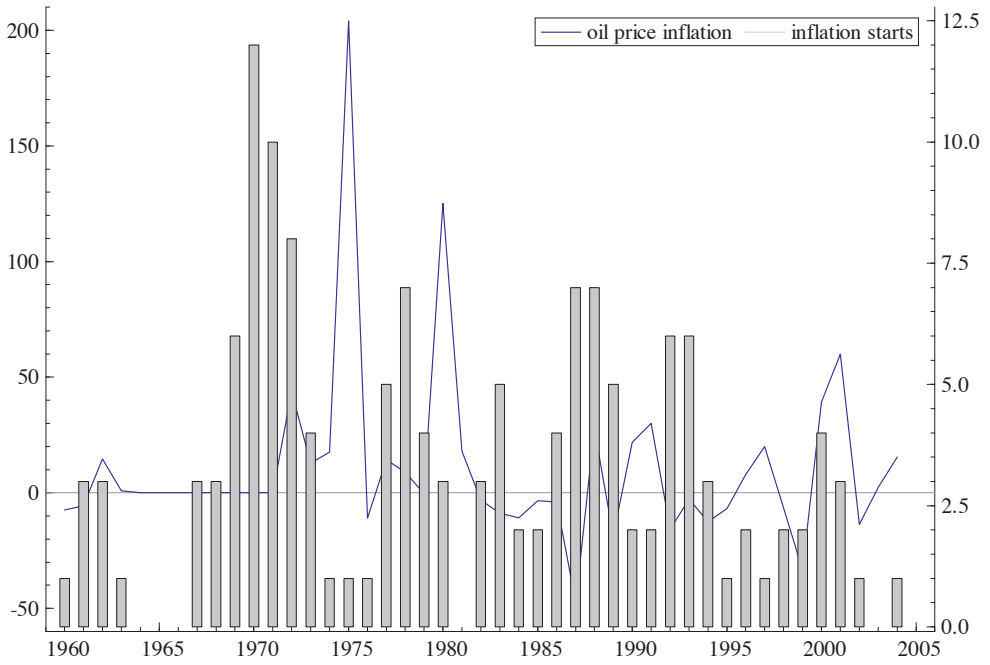

Figure 2: Changes in Brent oil prices and number of countries experiencing an inflation start

Finally, our regression includes a number of other potential control variables, including some institutional factors, such as the degree of corruption and the bureaucratic quality. We also test for the significance of the degree of capital account openness, capital flows, the external debt to GDP ratio, the current account to GDP ratio, and the growth in domestic food production.

4 Results

As discussed above, we use a probit model based on annual data to estimate the conditional probability of a prolonged inflation episode. The regressions are run with annual data. The time series dimension of the sample includes the years leading up to and including the year in which an inflation episode started. The data for the years in which an inflation episode is on-going are excluded from the regressions. For each country, the dependent variable is a binary variable taking on a value of 1 if an inflation start occurred in that country during that year and a value of 0 otherwise. The data for each country are stacked and the probit model estimated via maximum likelihood. We run the model for various sample; The full sample, a sample only including developing countries, one only containing the developed economies and a final sample for Latin American countries only. For completeness, we also consider, using the full sample with all countries, the regression results for two different time periods: the 70s only and the series from the 80s onwards only.

Table 2 presents the four different model estimation results, whereas Table 3 shows the results for the two different time periods. We show in the tables the marginal effects of the

independent variables evaluated at the means of the variable along with the standard errors. All explanatory variables enter the equation in first lags except for the development dummy variable and the constant. For all samples, we present the model estimates which only include statistically significant variables. Other variables, which were not significant, but considered were dropped. For all 4 samples, variables which were never significant are M2 growth, the growth in local food production, the growth in government spending, the growth in private consumption, the degree of capital account openness, the bureaucratic quality and the change in oil price. The fact that the change in the oil price is not statistically significant may at first sight appear surprising. Indeed, a vast literature argues that during the seventies, oil shocks triggered the high inflation episodes during that period. As can be seen in Chart 2, on average, over the sample, inflation had already started to rise before oil prices increased.

