Inflation, Openness, and Exchange-Rate-Regimes

The Quest for Short-Term Commitment

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Abstract

This paper further tests Romer's (1993) extension of Kydland and Prescott's (1977) predictions for dynamic-inconsistency problems in open economies. In a panel data set of developed and developing countries from 1973 to 1998, I find that openness does not play a role in restricting inflation in the short-run. On the other hand, a fixed exchange-rate regime plays a significant role. The results are robust to controlling for other variables that determine inflation, performing sensitivity analysis, and using a *de facto* exchange-rate regime classification.

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1. Introduction

The 1990s probably will be remembered, among other things, as the decade in which average inflation came under control around the world. According to the IMF, average inflation in industrialized economies between 1982 and 1991 was 4.9%; at the end of 1999 it was 0.8% as measured by the GDP deflator (Table 1a). More remarkably, average inflation in developing countries went from 45.1% between 1982 and 1991 to 6.9% in 1999. The 1990s also will be remembered as the "globalization" decade. Trade of goods as a percentage of PPP GDP went from 21.2% in 1988 to 28.3% in 1998 (Table 1b). This increase is even more striking when analyzed as a percentage of goods production, which increased from 71.9% in 1988 to 92.1% in 1998. Although concerns remain about lingering tariffs, non-tariff barriers, and other protectionist practices, it is hard to deny that the global economy has become more integrated.

The obvious question is then: Are these events related? Romer's (1993) work shows that inflation and openness are negatively and significantly correlated. Using Kydland and Prescott (1977) and Barro and Gordon (1983) type models, Romer argues that the negative openness-inflation relationship arises from the dynamic inconsistency of discretionary monetary policy. Romer's empirical work, using cross-country averages spanning more than a decade beginning in 1973, tests the long-run commitment effect of openness on restricting the usefulness of discretionary monetary policy. The question remains, however, whether openness or other mechanisms bind in a short-term horizon. In this paper, I test whether openness serves as a commitment mechanism for restraining inflation in the short run. In addition, I consider the role of other variables that affect the short-term dynamics that drive inflation and the time inconsistency problem, in particular, the exchange-rate regime.

One of the central issues underlying the time inconsistency problem is a government's inability to make binding commitments to future policies. Due to the sequential nature of policy-making, it is

generally optimal ex-post for governments to deviate from earlier, ex-ante optimal plans or pre-announced policy rules. Private agents, aware that policymakers have incentives to deviate in the future, base their current actions on the expectation that deviations will occur. The final outcome is a sub-optimal high inflation rate. Without binding commitments that impose high costs for reversing policy, a plan with desirable properties might encounter serious credibility problems.[1]

These considerations give rise to important empirical puzzles. Although we do observe high periods of inflation, we do not see them in all countries at all times. What does this say about the ability to commit? Does it change, or correlate to other policy instruments? What mechanisms enable countries to relax incentive constraints and mitigate the credibility problem? Judging from observed outcomes, the efficiency of such mechanisms varies across societies and time.

Unfortunately, there is little empirical evidence that the time inconsistency problem identified by Kydland and Prescott (1977) and Barro and Gordon (1983) is important to actual inflation. Romer's (1993) worthy contribution is to test the prediction that the absence of pre-commitment in monetary policy, given by the degree of openness, leads to inefficiently high inflation. The theoretical reasoning follows from Rogoff's (1985) model, which shows that more open economies gain less from surprise inflation. Surprise monetary expansions cause the real-exchange-rate to depreciate, leading to a negative terms-of-trade effect. The more open the economy, the more the real exchange depreciates, thus reducing incentives to undertake expansion. Using cross-country data, Romer finds a robust negative link between openness and inflation.[2]

I further explore the robustness of the cross-section results to adding more than a decade of observations and controlling for other variables that might determine inflation. The cross-section empirical work, however, tests the long-run commitment effect of openness on restricting the

[1] See Persson and Tabellini (1994) for a survey of the time-inconsistency literature.

[2] Lane (1997) considers alternative mechanisms beyond the large-country terms of trade effects that link inflation and openness. Empirically, Lane (1997) finds in a cross-section, after controlling for country size, that inflation and openness are inversely related, even for countries that face exogenous terms of trade.

usefulness of discretionary monetary policy. A more relevant exercise, given the very nature of the time inconsistency problem, is to test the effectiveness of openness on restricting discretionary monetary policy over shorter-time horizons.

Accordingly, and in contrast to previous work, I also use a panel data set of developing and developed countries from 1973 to 1998. I take advantage of the time-dimension of the data to analyze whether openness serves as a commitment mechanism for restraining inflation in the short-run. It could be argued that the correlation in the cross-section analysis might by driven by time-invariant omitted variables that often are difficult to measure. As a result, one could find evidence of a negative effect of openness on inflation where no such restraint on inflationary policy takes place. In effect, once time and country dummies are considered to capture this difference, I do not find a negative relationship between openness and inflation. In the short-run, there is no robust evidence that openness has restrained inflation.

I further explore which other variables might affect the short-term dynamics that drive inflation. In particular, I analyze the relationship between inflation, openness, and the exchange-rate regime as a commitment device. Romer (1993) argues that the choice of exchange-rate regime is not an important determinant of inflation.[3] But, as Frankel (1999) observes, fixing the exchange-rate has the advantage of providing an observable commitment to monetary policy. Calvo and Vegh's (1999) work on stabilization programs shows that exchange-rate pegs, albeit usually ending in balance of payment crises, enable countries to reduce inflation temporarily. The other often mentioned advantage of fixing the exchange-rate is that it reduces transaction costs and exchange-rate risks that might discourage trade (Frankel, 1999). This argument implies that fixed exchange-rate regimes

[3] Campillo and Miron (1997) find the exchange-rate regime to be relatively unimportant in a cross-section between 1973 and 1994. They introduced this variable as a dummy taking the value of 2 for countries in multilateral exchange-rate systems in 1974, 1 for countries in unilateral exchange-rate systems, and 0 for floating regimes. But, by using data for 1974, they fail to capture the effects of future regime changes.

could be associated with higher levels of trade. Excluding a fixed exchange-rate variable from an analysis that considers the relationship between inflation and openness can thus bias the results.

I find a significant negative relationship between a fixed exchange-rate regime and inflation that is robust to the inclusion of other control variables used in the literature. Ghosh et al. (1997) use a similar approach when studying the relation between inflation and different exchange-rate regimes across a panel of countries from 1960 to 1990. A main difference from previous work is that this paper focuses on the role time-invariant omitted variables play in driving the results for which I control for country and year fixed effects. In addition, I use a new exchange-rate regime classification constructed by Reinhart and Rogoff (2003) that considers parallel exchange-rate data when assessing whether a country has, *de facto,* maintained a pegged or a flexible regime. The main results are robust to using this classification.

The rest of the paper is organized as follows. The data are defined in section 2. Section 3 examines the cross-section evidence on openness and inflation. Section 4 discusses the panel empirical approach and the main results. The last section concludes.

