The Effectiveness of Monetary Policy Anchors: Firm-Level Evidence

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Abstract: Analyses of monetary policy posit that exchange-rate pegs, inflation targets, and central bank independence can discipline monetary policy decision-making and serve as anchors for private sector inflation expectations. Yet there are few direct empirical tests of these arguments at the micro level of analysis. We offer cross-national, individual-level evidence on the effectiveness of monetary anchors in controlling private sector inflation expectations. Using firm-level data from the World Bank's World Business Environment Survey (81 countries, ~10,000 firms), we find evidence that "international" anchors (exchange-rate commitments) correlate significantly with a substantial reduction in private sector concerns about inflation while "domestic" anchors (inflation targeting and central bank independence) do not. We also find that fixed exchange rates are associated with a marked improvement in firm owner perceptions of the predictability of economic policy. Our results support the conjecture that private sector inflation expectations are more responsive to international (exchange-rate) anchors because they are more transparent, more constraining, and more costly than domestic anchoring arrangements.

1. Introduction

The literature on monetary policy highlights the role of institutional commitments in stabilizing private-sector inflation expectations. Central bank independence, (CBI) inflation targeting (IT), and fixed exchange rates (pegs) are widely viewed as institutions that have the capacity to mitigate private sector concerns that policymakers will exploit them after they have locked in their price, wage, and investment decisions.[1] While previous empirical work has looked at the institutional correlates of inflation and its variability--yielding mixed results--we use firm-level data to directly assess the impact of monetary anchors on private sector inflation concerns and expectations. We find that strong evidence that only international anchoring arrangements (fixed exchange-rate regimes) mitigate firm owners' concerns with inflation and reduce their perceptions of policy instability. By contrast, purely domestic anchors such as inflation targeting and central bank independence are uncorrelated with these proxies for private-sector "inflation expectations."

Considerable research has investigated the use of inflation targets, central bank independence, and fixed exchange rates as institutions that governments might use to establish monetary policy credibility. Whereas these anchors are expected, theoretically, to yield improvements in credibility, the empirical record is surprisingly weak (see below). In this work, private-sector price expectations have been skipped over in favor of empirical approaches that model country-level inflation and inflation variability as a function of anchoring institutions and other influences. This has left a gap between the

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[1] We do not consider monetary targeting in this paper because cross-national data on it is limited. See Mishkin (1999) for a discussion of this anchoring system.

positive theories of inflation that rest on private agent microfoundations and empirical work, which tends to forego micro-level treatments altogether.[2]

Our work may shed light on the empirical inconsistencies found in country-level analyses. If certain monetary institutions are inherently more credible than others, then not only inflation but also private-sector inflation expectations must differ systematically across countries that differ in their institutions. If central bank independence reduces inflation, then firm owners in countries with more independent central banks should perceive their governments' promises of low inflation to be more credible. Likewise, if inflation targets and exchange-rate pegs anchor inflation expectations, we should expect to find that firm managers in countries with such regimes perceive policymakers to be more credible than firm owners in countries that lack these anchoring institutions. Examining the impact of institutions at the individual level of analysis is necessary because the structure of incentives provided by a country's monetary institutions must work through private agents to have aggregate effects.

Improvements in cross-national surveys of business managers and owners allow us to analyze the connection between anchoring institutions and individual perceptions. We draw upon the World Bank's World Business Environment Survey (WBES) for our firm-level data. In 1999, the WBES was administered to over 10,000 firms in 81 countries. The stated purpose of the survey was to identify the features of a country's investment climate that matter most for productivity and growth, *from the perspective of private-sector actors*. The WBES assessed the institutional and policy environment for

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[2] Some research employs "behavioral" proxies for inflation expectations--bond yields-- and examines the effects of monetary anchors on these indicators (Gurkaynak, Levin, and Swanson 2006).

private enterprise using a common survey instrument, administered to a representative sample of firms in each country. This standardized approach allows us to draw consistent, cross-national inferences from these data.