Although oil prices turn out to not statistically significantly increase the probability of an inflation episode, food prices appears to play an important role in triggering inflation episodes. Indeed, looking at the coefficient estimate for the full sample, it shows that a 1% increase in food price inflation tends to raise the probability that an inflation episode takes off by around 6% (see Table 2). This finding underscores the importance of agricultural shocks in inflation starts and can be partly explained by the large weight of food in the CPI basket, in particular in emerging market. Indeed, the regression results for the developing country and Latin America samples show even a larger impact elasticity, of between 8-9%, while for developed economies food price inflation was not a statistically significant explanatory factor in the regression estimates. Looking at the evolution of the importance of food price inflation over time, we can see that it was much more important during the 70s than during the later period. Indeed, while significant for both time subsamples, Table 3, shows that the impact of a 1% shock to food price inflation was much larger during the 70s than during the period thereafter. Indeed, during the 70s a 1% increase in food prices raised the probability of an inflation start by 9% while thereafter, the probability was only 1%.

Besides food price inflation, the degree of exchange rate flexibility also turns out to be an important factor in triggering inflation episodes. In more detail, for the full sample estimation, a country with a pegged exchange rate has a 42% higher chance of entering into an inflation episode than a country with a fully flexible exchange rate. As mentioned in Section 2, ex ante, it is unclear whether a pegged exchange rate regime should increase the probability that inflation episodes will occur. The result shown here may suggest that in most cases, the fixed exchange rate regime lacked credibility. The finding that pegged exchange rate regimes increase the probability of an inflation start was also uncovered by Boschen and Weise (2003) for OECD countries for the Bretton-Wood regime. Indeed, in their paper, the authors found that the probability of an inflation start was 16% higher during the Bretton Woods era. At the same time, Domac and Yücel (2005) by contrast found, using the exchange rate classification by Levy-Yeyati and Sturzenegger (2003) that the presence of a pegged exchange rate did not change the probability of an inflation start for the sample of countries they studied. Their shorter sample period (starting only in 1980 and hence missing the Bretton Woods era) and the small country sample may explain their different empirical finding. Indeed, here again, Table 3 reveals that the impact of the exchange rate regime was higher than thereafter, however also during the eighties and later periods, the choice of the exchange rate regime turns out to be an important variable driving inflation starts.

Not only the exchange rate choice, but also the role of monetary policy appears important

Table 2: Probit Estimations for Inflationary Episode Starts

	All countries	Developing	Developed	Latin America
Constant	0.65**	-1.88**	1.60**	-1.87**
	0.17	0.39	2.15	0.47
Food	0.06*	0.08**		0.09*
	0.00	0.00		0.01
ER regime	-0.03**	-0.05*	-0.09**	-0.10**
	0.01	0.03	0.02	0.04
Trade openness	-0.01**	-0.01*		
	0.00	0.00		
Real policy rate	-0.20**	-0.18*	-0.14**	
	0.01	0.01	0.03	
Global inflation	0.08**		0.15**	
	0.02		0.04	
Output gap			0.05**	0.01**
			0.02	0.04
Investment growth	0.01**			
	0.00			
Past inflation		0.02**		0.01**
		0.01		0.00
Debt/gdp ratio		0.02**		0.03*
		0.01		0.02
Democracy	-0.08**			
	0.08			
Durability		-0.01**	-0.06*	
		0.00	0.03	
Corruption				-0.10**
				0.03
Dummy development	0.65**			
	0.17			
Log likelihood	-326.38	-124.71	-6.52	-69.72
pseudo R^2	20.66	31.58	92.88	19.85

*,** denote statistical significance at the level of 1 and 5 percent respectively.