2. Data

The sample and data cover the period of the modern exchange-rate system following the breakdown of the Bretton-Woods arrangement in 1973. The full sample covers 130 countries from 1973 to 1998.[4] Inflation is measured by changes in the GDP deflator. Following Romer (1993) and Lane (1997), I use the logarithm of average annual inflation as the dependent variable in order to reduce the importance of extreme inflation countries. Consumer Price Index data is used as a robustness check. For openness measures, I use both the share of imports as a percentage of GDP and the share of exports as a percentage of GDP. As an additional control variable, I use the log of

[4] All data are described in detail in the Data Appendix. The analysis excludes the period following the introduction of the Euro as particularly important limitations were imposed on the member countries' ability to pursue

real income per capita measured by the real per capita GDP in constant dollars. To capture the effects of fiscal policies on inflation, I use fiscal deficits as a percentage of GDP as well as government debt as a percentage of GDP. Data are taken from the World Bank, World Development Indicators. The exchange regime classification is taken from the International Monetary Fund's (IMF) Annual Report on Exchange Arrangements and Exchange-rate Restrictions. In the robustness tests, I use a new classification of *de facto* regimes by Reinhart and Rogoff (2003).

Summary statistics on inflation and other key variables for the period 1973 to 1998 are presented in Table 2a. It is clear that there is extensive cross sectional variation. Table 2b presents the correlation matrix for the main variables. Figure 1 plots the correlation between the log of inflation and openness (imports as a percentage of GDP) from 1973 to 1998. The negative correlation persists even after adding more than a decade of observations over Romer's work. Finally, Table 2c shows the average inflation in fixed regimes to be higher than in floating regimes for both the *de jure* and *de facto* classifications.

3. Cross-Section Analysis

I first test whether the negative correlation between openness and inflation is robust to expanding the data set. I include in this test nearly an additional decade of observations over Romer's (1993) analysis. I follow Romer's estimation strategy by regressing inflation on a constant, the degree of openness, other control variables, and an i.i.d. error term.

$$Log(Inflation_i) = \beta_0 + \beta_1 Openess_i + \beta_2 Controls_i + \upsilon_i \qquad (1)$$

where *i* represents each country.

Table 3 presents the main results of the cross-section estimates from 1973 to 1998. Column (1) reports the results of a regression between inflation and imports as a share of GDP as the measure of

independent monetary policy. Following Romer (1993), the post-Bretton Woods pre-Euro period provides a better setting for testing the dynamic inconsistency problems of discretionary monetary policy in open economies.

openness. The coefficient on openness is negative and highly significant. The point estimates imply an average inflation of 23 percent for a close economy and 13 percent for an economy with the sample's average import share (40 percent). Column (2) shows this effect to be robust to controlling for the development level. The results suggest inflation to decline with real GDP per capita. Column (3) shows the negative and significant relationship between openness and inflation to be robust to the inclusion of regional dummies. The income per capita estimate, however, is not significant. Column (4) shows the results to be robust to using exports as a share of GDP as the openness measure. Although not reported due to space considerations, the negative relationship is robust to using alternative measures of inflation, such as the consumer price index.

The Role of Fiscal Policies

There is, however, debate about the forces that drive the openness-inflation relationship result. The fiscal view of inflation suggests that the ultimate cause of inflation is the government's fiscal imbalance. As the work by Sargent and Wallace (1973) shows, government's financing of their excess spending through money creation leads to inflation. However, as Catão and Terrones (2003) note, most cross-section studies do not control for fiscal deficits, presuming either that fiscal imbalances play no role in determining inflation or that their effect is captured by the other variables.[5] Table 4 explores the inflation-fiscal deficit link. As seen in column (1), fiscal deficits have a positive and significant effect on inflation. The openness coefficient, however, remains negative and significant even when controlling for regional differences, the development level, and fiscal deficits. Similar results, not reported due to space considerations, are obtained using exports as a share of GDP.

[5] The empirical work by Romer (1993), Lane (1995), Campillo and Miron (1997) and Bleaney (1999) does not control for fiscal deficits. See Calvo and Vegh (1999), Fisher, Sahay and Vegh (2002), and Catão and Terrones (2003) for the role of fiscal deficits in inflation.

Terra (1998) argues that the negative relationship between openness and inflation across countries is driven by a group of severely indebted countries. The author argues that the smaller a country's trade share, the more depreciated the real value of the currency must be to generate a given trade surplus as a share of GDP. The more depreciated the currency, the greater the pressure on the government's budget and the greater the pressure to inflate, thus explaining the negative correlation. Romer's (1998) main counter argument is that the relationship was significant both before and after the debt crisis. As shown in column (2) in Table 4, the results on openness and inflation are robust to controlling for government debt as percentages of GDP.[6]

In order to reduce the effect of outliers, columns (3) and (4) in Table 4 perform the same exercise controlling for episodes with average inflation rates above 50%, countries with average inflation levels below 2% and high openness countries (higher than 100% of GDP).[7] The results are robust to controlling for outliers.[8]

Decades

Are the results robust throughout the different decades and sample periods? Stokey (2002), for example, argues that the 1970s inflationary episode might reflect more than a reputation problem, a misguided response based on "flawed economic analysis" from a time when many economists believed there to be a significant trade-off between inflation and growth (Phillip's curve analysis). Government officials accommodated the real shocks of the 1970s, as opposed to engineering surprise inflation. The notion that only unanticipated inflation could stimulate output and the subsequent trade-off was not well understood until much later. As can be seen in Table 3, the results after

[6] The results are robust to using both fiscal deficits and government debt in addition to the development variable and regional dummies as control variables. The estimated coefficient on openness in this case is –0.016 (0.005).

[7] High openness countries were Singapore, Lesotho, Hong Kong, and Luxembourg.

[8] As Romer (1993) argues, log of inflation might not be an appropriate transformation if some countries have very low average inflation rates, as the logarithmic transformation would give these countries a weight close to zero. The estimates on openness of a regression using inflation as the average change in the GDP deflator and excluding high inflation episodes is -0.105 (0.034).

adding data for the late 1980s and 1990s remain robust. Table 4, column (5) reports the estimates of using cross-section averages only for the 1980s and 1990, that is, it excludes the 1970s; the coefficient for the openness measures is negative and significant. However, as seen in column (6), the results are *not* robust for the 1990s.[9] In particular, once we control for episodes in Latin America during the 1990s, openness is not significant at conventional levels.[10] This suggests that important country specific effects might be driving these results.

This particular result and the overall analysis of the cross-section averages raise an important question about the correct time horizon for studying dynamic-inconsistency problems. Is this a long- or a short-run phenomenon? Is the relevant time frame to study openness as a commitment device 30 years, 20 years, 10 years? Does it change over time? Across countries? What role do country specific variables play? Romer (1993), for example, analyzes the long run, but a study by Alesina and Roubini (1990) uses a short-term horizon profile. Di Tella and MacCulloch (2000), who find in a panel of 21 OECD countries a strong negative correlation between inflation and the welfare state, argue that establishing unemployment benefits makes the monetary authority less concerned about the plight of the unemployed. The next section explores whether an openness-inflation relationship arises from dynamic inconsistency of discretionary policy in the short run.

4. Panel Analysis

I exploit the time dimension of the data and present the regression analysis controlling for country and time-fixed effect. It could be argued that the correlation in the cross-section analysis might by driven by time-invariant omitted variables, such as institutional variables, that often are difficult to measure. Romer (1993), Lane (1997), Terra (1998), and Campillo and Miron (1997) consider, in a cross-section, additional variables such as central bank independence and political

[9] A similar result is reported by Bleaney (1999) who finds the robust negative correlation between openness and inflation found in the 1970s and 1980s to disappear in the 1990s.