Our micro-level approach provides a more direct test of institutional theories of monetary credibility than work employing cross-country or time-series inflation regressions. As such, it can help shed light on current controversies. For example, while the theoretical case for central bank independence and inflation targeting is strong, research has produced limited empirical evidence of independence or targeting delivering on their promised low inflation benefits in practice (see, for example, Forder 2000, and Ball and Sheridan 2005). The evidence on exchange-rate anchoring, however, tends to be more consistently supportive of this regime's ability to bring inflation and inflation volatility down (Tavlas, Dellas, and Stockman 2008). One reason why CBI and IT may perform poorly at the macro level is that these institutions are not as effective as exchange rate pegs in anchoring inflation expectations at the micro level. This is what we find in this paper. We conjecture that international (exchange-rate) anchors are more effective at anchoring firm owner expectations because they are more transparent, more constraining, and more costly to policymakers than domestic anchoring systems.

The plan of the paper is as follows. In section 2, we describe our research design and contrast it with existing work on inflation and monetary institutions. Section 3 presents our dependent variables from the WBES and assesses their validity. Section 4 presents our measures of international and domestic monetary commitment regimes and provides preliminary evidence on how these regimes relate to private sector inflation

expectations. Section 5 contains our empirical models and findings. Section 6 concludes

with a discussion of the theoretical and empirical implications of our study.

2. Monetary Anchors: Theory and Evidence

The Barro-Gordon model is one of the most widely accepted models of inflation

(Barro and Gordon 1983). In the model, the authors look at the costs and benefits of

surprise inflation in a game between the monetary authority and the private sector. After

the monetary authority has announced its policy and the private sector has taken actions

that rely on that policy, the authority has an incentive to raise output above its full

employment level through surprise inflation. In rational-expectations equilibrium, where

inflation is predicted correctly by the private sector, output remains at its full employment

level, but inflation and the volatility of inflation is higher than it would have been had the

monetary authority been able to pre-commit.

This rational-expectations model of inflation and inflation expectations has been a

workhorse for thinking about issues of credibility and institutional design. Rogoff (1985)

offers an institutional precommitment in which the policymaker delegates monetary

policy to an independent and conservative central banker who places a higher weight on

the inflation goal. The private sector, upon observing that the conservative central banker

is in charge of monetary policy, writes lower inflation into its wage and price contracts.

However, delegation to an independent central bank forces a tradeoff between lowering

inflation and stabilizing the real economy. Because a conservative central banker places a

lower weight on the output stabilization goal, the banker responds too little to real shocks.

A large, ancillary literature considers institutions that bring about commitment to

low inflation while allowing some degree of flexibility to stabilize the economy.

Lohmann (1992) proposes a partially independent conservative central banker that accommodates political pressures when extreme shocks hit the economy, while Walsh (1995) advocates optimal contracts that penalizes central bank governors, either by loss of compensation or prestige, for breaking promises without sufficient evidence of cause.

An international or external solution to the "credibility vs. flexibility" tradeoff also exists: commit to an exchange-rate target but provide an escape clause to accommodate shocks (Flood and Isard 1989, Canavan and Tommasi 1997). Pegging the exchange rate to a stable foreign currency provides a credible commitment to low inflation because it eliminates domestic policy discretion: under a peg, the single policy objective is to protect the peg (Ravenna 2005). If it is fully supported by monetary policy, an unchanged peg will tend to produce the same rate of inflation as in the country of the currency peg. As Frankel (1999) and Mishkin (1999) have observed, choosing the exchange rate as the nominal anchor and importing credibility from abroad provides additional advantages: it is relatively easy to implement and provides an easily observable commitment to monetary policy. Yet pegging comes at a high cost since it can eliminate policymakers' capacity to use monetary policy to stabilize the domestic economy; hence, Flood and Isard (1989) model pegged regimes with "escape clauses."

In contrast to targeting the exchange rate of an anchor currency, inflation targeting involves targeting inflation directly. Since the 1990s, inflation targeting has received growing attention-- academically and in practice--as the anchor with the most potential for balancing the goals of credibility and flexibility (Bernanke and Mishkin 1997, Bernanke et al 1999). Under this regime, the central bank commits to a numerical target in the form of a level or a range for annual inflation. This means the inflation

forecast over some horizon becomes the intermediate target of policy. Other requirements of IT are central bank transparency and accountability. These features are important because IT is supposed to enhance credibility while allowing the central bank the flexibility to respond to shocks. On the one hand, the medium-term inflation target makes it clear that low inflation is the primary goal of monetary policy, yielding an increase in credibility. On the other, greater transparency and accountability are meant to compensate for the greater operational flexibility that inflation targeting offers. In theory---if not in practice--short-term deviations of inflation from the medium-run forecast target are possible and do not necessarily translate into losses in credibility.