Table 3: Probit Estimations for Inflationary Episode Starts for two time subsamples

	70s sample	80s onwards
Constant	-1.41**	-2.48**
	0.32	0.40
Food (-1)	0.09**	0.01*
	0.01	0.00
Exchange rate regime (-1)	-0.07**	-0.04*
	0.00	0.02
Trade openness (-1)		-0.01**
		0.00
Real policy rate (-1)		-0.31**
		0.01
Global inflation (-1)		0.08**
		0.02
investment growth (-1)		0.01**
		0.00
democracy (-1)	0.18**	0.13**
	0.09	0.06
current account balance (-1)	-0.03*	
	0.02	
dummy development		0.70**
		0.10
log likelihood	-85.96	-268.59
pseudo R2	0.67	0.49

*,** denote statistical significance at the level of 1 and 5 percent respectively.

in triggering inflation episodes. Indeed, the real policy rate turns out to be an important factor in all samples (except the Latin America sample) with a higher real policy rate significantly lowering the probability of an inflation start. Indeed, in more detail, an increase of 100 basis points in the real interest rate reduces the probability by up to 20%. Policy mistakes may also explain the positive relationship between the output gap/investment growth and inflation starts. In particular in developed economies, the role of the output gap appears to be very important. Indeed, a 1 percent rise in GDP growth above trend increases the probability of an inflation start by 5% in the developed economies sample. Such a link was also found in Boschen and Weise (2003) who shows in their model for OECD countries that a 1% increase in GDP growth above trend raises the probability of an inflation start by 4.7% Such results seem to be mainly driven by the developments in the post 70s sample as during the 70s episode, both the real policy rate and the output gap are not significant.

Boschen and Weise (2003) also found the international transmission of inflation to be an important source of inflation starts, in particular during the Bretton Woods era. We are not able to confirm their finding, as the US inflation rate was not a significant explanatory variable in our sample. However, we do find for developed economies and for the post seventies sample estimates that the international transmission of inflation is significant. For developing countries, by contrast, past domestic inflation rates are more important and again mainly driven by the post seventies sample. This confirms that in high inflation countries, the inflation rate is more likely to take off, in part due to the impact high inflation has on wage indexation and inflation expectations. Such factors appear to be more relevant for emerging markets, where in fact wage indexation is still more automatic than in most developed economies and the average inflation rate is still higher. Similarly, the ratio of external debt to GDP turns out to be an important factor, but only for developing countries.

The empirical results also show the importance of political factors. In fact, for our full sample, the results show that a higher democracy score reduces the probability of an inflation start: a 1 unit increase in the democracy score lowers the probability of an inflation start by 8 percent. This result seems to lend support to the state-capture view, which argues that strong, insulated governments are needed to prevent inflation. According to this view, inflation does not stem from voters or consumers pressuring politicians to ease monetary or fiscal constraints, but rather because incumbents obtain private benefits from money creation and from public spending (which they can then channel to favored constituents) (see Aslund et al. 1996, Mikhailov, 1997).

For the two subsamples (developing countries, developed countries) regime durability appears to be the relevant factor suggesting that the longer a political regime remains intact, the less likely it will result in an inflation start. This may lend support to the fact that short-lived, instable governments tend to push politicians easier into the use of ease monetary or fiscal constraints, thereby possibility triggering inflationary periods. In addition, in Latin America, the degree of corruption also plays an important role in determining the probability of an inflationary episode to start. In fact, an increase of one point in the score of corruption raises the probability by 10%. Moreover, in line with the existing literature, we find for emerging markets that the more trade open economies are less prone to inflation starts, although the overall impact is small.

Finally, interestingly, for the 70s sample only, the development dummy (which takes a value of one if a country is a developing or emerging market economy) is not significant. This would suggest that the probability of an inflation start was not different for developed and developing countries during that period. Thereafter, however, the variable is important

and statistically significant, whereby developing countries at 70% more likely to enter into an inflation episode (see Table 3).

5 Conclusions

In this paper, we empirically assessed which factors trigger prolonged periods of inflation for a sample of 91 countries over the period 1960-2006. The paper employes pooled probit analysis to estimate the contribution of the key factors to inflation starts. The empirical results suggest that for all samples considered a more fixed exchange rate regime and lower real policy rates increase the probability of an inflation start. For developing countries, other relevant factors include food price inflation, the degree of trade openness, the level of past inflation, the ratio of external debt to GDP and the durability of the political regime. For developed countries, these factors turned out to be statistically significant but instead a positive output gap, higher global inflation and a less democratic environment were seen to be detrimental for triggering inflation starts. Finally, oil prices, M2 growth, government spending were in no case significant.