[10] If no regional dummies are considered, the estimated coefficient on openness is –0.010 (0.006).

instability variables that, being available for only a subset of countries and years, are of limited use in a panel investigation. Time and country dummies, however, should capture their effect. Country dummies are included to control for omitted variables driven by individual time-invariant effects, thereby eliminating a potential source of omitted-variables bias; period dummies are included to control for period individual invariant variables such as global shocks that might affect aggregate inflation in any period but are not captured by the explanatory variables. This technique, however, does not adjust for all omitted-variable bias since it does not control for omitted variables whose values change over time. However, institutional variables that might affect the inflation-openness relationship, such as central bank independence, tend to have little time variation.

Accordingly, I investigate the relation between the log of inflation against openness measures, controlling for country and time-fixed effects.

$$Log(Inflation_{it}) = \beta_1 Openess_{it} + \beta_2 Controls_{it} + \eta_i + \lambda_t + \varepsilon_{it} \qquad (2)$$

where *i* represents each country and *t* represents each time period; η refers to country fixed effect (country dummies), λ to year fixed effect (period dummies), and ε_{it} is an i.i.d. error term.

One additional consideration is the role of non-stationary variables in the data. Several unit root tests have been extended to panel data, and in particular to large N panel data sets such as the one used in this paper.[11] A common test in the literature is Levin, Lin and Chu (2002). The test assumes that the coefficient of the lagged dependent variable is homogeneous across all cross-section units of the panel and allows for fixed effects, time effects and possibly a time trend. The null hypothesis is that each series in the panel contains a unit root, i.e. H_0: $\rho=1$; against the alternative hypothesis that all individual series are stationary, i.e. H_1: $\rho<1$. Alternatively, Im, Pesaran and Shin (2003) provide a test that allows for heterogeneous coefficients in the lagged dependent variable and propose an alternative procedure based on

averaging individual unit root test statistics.[12] The null hypothesis is that each series in the panel contains a unit root, i.e. *Ho:* $\rho_i=1$ for all i; against the alternative hypothesis that at least one of the individual series is stationary, i.e. *H1:* $\rho_i<1$.

I applied both tests to the main variables.[13] Results reject the hypothesis of a unit root for the openness variable. However, we cannot reject the hypothesis that the GDP per capita variable has a unit root. I thus first-differenced this variable and used it as one of the regressors.[14] Both tests reject the hypothesis that the first difference of this variable has a unit root.[15]

Table 5 reports the main results using annual data. The first interesting result is that the negative relationship between openness and inflation disappears when controlling for time and country fixed effects.[16] In fact, the relation becomes positive and significant at conventional levels in many of the specifications. Since country dummies control for a country's unobservable-time invariant characteristics or fixed effect, instead of analyzing differences in inflation and openness across countries, the estimation focuses on changes in these variables within each country across time; in other words, how changes in openness relate to changes in inflation within a given country. The results suggest that an increase in openness does not lead to lower inflation. Column (2) shows this result to be robust to the inclusion of the growth of the GDP per capita measure. As expected, growth

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[11] See Baltagi (2001) for an overview of non-stationary panels.

[12] The Levin, Lin and Chu (2002) test can be viewed as a pooled Dickey-Fuller (DF) or pooled Augmented Dickey-Fuller (ADF) test. The authors provide transformation factors such that the test has a normal distribution in the limit. The test does require a balanced panel; the data set was reduced to 22 years and 92 countries (22 and 56 respectively for the fiscal variables) in order to maximize the number of observations. The Im, Pesaran and Shin (2003) test can be viewed as the average of the individual ADF statistics and after transformation, the test has a normal distribution.

[13] The adjusted t-statistics for the Levin Lin and Chu test (one lag) for imports, log of GDP per capita, first different log GDP per capita, log of inflation, and fiscal deficits were –3.71, -1.19, -19.48, -12.78, -5.98 respectively. The adjusted t-statistics for the Im, Pesaran and Shin test (one lag) were –1.91, 5.02, -18.89, -12.72, -5.50 respectively.

[14] See Gosh et al. (1997, 2002) for a similar treatment.

[15] Note however, as Baltagi (2001) points out, that the use of such panel data methods is not without criticism, in particular, regarding the properties of both tests when N is large relative to T. As an additional robustness check, Table 5, column (7) runs the regression using the first difference of the openness variable.

[16] The fixed effect model is generally more appropriate than a random effects model for macro data sets. Most macro data sets tend to include most of the countries of interest as opposed to be a random sample from a larger universe.

has a negative and significant effect on inflation. As seen in column (3), fiscal deficits have a positive coefficient, although the coefficients are not significant as obtained in the cross-section analysis.[17] As seen in column (4), the results are robust to using exports as a percentage of GDP as the openness measure.

As an additional exercise, columns (5) and (6) compare the previous results that control for country *and* time-fixed effects against those obtained if *no* country dummies are included in the regression. This latter specification is closest to the spirit of the earlier cross-section analysis. As seen in column (5), in this case, the estimate for the openness variable is negative and significant, as in the cross-sectional results. Column (6) shows a positive and significant effect for fiscal deficits. These results suggest that, in effect, previous results could be driven by omitted-time invariant variables. Finally, as an additional test, column (7) uses the first difference of the share of imports as a percentage of GDP as the openness measure. In this case, the openness variable has a positive effect on inflation. The result, however, is not significant.

Table 6 performs robustness checks to the previous results. In particular, columns (1) to (3) show the results to be robust to controlling for high openness, high inflation, and low inflation episodes. The coefficient on openness is positive and significant.[18] In this case, the fiscal deficit variable has a positive although not significant effect on inflation. Columns (4) and (5) in Table 6 also analyze the effects of openness and inflation during different sample periods. As seen in column (4), the openness variable has a positive and significant effect on inflation during the 1980s and

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In addition, Hausman specification tests comparing the fixed-effect specifications with the random effects models rejected the assumptions required for random effects.

[17] Similar results are obtained when using government debt as a percentage of GDP. The related empirical work using panel data has yet to find a strong and significant relation between fiscal deficits and inflation across a broad range of countries. Fisher, Sahay and Vegh (2002), using fixed effects in a panel of 94 countries, find that fiscal deficits drive inflation rates in excess of 100 per year; but fiscal deficits have no inflationary effect in low-inflation episodes. Using a larger data set and a dynamic panel estimator, Catão and Terrones (2003) find a strong association between deficits and inflation among high inflation and developing countries, but not among low inflation or advanced countries.

[18] As an additional robustness test, the estimate on openness of a regression using inflation measured as the annual change in the GDP deflator and excluding high inflation episodes was 0.053 (0.026).

1990s. However, as column (5) shows, none of the variables have significant estimates for the 1990s. Notice, however, that this can be due to the reduction in the sample size. Finally, columns (6) and (7) control for the development level. Column (6) shows the openness variable to be positive but not significant for high-income countries; although, again, the sample size is reduced dramatically. The results, however, are significant for middle and poor income countries.