A large body of macro-level empirical work is built upon the Barro-Gordon framework but it is remarkable how very limited the evidence is that domestic monetary anchors, CBI and IT, bring lower inflation in practice. While some earlier studies found that central bank independence correlated with lower average inflation in a small subset of developed countries (Grilli, Masciandaro, and Tabellini 1991, Cukierman 1992, Alesina and Summers 1993), other researchers have found little or no evidence for the anti-inflationary benefits of CBI in wider samples (Banaian, Burdekin and Willett 1995, Campillo and Miron 1997, Fuhrer 1997, and Crosby 1998). Cargill (1995) finds that the relationship is not robust even among developed countries when the sample of countries and time horizon are changed, while (Posen 1993) suggests that both CBI and inflation can be jointly accounted for by the financial sector's aversion to inflation. Overall, the empirical record for CBI is very mixed, as noted in various reviews of the literature (Eijffinger and de Haan, 1996, de Haan and Kooi, 2000, Berger, Eijffinger, and de Haan, 2001, Arnone, Laurens, and Segalotto 2006, Crowe and Meade 2007).

The evidence on inflation targeting is also inconclusive. While some studies, such as Ammer and Freeman (1995) and Mishkin and Posen (1997), found that average inflation fell under inflation targeting, Cecchetti and Ehrmann (2000) did not find similar benefits. Also, Siklos (1999) found mixed evidence in time-series data, with inflation targeting improving inflation performance in Australia, Canada, and Sweden, but not in Finland, New Zealand, Spain, and the United Kingdom. Ball and Sheridan (2005) examined changes in the level and variability of inflation for seven inflation targeters and 13 non-targeting countries but found no significant evidence that inflation targeters performed better than non-targeters. But these findings have been challenged by supporters of IT (see, e.g., Mishkin and Schmidt-Hebbel 2007). Nevertheless, despite a great deal of effort, many analysts remain skeptical: "Empirical studies on IT have consistently failed to show convincingly that IT has been an important factor in speeding up disinflation, achieving lower inflation rates, lowering the cost of disinflation, or raising the credibility of the central bank's commitment to low inflation" (Neumann and von Hagen 2002, 127).

In contrast to CBI and IT, empirical work on exchange rate targeting has more consistently found correlations between pegging and improvements in inflation performance. In theory, when countries make a firm commitment to target the exchange rate, they sacrifice domestic monetary policy in order to import low-inflation credibility from abroad. In practice, Mahadeva and Stern (2000) report than 39 of 70 episodes of stable inflation, defined as a period of at least five years when inflation remains within a given range, were achieved through exchange rate pegging. They also find that, among developing countries, all 14 episodes of stable inflation occurred through exchange rate

targeting. These findings echo those of other studies, such as Calvo and Vegh (1999), who show that many developing countries that pegged their exchange rates were successful in stabilizing inflation from historically high levels. Giavazzi and Pagano (1988) also found that membership in the European Monetary System generally brought significant credibility gains to inflation-prone countries, such as Italy, Spain, and Portugal. Ravenna (2005) reports that joining the European Monetary Union gave new members from Eastern Europe similar credibility benefits. More generally, Ghosh, Gulde and Wolf (2002) studied a sample of 150 advanced and developing countries and found that inflation averaged 9 percent under pegs, 30 per cent under intermediate regimes, and 59 percent under floating regimes.

In a recent review of the literature on exchange-rate targeting, Tavlas, Dellas, and Stockman (2008, p. 958) conclude that what "emerges from much of the literature, applying to both unconditional and conditional results, is that pegged exchange-rate systems tend to be associated with lower inflation rates." Within the group of pegging nations, other patterns emerge: single-currency pegs--which are more transparent and easier to verify than basket pegs-- had lower inflation rates than other pegged arrangements (Bleaney and Fielding 2002). Also, harder pegs--currency boards, dollarization, and currency unions--are associated with lower inflation rates than softer pegs (Bleaney and Francisco 2005, Ghosh, Gulde and Wolf, 2002).