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Appendices

A List of countries

Algeria; Argentina; Australia; Belgium; Bolivia; Brazil; Canada; Central African Republic; Chile; China; Colombia; Congo; Costa Rica; Cote d'Ivoire; Cyprus; Denmark; Dominican Republic; Ecuador; Egypt; Ethiopia; Fiji; Finland; France; Gabon; Germany; Ghana; Greece; Guatemala; Guyana; Haiti; Honduras; Hong Kong; Iceland; India; Indonesia; Iran; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kenya; Korea; Kuwait; Lesotho; Libya; Luxembourg; Madagascar; Malawi; Malaysia; Malta; Mauritius; Mexico; Morocco; Myanmar; Netherlands; New Zealand; Nicaragua; Niger; Nigeria; Norway; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Portugal; Rwanda; Saudi Arabia; Senegal; Seychelles; Sierra Leone; Singapore; South Africa; Spain; Sri Lanka; Suriname; Sweden; Switzerland; Syrian Arab Republic; Tanzania; Thailand; Trinidad and Tobago; Tunisia; Uruguay; United States; Venezuela; Zambia; Zimbabwe.

B Data sources and timing of inflation episodes

CONSUMER PRICE INFLATION

Definition: Headline consumer price inflation

Units: Index.

Source: Global Financial Database.

OUTPUT GAP

Definition: Own calculation, using the HP filter to derive trend output based on real GDP series in local currencies. Smoothness parameter was set at 100.

Units: Deviation of real GDP growth from trend.

Source: World development indicators for real GDP series in local currency units.

REAL INTEREST RATE

Definition: Policy rate deflated by headline CPI inflation.

Units: Percent.

Source: Global Financial Database.

DEMOCRACY

Definition: The operational indicator of democracy is a weighted average of the scores of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive.

Units: An additive 3 point scale (0-3).

Source: Polity IV database

DURABILITY

Definition: The number of years since the most recent regime change. the first year during which a new regime is established is set as baseline year and the indicator is assigned the value of zero for that year. Each subsequent year adds one to the value of the variable.

Source: Polity IV database

EXCHANGE RATE REGIME

Definition: A classification system of the de facto exchange rate regime in a country. the classification is based on an algorithm which relies on a broad variety of descriptive statistics and chronologies, and groups episodes into a grid of 14 regimes. The analysis is based on an extensive database on market-determined dual or parallel rates.

Units: A point scale between 1 and 14.

Source: Reinhart and Rogoff (2004), updated up to 2007 on http://www.wam.umd.edu/~creinha

INFLATION GAP

Definition: The difference between the home and US headline CPI inflation rate.

Units: Index.

Source: Global Financial Database and US Bureau of Labor Statistics

BRENT OIL PRICES

Definition: The crude Brent oil price.

Units: Dollars per barrel.

Source: Haver Analytics

FOOD PRICES

Definition: The IMF IFS index for internationally trade food prices.

Units: Index.

Source: Haver Analytics

CAPITAL ACCOUNT OPENNESS

Units: An additive 3 point scale (0-3).

Source: Polity IV database

DEPENDENCY RATIO

Definition: The ratio of nonworking age to working age population.

Units: Ratio.

Source: World Bank Development Indicators

LAW

Units: An additive 3 point scale (0-3).

Source: Polity IV database

BUREAUCRATIC QUALITY

Definition: The operational indicator of democracy is a weighted average of the scores of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive.

Units: An additive 3 point scale (0-3).

Source: Polity IV database

CORRUPTION

Definition: The operational indicator of democracy is a weighted average of the scores of the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive.

Units: An additive 3 point scale (0-3).

Source: Polity IV database

TRADE OPENNESS

Definition: The ratio of imports plus exports over GDP.

Units: Ratio.