Summarizing, controlling for time and country fixed effects that capture cyclical and other time-invariant determinants of inflation and performing several robustness tests, that data shows that openness does not, in the short-run, seem to be a constraint on policy-makers incentives to inflate.

The Role of the Exchange-Rate Regime

Moving to a shorter-term horizon leads us to ask what other mechanisms might limit the benefits of unanticipated monetary expansions in the short run. One mechanism is the exchange-rate regime.

A classical argument for adopting fixed exchange-rate regimes is that doing so creates incentives for policymakers to control monetary supply and, thus, inflation. In an open economy, a fixed exchange-rate regime can provide a commitment device for a country that pegs its economic policy to a more stable currency and imports its monetary policy. By using the exchange-rate as a nominal anchor, the monetary authorities tie down the price of trade goods, which eventually will force other prices to come down. The more open the economy, the more efficient will be the mechanism of pegging the exchange, as more prices will be "tied down." This argument explains why countries such as Spain, Italy, and Portugal were eager to import Germany's monetary discipline. The stabilization literature reviewed by Calvo and Vegh (1999) shows how often countries have used a fixed exchange-rate to provide a nominal anchor to reduce inflation. Over the last four decades, a number of Latin American stabilization programs pegged their exchange rates to the U.S. dollar. All of this assumes, of course, that a country wants to defend the peg and is pursuing policies consistent with this end. The peg does not eliminate the incentive to create inflation; it merely imposes a

constraint on the central bank's ability to act on that incentive which will depend on the political (or other) costs of breaking the peg.[19]

The other major advantage of fixing the exchange-rate is that doing so reduces transaction costs and exchange-rate risks that discourage trade (Frankel, 1999). The higher exchange-rate variability associated with floating exchange-rate regimes creates uncertainty that can discourage trade and investment. Although the argument that fixing the exchange-rate can eliminate excessive exchange-rate volatility and risk and encourage trade and investment tends to be downplayed in countries in which exchange-rate risk hedging is possible due to forward markets and other instruments, trade and investment promotion in Europe were clearly a prime motivator of the European Monetary Union. Although the empirical findings regarding the relationship between trade and fixed exchange-rates tend to be ambiguous, we cannot, however, reject the associated theoretical implications.[20] As observed by Rose (2000), there is little consensus on the effects of exchange-rate volatility on trade, save that the effects are difficult to estimate. Possible explanations for this difficulty in time-series analysis include the difficulty of measuring exchange-rate volatility and using derivatives to hedge risk as well as problems with data sets. Kenen and Rodrik (1986) find, however, that volatility tends to depress the volume of international trade.

This second line of arguments implies that because fixed exchange-rate regimes might be associated with higher levels of openness and trade, excluding the fixed exchange-rate regime variable can bias the results.

In order to take into account these considerations, I estimate a regression of the log of inflation on the degree of openness, a variable that controls for the exchange-rate regime, other control variables, and country and year dummies.

[19] See Tornell and Velasco (2000) for arguments against the discipline imposed by fixed exchange-rate regimes.

[20] Bacchetta and Van Wincoop (2000), using a general-equilibrium framework with deviations from purchasing power parity caused by rigid price setting in the buyer's currency, find that both trade and welfare can be higher under either a fixed or flexible regime depending on the preferences and monetary rules pursued.

$$Log(Inflation_{it}) = \beta_1 Openess_{it} + \beta_2 Exchange\ Rate\ Regime_{it} + \beta_2 Controls_{it} + \eta_i + \lambda_t + \nu_{it} \quad (3)$$

where η_i refers to country fixed effect, λ to year fixed effect, and ν_{it} the i.i.d. error term.

The exchange-rate regime was taken from the IMF's *Annual Report on Exchange-rate Arrangements and Exchange Restrictions*. The regime variable was defined as a dummy variable that takes the value of 0 country maintained a floating regime, 1 if a country maintained an intermediate regime, and 2 if a country a maintained a fixed regime, at each *t*.

Table 7 reports the main results. Column (1) reveals the openness measure to be positive and significant and the exchange-rate regime variable to be both negative and significant. Note again that because the regression includes fixed effect and period dummies, only the time series variation in openness and the exchange-rate regime are picked up by the coefficient. Hence, the coefficient reflects the effect of moving from floating to fixed regimes on inflation. The results are also economically significant. A country adopting a fixed exchange-rate regime would experience a reduction in inflation close to 40% relative to that under a floating regime. The result, as reported in column (2), is robust to the inclusion of growth of GDP per capita, which has a negative and significant effect on inflation. In this case, the coefficient on openness is positive and significant. Column (3) compares these results with those obtained *not* controlling for country fixed effects. In this case the openness measure is negative and significant. The exchange-rate-regime dummy, however, remains negative and significant with a higher estimated reduction in inflation. This indicates that countries with fixed regimes tend to have lower inflation levels; not only moving from floating to a fixed-regime reduces inflation.

Column (4) adds the fiscal deficits variable. The openness measure remains positive and significant and both the exchange-rate regime variable and the log of GDP are negative and significant. The fiscal variable, although having the right sign, is not significant. Column (5) shows the results to be robust to controlling for high inflation. The coefficient on openness is positive and

significant. The results, not reported due to space considerations, are robust to controlling for fiscal deficits.[21] Column (6) control for the development level and shows the exchange-rate regime variable to be significant for middle and poor income countries.[22]

Causality

In particular, it might be that low inflation countries are better able to maintain a pegged exchange-rate regime. I follow Ghosh et al. (1997, 2002) approach and test for endogeneity of the exchange-rate-regime choice. Following Maddala (1989), the authors implement a simultaneous equation framework whereby the reduced form for the regime choice is first estimated using a probit model. The predicted values from the probit estimation are substituted into the inflation equation with the appropriate correction for standard errors.[23] Since it is difficult to find plausible instruments that distinguish between pegged and intermediate regimes, the authors use only pegged regimes (and group intermediate and floating together). In addition, lagged values were used as instruments to control for potential endogeneity of the other variables. As a benchmark result, column (5) shows the estimates of a regression of the log of inflation on openness, a dummy for pegged regime, the control variables, and country and time dummies. Column (6) shows the results of controlling for regime choice.[24] The lower estimate indicates that there is some choice-endogeneity in the OLS estimates. However, even after taking this into consideration, adopting a fixed exchange-rate regime has a significant and economically important impact on reducing inflation.[25]

Exchange-rate Regime Classification

[21] The estimate on openness and the exchange-rate regime of using inflation measured as the annual change in the GDP deflator and controlling for high inflation episodes were 0.032 (0.026) and –2.402 (0.356) respectively.

[22] Results were not significant for a rich countries sub-sample, although this might be due to the smaller sample size.

[23] In principle, the non-linearity of the probit function is sufficient for identifying the inflation regression; however, the authors use country size and export concentration as exclusion restrictions.

[24] In the first-stage probit regression, export concentration and openness had the expected sign and significant estimates, 0.025 (0.003) and 0.018 (0.003) respectively. The estimates for other variables were not significant.

[25] The results are robust to including fiscal deficits and controlling for endogeneity choice. The estimated coefficient on the exchange rate regime dummy was –0.249 (0.095).