There is substantial evidence that pegging comes at a cost, which is expected. These costs represent the trade-off that pegging entails: enhancing credibility by abandoning monetary policy as a tool of domestic macroeconomic stabilization. Ghosh et al. (2002) found that pegs are associated with lower inflation but at the cost of more

variable output than in flexible exchange rate regimes. Similarly, Bleaney and Francisco (2007) provide evidence that hard pegs (i.e., currency boards and common currency arrangements) are associated with lower inflation--but again at the cost of slower and more volatile growth--than either floats or soft peg regimes. Furthermore, if the shocks to the economy are large enough, the cost of sustaining a pegged regime can rise above the benefits of sustaining it, inducing a large devaluation accompanied by a sizable decline in economic activity (Aizenman and Glick 2008). Although pegged regimes initially impart substantial improvements in inflation performance, Eichengreen (1999), documents the frequency with which currency crisis and output loses accompany "unhappy" exits from pegged regimes.

Another branch of the empirical literature on exchange rate anchors examines the sustainability of disinflation efforts. It often takes high inflation countries several attempts to rid the economy of inflation and some efforts are successful only temporarily. Several scholars analyze the covariates of successful stabilizations and their results suggest that pegging helps countries sustain successful efforts while inflation targeting does not. Hofstetter (2008) looked at the correlates of successful disinflation efforts in the 1990s and found that an increase in exchange rate flexibility reduced the sustainability of disinflations. He also tested to see if inflation targeting improved the sustainability of disinflation efforts and found no significant relationship. Similarly, Hamann and Prati (2002) examined 51 stabilizations from high inflation and found that countries that pegged were more likely to succeed, after controlling for institutional factors and the pre-stabilization level of inflation.

In summary, the country-level empirical record suggests that nations with a history of high inflation improved their monetary policy credibility and stabilized inflation by pegging. On the other hand, there is surprisingly little consistency in the evidence that inflation targeting or central bank independence is associated with higher credibility and improved inflation performance in the country-level data.

Our research design provides a different--and more direct--test of the relationship between monetary anchors and inflation. Unlike the literature that regresses cross-country inflation rates or inflation volatility on a monetary anchor, we evaluate the effect of anchoring institutions at the micro level, using firm owners' perceptions of inflation and policy volatility as our dependant variables. This design, we contend, provides a more direct test of the rational expectations theory of inflation.

According to the theory of inflation, monetary commitment institutions do not directly affect inflation and inflation variability; rather, institutions influence individual *perceptions and behaviors* which, in aggregate, influence inflation outcomes. Private-actor agency lies between institutions and aggregate outcomes. This suggests that empirical research would benefit from estimating the impact of monetary anchors on individual inflation perceptions, if not on the economic behaviors of private agents.

Figure 1 diagrams the causal pathway modeled in institutional theories of inflation and contrasts it with research designs evident in current empirical work. The heavy horizontal arrows depict the theoretical relationship between institutions, the perceptions and behaviors of private sector actors, and inflation. Most researchers, however, skip over these the intermediate steps in the casual process and run regressions of inflation on institutions (depicted by the upper dashed arrow). This avoids the crucial

issue of whether monetary institutions actually affect individual perceptions and behavior and thereby imposes the causality relationship from the outset. Regardless of the institution that commits monetary policy to low inflation--central bank independence, exchange-rate pegs, inflation targets--every institutional theory works through individual expectations and actions. That is, institutions affect inflation and other macroeconomic outcomes by encouraging certain expectations and behaviors and discouraging others. Our approach is to test this intermediate stage of the analysis. To this end, we utilize individual responses from business owners to questions from the WBES to develop distinct indicators for individual "inflation expectations."

3. Operationalizing Private Sector "Inflation Expectations"

In this section, we present our operationalization of private sector "inflation expectations" and analyze the validity of our measures. Our data come from the WBES, an 81-country cross-sectional firm-level survey conducted in developed and developing countries in 1999 by the World Bank.[3] At least 100 firms were interviewed in each country, with an overall total of 10,090 firms in the sample. The survey has a number of questions on the business environment in which firms operate, including assessments of monetary policy conditions and institutions.[4] The database also includes information on firm ownership (foreign, government), firm size, sales performance, sector of operation

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[3] For a general discussion of the WBES, see Batra, Kaufmann, and Stone (2003).

[4] Beck, Demirguc-Kunt, and Maksimovic (2004) use the WBES to explore the effects of financial obstacles on firm growth. Broz and Weymouth (2007) utilize the WBES to examine the connection between the political party orientation of government and firms' perceptions of property rights. Broz, Frieden, and Weymouth (2008) use the WBES to analyze firms' attitudes toward exchange rates.

(manufacturing, services, agriculture), and export orientation, which we tap as control variables.