Source: World Bank Global Development Indicators

CURRENT ACCOUNT BALANCE

Definition: The ratio of the current account to GDP.

Units: Ratio.

Source: World Bank Development Indicators

EXTERNAL DEBT TO GDP

Definition: The ratio of external debt to GDP (in USD).

Units: Ratio.

Source: World Bank Development Indicators

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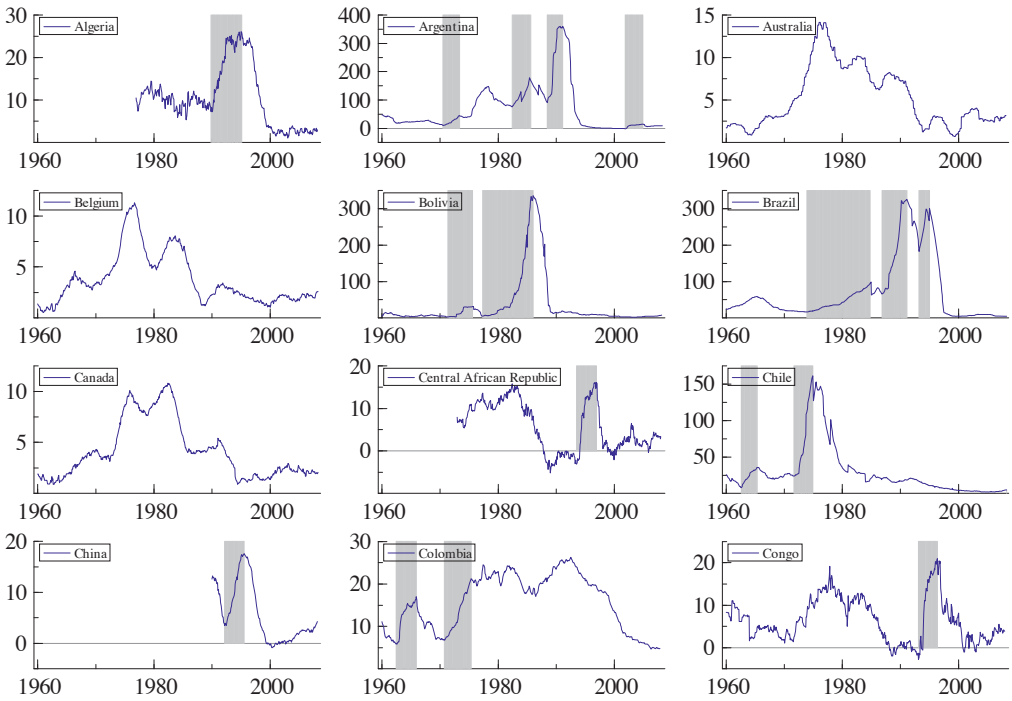