An additional concern is related to the differences between what governments have announced and what they have actually done in terms of exchange-rate regimes. D*e jure* regimes capture the importance of public announcements as a signal to set expectations. As an additional test, I also use *de facto* regimes. Table 8 presents the main results of performing a similar exercise using the exchange-rate classification developed by Reinhart and Rogoff (2003). These authors use data based on market-determined parallel exchange-rates to classify the exchange-rate regime.[26] As they note, this new method found that an important number of countries floated the exchange-rate while announcing peg regimes and vice versa – several countries that claim to float where *de facto* pegging. In order to ease comparisons with the results that use the IMF classification, their floating regime were coded as 0; intermediate regimes as 1; and fixed as 2.

Column (1) in Table 8 shows the exchange rage regime variable to have a positive and significant value. Once considering for *de facto* regimes, adopting a fixed exchange-rate regime has a significant effect in reducing inflation. Columns (2) to (5) show the result to be robust to including growth, fiscal deficits, excluding high inflation episodes and in middle- and low- income countries. Finally, column (7) controls for the endogeneity of the regime choice. The results can be contrasted against the benchmark case that uses a dummy for fixed regimes in column (6).[27] Although the OLS estimates were also subject to simultaneity bias, the main results are still significant and economically important. Summarizing, at short-term horizons, the exchange-rate regime betters openness in restraining inflation.

5. Conclusions

This paper demonstrates empirically the non-significant role openness seems to play as a commitment mechanism in the short-term. Pegged-exchange-rate regimes, however, have been

[26] The Data Appendix describes the classification in detail.

[27] The first-stage probit estimates for export concentration and openness were 0.017 (0.003) and 0.003 (0.001) respectively. Estimates for the other variables were not significant.

associated with significantly better inflation performance. These results hold after controlling for country and time-fixed effects and using Reinhart and Rogoff's (2003) *de facto* exchange-rate-regime classification.

The negative and strong relationship between inflation and a fixed exchange-rate regime is consistent with the classical literature, which argues that fixed exchange-rate regimes impose "discipline" on individual countries, reflecting the greater observability, accountability, and transparency of the exchange-rate over openness. The relationship is consistent as well with the literature on dynamic inconsistency problems that suggest that the absence of pre-commitment in monetary policy leads to inefficiently high levels of inflation. A government that decides to pursue an inflationary policy risks undermining the viability of the fixed exchange-rate regime, which can constrain its intentions. There being a stronger link between the exchange-rate and inflation than between inflation and openness in the short-term, inflation might be more effectively restrained through economic cooperation and by integrating the design of macroeconomic policies consistent with maintaining fixed exchange-rates. The message of the paper is not that a peg inconsistent with fiscal and monetary policies can achieve low, long-term, sustainable inflation. Rather, this paper argues that, in the short run, a fixed exchange-rate has served as a commitment mechanism and thereby limited inflation.

6. Data Appendix

A. Countries and Samples

1. Sample of countries included in cross-section
2. Sample of countries included in panel

Algeria (1,2), Angola (1), Argentina (1,2), Australia (1,2), Bahamas (1), Bahrain (1,2), Bangladesh (1,2), Barbados (1,2), Belgium (1,2), Belize (1,2), Benin (1,2), Bolivia (1,2), Botswana (1,2), Brazil (1,2), Bukina Faso (1,2), Burundi (1,2), Cameroon (1,2), Canada (1,2), Cape Verde Is. (1), Central African Republic (1), Chad (1), Chile (1,2), Colombia (1,2), Comoros (1), Congo (1,2), Costa Rica (1,2), Cyprus (1,2), Denmark (1,2), Djibouti (1), Dominica (1), Dominican Republic (1,2), Ecuador (1,2), Egypt (1,2), El Salvador (1,2), Ethiopia (1,2), Fiji (1,2), Finland (1,2), France (1,2), Gabon (1,2), Germany (1,2), Ghana (1,2), Greece (1,2), Guatemala (1,2), Guinea (1), Guinea-Bissau (1), Guyana (1,2), Haiti (1,2), Honduras (1,2), Hong Kong (1,2), Hungary (1), Iceland (1,2), India (1,2), Indonesia (1,2), Iran (1,2), Iraq (1), Ireland (1,2), Israel (1,2), Ivory Coast (1,2), Jamaica (1,2), Japan (1,2), Jordan (1,2), Kenya (1,2), Korea (1,2), Kuwait (1,2), Laos (1), Lesotho (1), Liberia (1,2), Luxembourg (1,2), Madagascar (1,2), Malawi (1,2), Malaysia (1,2), Mali (1), Mauritania (1,2), Mauritius (1,2), Mexico (1,2), Morocco (1,2), Mozambique (1,2), Myanmar (1,2), Namibia (1), Nepal (1), Netherlands (1,2), New Zealand (1,2), Nicaragua (1,2), Niger (1,2), Nigeria (1,2), Norway (1,2), Oman (1,2), Pakistan (1,2), Panama (1,2), Papua N. Guinea (1,2), Paraguay (1,2), Peru (1,2), Philippines (1,2), Portugal (1,2), Puerto Rico (1), Rwanda (1), Saudi Arabia (1,2), Senegal (1,2), Seychelles (1), Sierra Leone (1,2), Singapore (1,2), Solomon Is. (1), Somalia (1,2), South Africa (1,2), Spain (1,2), Sri Lanka (1,2), St. Lucia (1), St. Vincent and Grenada (1), Sudan (1,2), Suriname (1,2), Swaziland (1,2), Sweden (1,2), Switzerland (1,2), Syria (1,2), Thailand (1,2), Togo (1,2), Trinidad and Tobago (1,2), Tunisia (1,2), Turkey (1,2), U.K. (1,2), U.S.A. (1,2), Uganda (1), United Arab E. (1,2), Uruguay (1,2), Venezuela (1,2), Yemen (1,2), Zaire (1,2), Zambia (1,2), Zimbabwe (1,2).

B. Data Sources and Descriptions

Inflation: Logarithm of inflation measured by the GDP deflator, 1973-1998. Source: *World Bank Development Indicators* (2001).

Openness measures: Imports as a percentage of GDP and exports as a percentage of GDP, 1973-1998. Source: *World Bank Development Indicators*.

Real GDP per capita: Log of real per capita GDP in constant 1995 dollars, 1973-1998. Source: *World Development Indicators, World Bank* (2001).

Growth real GDP per capita: First difference of log of real per capita GDP in constant 1995 dollars, 1974-1998. Source: *World Development Indicators, World Bank* (2001).

Fiscal Deficit: Overall government deficit including grants as a percentage of GDP, 1973-1998. Source: *World Development Indicators, World Bank* (2001).

Public Debt: Central government's debt as a percentage of GDP, 1973-1998. Source: *World Development Indicators, World Bank* (2001).

Export Concentration: Share of total exports to 3 largest trading partners, 1973-1998. Source: Gosh et al. (2002).

Exchange-rate regime: Dummy variable defined as 0 if the country maintained a floating regime; 1 if country maintained an intermediate regime 2 if the country maintained a fixed regime, 1973-1998. Source: *IMF's Annual Report on Exchange-rate Arrangements and Exchange Restrictions*, various issues 1973-1998.