In most macroeconomic models, the inflation expectations of price and wage setters are a crucial factor in the inflation process. But data on the price expectations of business firms--the price setters in the first instance--as well as information on nominal wage expectations is scarce. The most widely used surveys ask household consumers, as opposed to firms or labor representatives, about their inflation expectations (Mankiw, Reis, and Wolfers 2004). For example, the University of Michigan's "Survey of Consumer Attitudes and Behavior" has tracked the inflation expectations of U.S. households for over 50 years by asking consumers to predict the change in prices over the next 12 months. Since consumers do not set prices or wages, these surveys do not measure the forecasts of the individuals that matter in models of inflation.[5]

One of the advantages of the WBES is that it is a survey of business owners and managers, so that people with the capacity to set prices form the pool of respondents. A shortcoming is that the WBES does not explicitly ask businesses to forecast inflation. Nevertheless, we think two WBES queries on inflation are sufficiently forward-looking and approximate the concept of "inflation expectations." The WBES contains two inquiries that we utilize to approximate the theoretical construct of "inflation

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[5] The Livingston "Survey of Professional Forecasters," conducted quarterly by the Federal Reserve Bank of Philadelphia, comes closer to measuring the expectations of price-setting firms, since respondents come largely from the business world. But, like the Michigan consumer survey, data are limited to the United States. In work similar to our own, Crowe (2006) and Levin, Natalucci, and Piger (2004) employ cross-country micro-level inflation forecasts from *Consensus Forecasts*--a firm that pools and averages the forecasts of professional economists from around the world--to examine the effectiveness of inflation targeting.

expectations." The first we label "INFLATION CONCERN," which is firm owners'

response to the following question:

> "Please judge on a four point scale how problematic inflation is for the
> operation and growth of your business."

Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4

(major obstacle). We think this variable is a reasonable proxy for price-setters' inflation

expectations. On the one hand, the frame of the query --"operation and growth of your

business"--suggests a forecast. "Growth" is, of course, a forward-looking concept. On

the other hand, "operation" suggests a short-run (recent past, current, near future)

perspective. This part of the frame, however, is not a severe problem for our analysis

because existing survey measures of inflation expectations correlate strongly with current

inflation levels (Thomas 1999). Since other types of respondents (consumers and

business economists) have been shown to pay a great deal of attention to recent inflation

data when forming expectations about future inflation--even for forecasts as far out as

five years--we believe this variable captures business expectations as well as a more

explicitly forward-looking query might.

Our measure of businesses' inflation expectations, INFLATION CONCERN, has

a mean of 2.8 and a standard deviation of 1.07. Overall, 34 percent of all firms in the

sample report that inflation is a major obstacle to the operation and growth of their

businesses. Another 26 percent see inflation as a moderate obstacle, while 23 percent of

firms view inflation as minor obstacle, and 16 percent view inflation as no obstacle at all.

Table 1 assesses the face validity of this variable by showing that the measured

concern with inflation not only varies across firms within a country but that it also varies

across countries in intuitive ways. The table lists the country average of INFLATION CONCERN for the top and bottom ten countries in the sample along with information on inflation and the volatility of inflation in these countries. With few exceptions, the lists are intuitively appealing: in the ten countries where firms reported the least concern with inflation when they were surveyed in 1999, inflation volatility (as measured by the standard deviation of month-to-month inflation over calendar year 1998), averaged just 0.60. The inflation rate (measured as the annual percentage change in CPI for 1998) in these countries was also very low, averaging just 1.8 percent. By contrast, in the ten countries where firms reported the most concern with inflation, inflation volatility was very high, averaging 12.55, and actual inflation averaged 33.3 percent. This list provides support for the validity of our first measure of firm owner inflation perceptions.

A second WBES survey question gauges firm owners' perception of the predictability of economic and financial policies:

> "Do you regularly have to cope with unexpected changes in economic and financial policies which materially affect your business? Changes in economic and financial policies are ..."

Answers vary between 1 (completely predictable), 2 (highly predictable), 3 (fairly predictable), 4 (fairly unpredictable), 5 (highly unpredictable), and 6 (completely unpredictable). This variable, "POLICY PREDICTABILITY," provides an indication of the extent to which firms find unstable/uncertain government policies problematic to the operation and growth of their business. Perceptions of economic policy instability are related to the concept of "expectations" in the theory of inflation. In particular, if a

government is credible in its *ex ante* policy announcements, then its policies will be perceived as more stable and certain in the future.