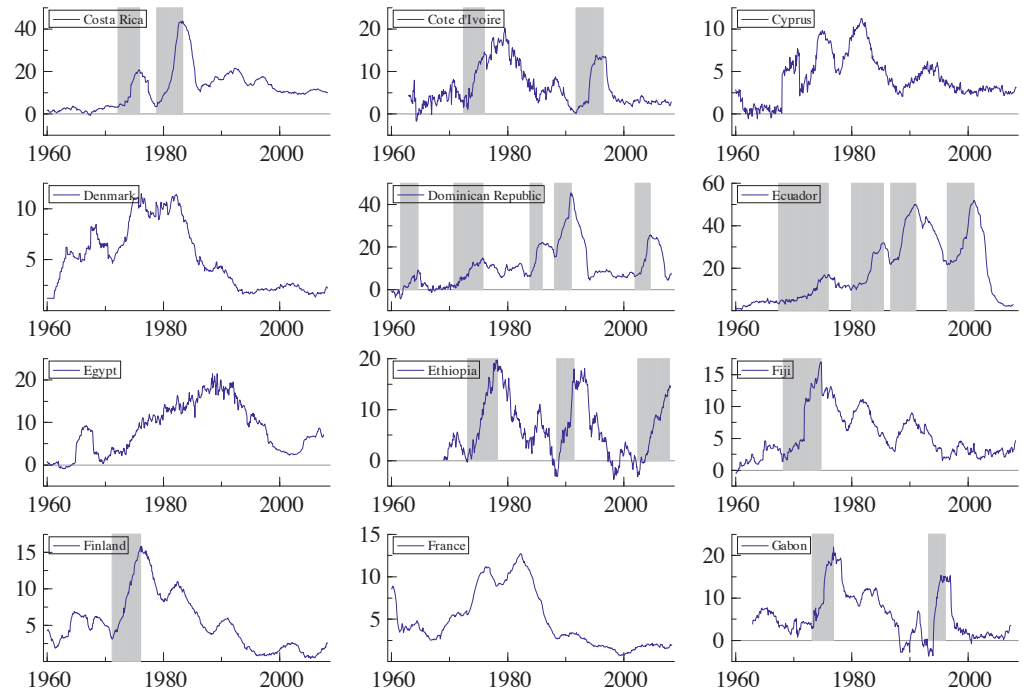
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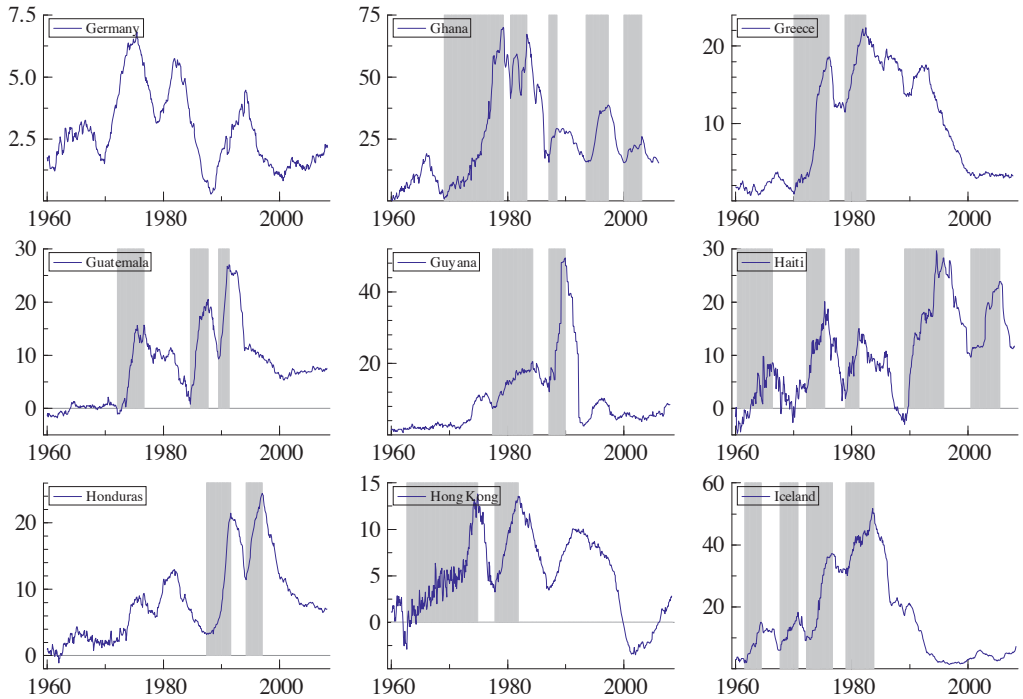