Fixed exchange-rate regime: Dummy variable defined as 1 if the country maintained a fixed exchange-rate regime, zero otherwise, 1973-1998. Source: *IMF's Annual Report on Exchange-rate Arrangements and Exchange Restrictions*, various issues 1973-1998.

Regime-Reinhart-Rogoff: Exchange-rate taxonomy constructed by Reinhart and Rogoff (2003) that classifies de facto exchange-rates by considering the role of market-determined parallel exchange-rates among other variables. In their classification, the least flexible arrangements are assigned lower values in their scale. The coarse grid differentiates five categories: (1) fixed regimes (no separate legal tender, pre announced peg or currency board arrangement, pre announced horizontal band that is narrower or equal to +/-2%, and de facto pegs), (2) crawling pegs (pre announced and *de facto* crawling pegs and pre announced crawling band that is wide than or equal to +/-2%,), (3) managed floating (which includes de facto crawling band that is narrower than or equal to +/-5% and moving band that is narrower than or equal to +/-2%), (4) freely floating and (5) freely falling (a category for counties whose twelve-month inflation rate is above 40%). In order to compare results with the IMF classification, the exchange-rate regime was defined as dummy variable defined as 0 if the country maintained a floating regime, (3), (4), (5) in their original classification; 1 if country maintained an intermediate regime, (2) in their original classification; and 2 if the country maintained a fixed regime, (1) in their original classification, 1973-1998. Source: *Reinhart and Rogoff (2003)*.

Fixed-Reinhart-Rogoff: Dummy variable defined as 1 if Reinhart and Rogoff (2003) classified a country as one with a fixed exchange-rate regime (1), zero otherwise, 1973-1998.

7. References

Alesina A. and R. Roubini (1990). "Political Cycles in OECD Economies," *Review of Economic Studies* 59, 663-688.

Bacchetta, Phillipe and Eric Van Wincoop (2000). "Does Exchange-Rate Stability Increase Trade and Welfare?" *American Economic Review* 90, 1093-1109.

Barro, Robert and David Gordon (1983). "A Positive Theory of Monetary Policy in a Natural Rate Model?" *Journal of Political Economy* 91, 589-610.

Baltagi, Badi H. (2001). *Econometric Analysis of Panel Data* (Chichester, U.K: John Wiley & Sons).

Bleaney, Michael (1999). "The Disappearing Openness-Inflation Relationship: A Cross-Country Analysis of Inflation Rates," IMF Working Paper.

Calvo, Guillermo and Carlos Vegh (1999). "Inflation Stabilization in Chronic Inflation Countries," in *Handbook of Macroeconomics*, edited by John Taylor and Michael Woodford (Amsterdam: North Holland).

Campillo, Marta and Jeffrey A. Miron (1997). "Why Does Inflation Differ across Countries?" *Reducing Inflation: Motivation and Strategy,* edited by Christina D. Romer and David H. Romer, NBER Studies in Business Cycles, (Chicago and London: University of Chicago Press).

Catão, Luis and Macro E. Terrones (2003). "Fiscal Deficits and Inflation," IMF Working Paper.

Di Tella, R. and R. MacCulloch (2000). "The Welfare State as a Substitute for a Conservative Central Banker," Harvard Business School Working Paper.

Ghosh, Atish, Anne-Marie Gulde and Jonathan D. Ostry (1997). "Does Nominal Exchange Regime Matter?" NBER Working Paper 5874.

Ghosh, Atish, Anne-Marie Gulde and Jonathan D. Ostry (2002). *Exchange-rate Regimes. Choices & Consequences* (Cambridge: MIT Press).

Fisher Stanley, Ratna Sahay and Carlos Vegh (2002). "Modern Hyper- and High Inflations," *Journal of Economic Literature* 40, 176-187.

Frankel Jeffrey (1999) "No Single Currency Regime is Right for All Countries or at All Times," NBER Working Paper 7338.

Im, Kyung So, M. Hashem Pesaran and Yongcheol Shin (2003) "Testing for Unit Roots in Heterogeneous Panels," *Journal of Econometrics* 115, 53-74.

International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restriction*, various issues, (Washington, D.C.).

Kenen, Peter B. and Dani Rodrik (1986). "Measuring and Analyzing the Effects of Short-term Volatility in Real Exchange-rates," *Review of Economics and Statistics* 68, 311-315.

International Monetary Fund*, International Financial Statistics on CD-Rom* (Washington, D.C.).

Kydland, Finn and Edward Prescott (1977). "Rules Rather than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy* 85, 473-491.

Lane, Philip R. (1997). "Inflation in Open Economies," *Journal of International Economics* 42, 327-347.

Levine, Andrew, Chien-Fu Lin and Chia-Shang James Chu (2002). "Unit Root Tests in Panel Data: Asymptotic and Finite Sample Properties," *Journal of Econometrics* 108, 1-24.

Maddala, G. S. (1989). *Limited Dependent and Qualitative Variables in Econometrics* (Cambridge: Cambridge University Press).

Persson, Torsten and Guido Tabellini (1994). "Introduction," in *Monetary and Fiscal Policy* (Cambridge: MIT Press).

Reinhart, Carmen and Kenneth Rogoff (2003). "The Modern History of Exchange-rate Arrangements: A Reinterpretation," forthcoming *Quarterly Journal of Economics.*

Rogoff, Kenneth (1985). "Can International Monetary Policy Coordination Be Counterproductive?" *Journal of International Economics* 18, 199-217.

Romer, David (1993). "Openness and Inflation: Theory and Evidence," *Quarterly Journal of Economics* 58, 869-903.

Romer, David (1998). "A New Assessment of Openness and Inflation: Reply," *Quarterly Journal of Economics* 63, 649-652.

Rose, Andrew (2000). "One Money, One Market: Estimating The Effect of Common Currencies on Trade," *Economic Policy* 15, 7-33.

Sargent, Thomas and Neil Wallace (1973). "The Stability of Models of Money and Growth with Perfect Foresight," *Econometrica* 41, 1043-1048.

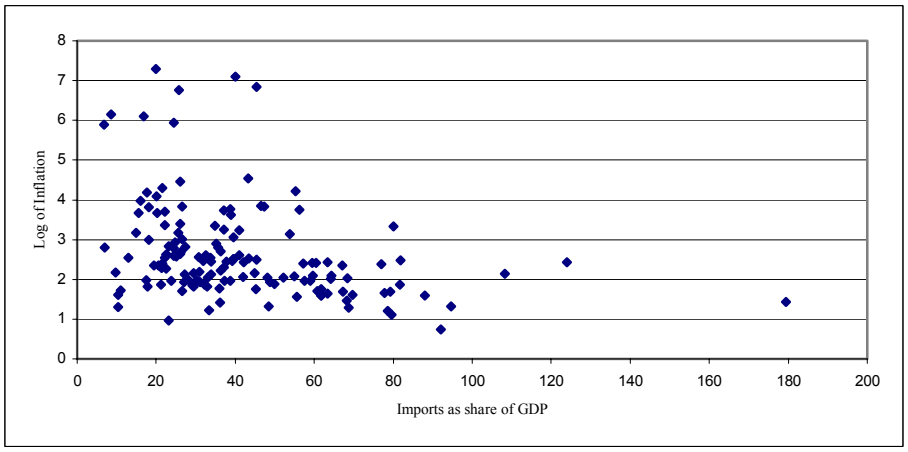
Stokey, Nancy (2002). " Rules versus Discretion After Twenty Five Years," University of Chicago Conference Draft for the *NBER Macroeconomics Annual 2002*.