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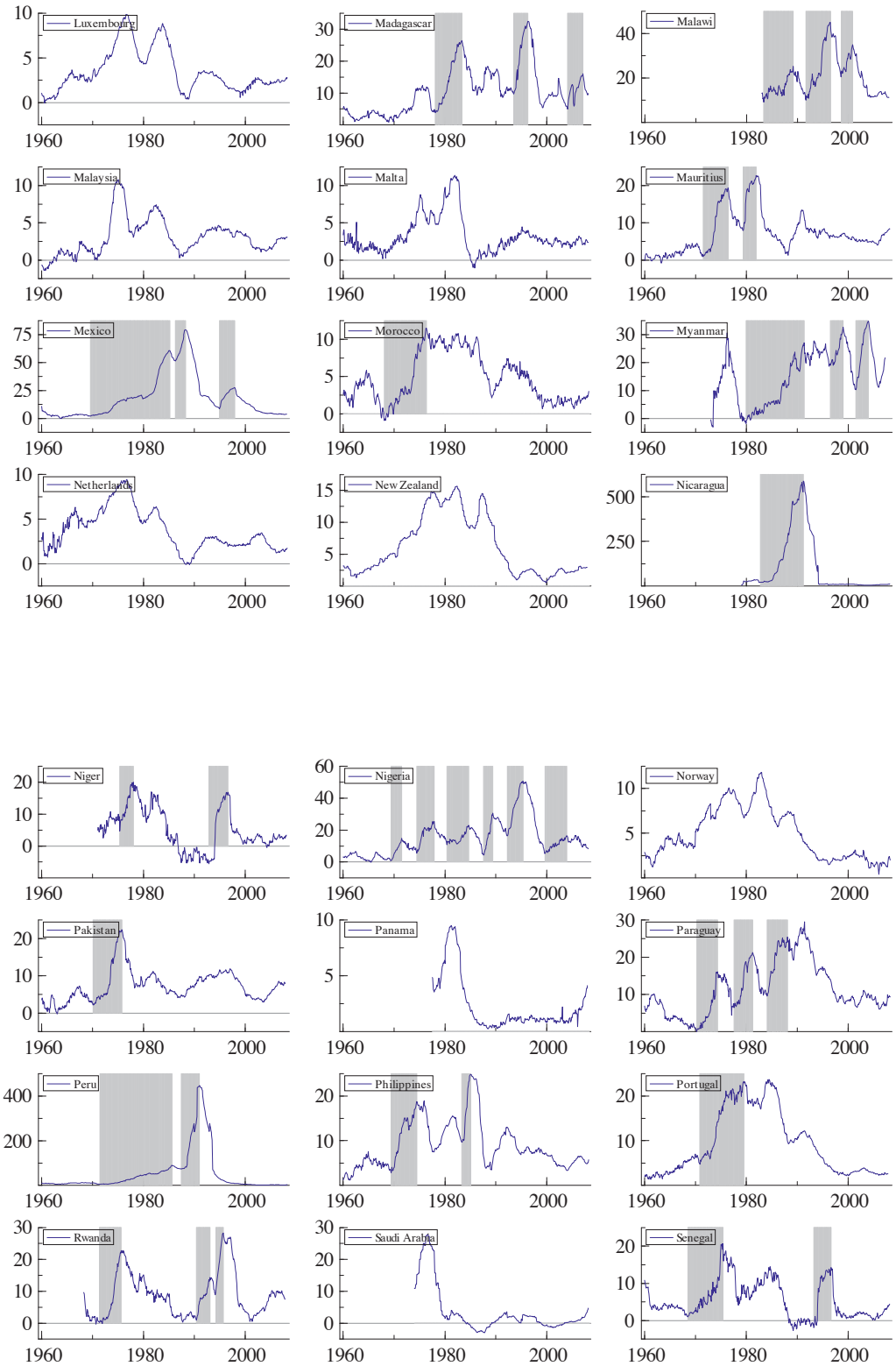
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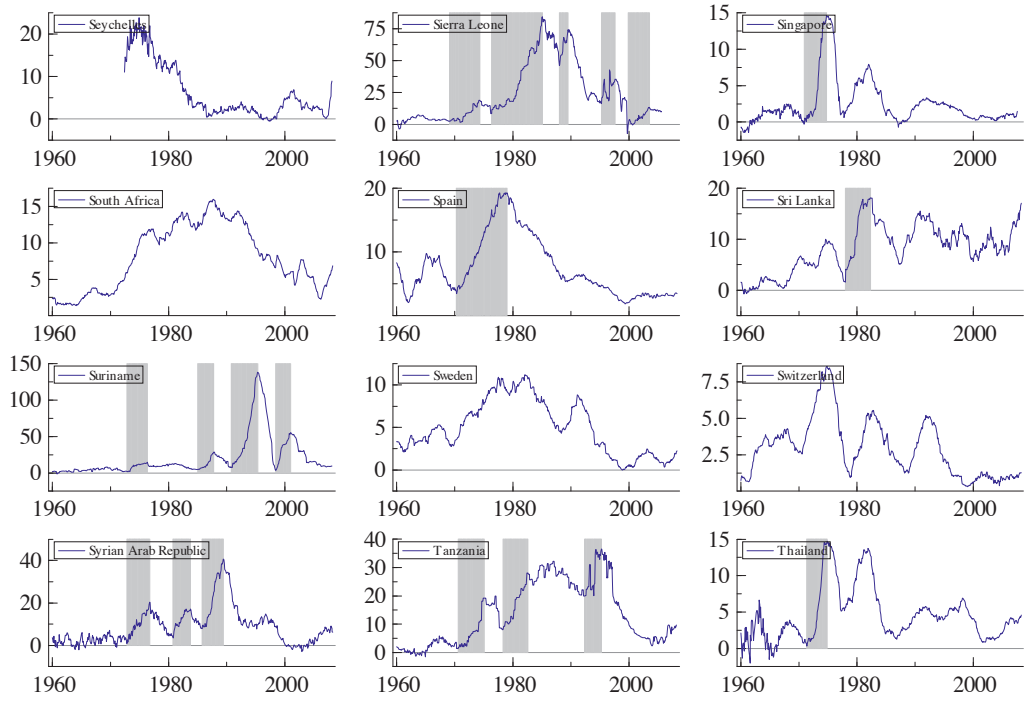
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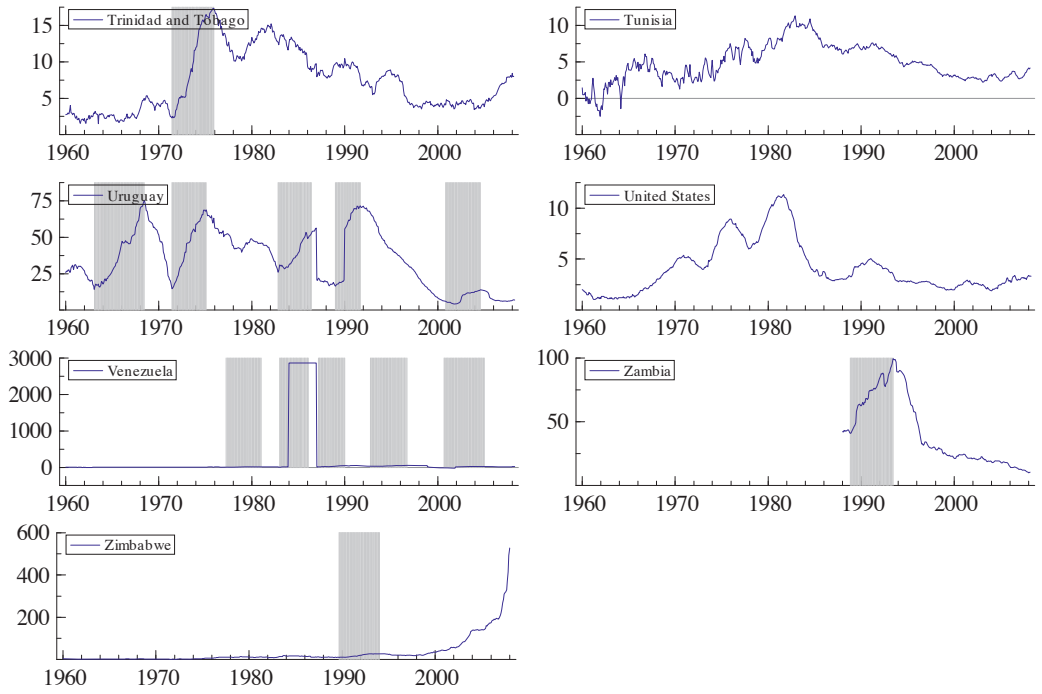
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