Terra, Cristina (1998). "Openness and Inflation: A New Assessment," *Quarterly Journal of Economics* 63, 641-648.

Tornell, Aaron and Andrés Velasco (2000). "Fixed versus Flexible Exchange-Rates: Which Provides more Fiscal Discipline?" *Journal of Monetary Economics* 45, 399-436.

World Bank, (2000). *World Development Indicators, CD-ROM*. (Washington, D.C.).

Figure 1: **Inflation and Openness: 1973-1998**



Notes: See the Data Appendix for countries included in the sample.

Table 1a: **Inflation in Selected Regions of the World**

	Average 1982-1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP deflator										
Advanced countries	4.9	3.2	2.7	2.2	2.3	1.8	1.7	1.4	0.8	1.4
Consumer prices										
Advanced countries	4.9	3.5	3.1	2.6	2.6	2.4	2.1	1.5	1.4	2.3
Developing countries	45.1	42.8	48.7	55.3	23.2	15.4	10.0	10.6	6.9	6.1
Africa	19.5	47.1	39.1	54.7	35.3	30.2	14.6	10.9	12.3	14.2
Asia	9.7	8.6	10.8	16.0	13.2	8.3	4.8	7.7	2.5	1.9
Western Hemisphere	163.0	150.1	195.2	200.2	36.0	21.2	12.9	9.8	8.9	8.2

Source: World Bank, *World Development Indicators,* 2001.

Table 1b**: Integration with the Global Economy: Trade in Goods**

	% Share of PPP GDP		% Share of Goods GDP	
	1988	1998	1988	1998
World	21.2	28.3	71.9	92.1
Low Income	6.8	8.3	38.6	62.5
Latin America and Caribbean	9.4	19.1	52.3	74.5
Sub-Saharan Africa	15.4	16.8	73.2	99.5
High Income	28.3	38.3	75.2	95.1

Source: World Bank, *World Development Indicators,* 2001.

Table 2a: **Descriptive Statistics**

Sample: 130 Countries (1973-1998)				
	Mean	Std. Dev.	Minimum	Maximum
Inflation	44.5	143.9	0.8	1121.1
Imports	40.4	24.0	7.4	158.5
Exports	34.6	23.5	7.3	171.1
GDP per Capita	5244	5149	382	19762
Fiscal Deficit	4.3	4.4	0.1	31.5
Government Debt	47.2	38.3	4.2	220.9

Notes: All variables are sample averages for 1973-1998. Inflation is the log of the average annual change in the GDP deflator. Imports are the share of imports to GDP. Exports are the share of exports to GDP. GDP per capita is Gross Domestic Product in constant U.S. dollars divided by the population. Fiscal Deficit is the government's deficit as a percentage of GDP. Government Debt is the central government's debt as a percentage of GDP. See the Data Appendix for sources.

Table 2b: **Correlation Matrix**

Sample: 130 Countries (1973-98)					
	Imports	Exports	GDP Capita	Deficit	Debt
Imports	1.00				
Exports	0.87	1.00			
GPD per Capita	0.13	0.36	1.00		
Fiscal Deficit	0.07	0.01	-0.20	1.00	
Government Debt	0.15	0.03	-0.20	0.68	1.00

Notes: This correlation matrix is for the main explanatory variables. See the Data Appendix for sources and definitions of the variables.

Table 2c: **Average Inflation Across Exchange Rate-Regimes**

IMF Exchange Rate Regime			Reinhart-Rogoff Exchange Rate Regime		
	Mean	Std. Dev.		Mean	Std. Dev.
Fixed	27.1	235.5	Fixed	10.3	17.6
Floating	52.7	255.4	Floating	67.1	318.4

Notes: Inflation is the log of the annual change in the GDP deflator. IMF Exchange Rate regime (IMF) refers to the IMF's classification of a country's exchange rate as fixed or floating. Reinhart-Rogoff Exchange Rate Regime (RR) refers to the Reinhart-Rogoff classification of country exchange rates as fixed or floating. Intermediate regimes are included in the floating category. Table excludes hyperinflation episodes in order to smooth the effect of outliers. See the Data Appendix for sources and definitions of the variables.

Table 3: **Openness and Inflation: Long-Term Commitment (Cross-Section)**

Dependent Variable: Inflation

	(1)	(2)	(3)	(4)
Imports	-0.014***	-0.013***	-0.015***	-
	(0.004)	(0.004)	(0.004)	-
Exports	-	-	-	-0.016***
	-	-	-	(0.005)
GDP per Capita	-	-0.181**	-0.047	0.078
	-	(0.078)	(0.127)	(0.137)
Constant	3.159***	4.569***	3.678***	2.650***
	(0.194)	(0.615)	(0.969)	(0.994)
Regional Dummies	No	No	Yes	Yes
R^2	0.09	0.12	0.23	0.22
# Observations	130	130	130	130

Notes: All regressions correspond to the cross-sectional average for the period 1973-1998 and are estimated by OLS with White's correction for heteroskedasticity. Robust standard errors are in parentheses denoting *** 1%, ** 5%, * 10% significance. All variables are in levels except inflation and GDP per capita, which are in logs in order to smooth the effect of outliers. Imports, Exports, Fiscal Deficit and Government Debt correspond to the respective percentages of GDP. Regional Dummies include OECD, Latin America, Africa, and East Asia. See the Data Appendix for sources and descriptions of the variables.

Table 4: **Robustness. Inflation and Openness: Long-Term Commitment**

Dependent Variable: Inflation

	(1)	(2)	(3)	(4)	(5)	(6)
Imports	-0.018***	-0.016***	-0.009***	-0.013***	-0.011**	-0.003
	(0.004)	(0.005)	(0.003)	(0.003)	(0.005)	(0.006)
GDP per Capita	0.024	-0.032	-0.094	-0.038	-0.195	-0.225
	(0.129)	(0.169)	(0.090)	(0.082)	(0.181)	(0.178)
Fiscal Deficit	0.060***	-	0.051***	0.052***	0.049*	0.127*
	(0.019)	-	(0.010)	(0.010)	(0.025)	(0.065)
Government	-	0.004*	-	-	-	-
Debt	-	(0.003)	-	-	-	-
Constant	2.929***	3.342***	3.253***	3.007***	3.880***	3.529**
	(0.979)	(1.276)	(0.668)	(0.623)	(1.322)	(1.461)
R^2	0.32	0.34	0.72	0.76	0.36	0.44
# Observations	123	103	123	123	123	123

Notes: All regressions correspond to the cross-sectional average for the period 1973-1998 and are estimated by OLS with White's correction for heteroskedasticity. All regressions include regional dummies (OECD, Latin America, Africa, and East Asia). Robust standard errors are in parentheses denoting *** 1%, ** 5%, * 10% significance. All variables are in levels except inflation and GDP per capita, which are in logs in order to smooth the effect of outliers. Column (3) controls for high inflation countries (average inflation greater than 50%). Column (4) controls for high inflation countries, low inflation countries (average inflation less than 2%), and high openness countries (imports as a percentage of GDP greater than 100%). For column (5) the sample period is 1980-1998; for column (6) it is 1990-1998. See the Data Appendix for sources and descriptions of the variables.

Table 5: **Openness and Inflation: Short-Term Commitment (Panel Data)**

Dependent Variable: Inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Imports	0.012***	0.013***	0.017***	-	-0.009**	-0.012***	0.004
	(0.003)	(0.003)	(0.004)	-	(0.001)	(0.002)	(0.010)
Exports	-	-	-	0.018***	-	-	-
	-	-	-	(0.003)	-	-	-
Growth GDP	-	-1.892***	-2.828***	-2.011***	-3.123***	-3.560***	-4.092***
Per Capita	-	(0.574)	(0.672)	(0.585)	(0.660)	(0.706)	(0.737)
Fiscal Deficit	-	-	0.004	-	-	0.015***	0.013**
	-	-	(0.008)	-	-	(0.006)	(0.005)
R^2	0.54	0.54	0.58	0.56	0.09	0.12	0.07
# Observations	2033	2033	1563	2033	2033	1563	1561

Notes: All regressions correspond to annual panel data for 1973-1998. All specifications include year and country dummies except for columns (5)-(7), which include only year dummies. Robust standard errors are in parentheses denoting *** 1%, ** 5%, * 10% significance. All variables are in levels except inflation, which is the log of the annual change in the GDP deflator in order to smooth the effect of outliers. Growth GDP per capita corresponds to the first difference of the log of the annual GDP per capita. In Column (7) imports correspond to the first difference of the share of imports to GDP. See the Data Appendix for sources and descriptions of the variables.

Table 6: **Robustness. Inflation and Openness: Short-Term Commitment**

Dependent Variable: Inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Imports	0.011***	0.008***	0.011***	0.018***	-0.002	0.004	0.009**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.007)	(0.008)	(0.003)
Growth GDP	-1.390***	-1.387***	-1.639***	-2.524***	-1.084	-0.080	-2.012***
Per capita	(0.466)	(0.408)	(0.497)	(0.678)	(1.242)	(1.111)	(0.587)
Fiscal Deficit	-	-	0.0003	-	-	-	-
	-	-	(0.006)	-	-	-	-
R^2	0.63	0.72	0.74	0.54	0.71	0.72	0.53
# Observ.	2033	2033	1563	1669	744	351	1682

Notes: All regressions correspond to annual panel data for 1973-1998. All specifications include year and country dummies. Robust standard errors are in parentheses denoting *** 1%, ** 5%, * 10% significance. All variables are in levels except inflation rate, which is the log of the change in the GDP deflator in order to smooth the effect of outliers. Growth GDP per capita corresponds to the first difference of the log of the annual GDP per capita. Column (1) controls for high inflation episodes (average inflation greater than 50%). Columns (2) and (3) control for high inflation episodes, low inflation episodes (average inflation less than 2%), and high openness (imports as a percentage of GDP greater than 100%). The sample period in column (4) is 1980-1998; the sample period in column (5) is 1990-1998. Column (6) includes only high-income countries; column (7) includes only middle- and low-income countries. See the Data Appendix for sources and descriptions of the variables.

Table 7: **Inflation and Openness. Short Term Commitment: The Role of the Exchange Rate Regime (IMF Classification)**

Dependent Variable: Inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Imports	0.009	0.010***	-0.007***	0.014***	0.008***	0.007*	0.013***	0.007**
	(0.003)	(0.003)	(0.001)	(0.004)	(0.002)	(0.004)	(0.003)	(0.003)
Growth GDP	-	-1.932***	-3.511***	-0.283***	-1.431***	-2.011***	-1.909***	-2.264**
Per capita	-	(0.565)	(0.655)	(0.661)	(0.459)	(0.582)	(0.551)	(0.555)
Exchange	-0.260***	-0.262***	-0.294***	-0.242***	-0.227***	-0.184***	-	-
Regime- IMF	(0.036)	(0.036)	(0.029)	(0.044)	(0.020)	(0.039)	-	-
Fiscal Deficit	-	-	-	0.004	-	-	-	-
	-	-	-	(0.007)	-	-	-	-
Pegged	-	-	-	-	-	-	-0.352***	-0.205**
Regime-IMF	-	-	-	-	-	-	(0.067)	(0.088)
R^2	0.56	0.56	0.13	0.60	0.65	0.54	0.57	0.45
# Observ.	2033	2033	2033	1563	2033	1682	1517	1517

Notes: All regressions correspond to annual panel data for 1973-1998. All specifications include country and year dummies except for column (3), which includes only year dummies. Robust standard errors are in parentheses denoting *** 1%, ** 5%, * 10% significance. All variables are in levels except inflation rate, which is the log of the annual change in the GDP deflator in order to smooth the effect of outliers. Growth GDP per capita corresponds to the first difference of the log of the annual GDP per capita. Exchange Rate Regime (IMF) refers the IMF classification of a country's exchange rate regime (2 if fixed; 1 if intermediate; 0 if floating). Column (5) controls for high inflation episodes (greater than 50%). Column (6) includes only middle- and low-income countries. In column (7), pegged regime is a dummy variable taking the value of 1 if the country has a fixed exchange rate regime according to the IMF classification. Column (8) controls for endogeneity of regime choice. See the Data Appendix for sources and descriptions of the variables.

Table 8: **Inflation and Openness. Short Term Commitment: The Role of The Exchange Rate Regime (Reinhart-Rogoff Classification)**

Dependent Variable: Inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Imports	0.013***	0.014***	0.018***	0.011***	0.011***	0.017***	0.004
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
Growth GDP Per Capita		-1.230* (0.629)	-2.206* (0.777)	-0.714 (0.537)	-1.410** (0.633)	-1.944** (0.635)	-2.179*** (0.620)
Exchange Regime-RR	-0.393	-0.387***	-0.376***	-0.279***	-0.346***	-	-
	(0.042)	(0.042)	(0.050)	(0.032)	(0.045)	-	-
Fiscal Deficit	-	-	0.006	-	-	-	-
	-	-	(0.008)	-	-	-	-
Pegged Regime - RR	-	-	-	-	-	-0.444***	-0.344***
	-	-	-	-	-	(0.070)	(0.121)
R^2	0.57	0.57	0.61	0.65	0.55	0.59	0.26
# Observ.	1810	1810	1421	1810	1492	1404	1404

Notes: All regressions correspond to annual panel data for 1973-1998. All specifications include country and year dummies. Robust standard errors are in parentheses denoting *** 1%, ** 5%, * 10% significance. All variables are in levels except inflation rate, which is the log of the change in the annual GDP deflator in order to smooth the effect of outliers. Growth GDP per capita corresponds to the first difference of the log of the annual GDP per capita. Exchange Rate Regime (RR) refers the Reinhart-Rogoff classification of a country's exchange rate regime (2 if fixed; 1 if intermediate; 0 if floating). Column (4) controls for high inflation episodes (greater than 50%). Column (5) includes only middle- and low-income countries. In column (6), pegged regime is a dummy variable taking the value of 1 if the country has a fixed exchange rate regime according to the Reinhart and Rogoff classification. Column (7) controls for endogeneity of regime choice. See the Data Appendix for sources and descriptions of the variables.