Table 2 reports the countries with the top and bottom ten scores for POLICY PREDICTABILITY, along with inflation and inflation volatility in these countries.[6] As with INFLATION CONCERN, the cases are intuitive. Firms that perceived the economic and financial policy environment to be more predictable resided in countries with low and stable inflation rates while firms that viewed policy to be more unpredictable were located in countries with highly unstable prices. Indeed, the standard deviation of inflation in countries at the bottom of the list is nearly 10 times that of the top ten group. The exceptions in this bottom ten group-- Brazil and Kazakhstan--had relatively stable inflation performance in 1998 but more volatile inflation over the prior two years. Brazil's month-on-month standard deviation of inflation was 6.06 from 1996-1998, while Kazakhstan earned its ranking at the bottom of the list (in terms of policy predictability) by registering a standard deviation of inflation of 14.71 over this period.

4. Monetary Anchors and Private Sector Inflation Expectations

High and volatile inflation distorts private sector decision-making with regard to investment, savings, and production, and ultimately leads to slower economic growth. A number of institutions have been suggested to lower inflation expectations by way of credible monetary policy commitment. These institutions include an independent central banker that places a higher weight on inflation stabilization than the policymaker (Rogoff 1985, Lohmann 1992), a policy commitment to an inflation target (Bernanke et al. 1999),

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[6] For reasons that we do not understand at this point, the WBES did not ask firms in any African country to respond to this query. Nevertheless, we have 7,597 responses from firms in 61 countries.

and pegging the exchange rate to a stable foreign currency (Frankel 1999, Ravenna 2005).

Our research goal is to examine whether such monetary commitment institutions anchor private sector inflation expectations in the manner specified by theory. In this section, we describe our measures of monetary institutions and provide some preliminary comparisons of firm owner inflation expectations across these regimes.

With respect to exchange rate regimes, we want to assess how firms' inflation expectations are conditioned by the country's exchange-rate regime. For this purpose, we need to classify countries by exchange-rate regime. We employ two classifications of *de facto* exchange rate regimes: Levy-Yeyati and Sturzenegger (2005), and Reinhart and Rogoff (2004). Although the methods differ, both classifications attempt to capture the actual behavior of the exchange rate. Levy-Yeyati and Sturzenegger categorize regimes according to observed changes in the nominal exchange rate, the volatility of these changes, and the volatility of international reserves. Reinhart and Rogoff, exploit the conditional probability of the exchange rate staying within a given range over a rolling five-year window, and use information about parallel (dual market) exchange rates in determining whether a regime continues from one year to the next. We collapse Reinhart and Rogoff's classification into three regimes (0 = Float, 1 = Intermediate, 2 = Fixed), take values for 1999 and label this variable "PEG (RR)." We take the Levy-Yeyati and Sturzenegger 3-way classification for 1999 and label it "PEG (LYS)".[7] Our results are robust to these alternative *de facto* regime classification schemes.[8]

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[7] Please see the data appendix for details.

We also include a *de jure* measure of exchange-rate regime on the grounds that an announced regime that differs from a *de facto* regime may be less credible to private-sector actors. "PEG (IMF)" is the regime the government announces and reports to the IMF. As above, we take values from 1999 and construct a 3-way indicator (0 = Float, 1 = Intermediate, and 2 = Fixed).

To test the effects of central bank independence on firm owner expectations about inflation, we use three alternative measures. For *de jure* CBI, as written into countries' laws and legal systems, we use the Polillo and Guillén (2005) update of the Cukierman, Webb, and Neyapti (1992) index. Polillo and Guillén replicated the Cukierman, Webb, and Neyapti method to update the *de jure* CBI index for the 1992-2000 period. Our variable, "CBI (CWN)," is the 1999 value of the Polillo and Guillén index for countries in our sample.[9]

Our second measure of *de jure* central bank independence is from Mahadeva and Sterne (2000). Unlike the CBI (CWN) index, which was coded by academic experts on the basis of a reading of central banking statutes, Mahadeva and Sterne's index is constructed from a 1998 survey administered directly to central bankers. Under the auspices of the Bank of England, the survey was designed along the lines of Cukierman's (1992) *de jure* approach. The resulting composite CBI index is a weighted average of

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[8] Neither of these classifications systematically codes basket pegs as a unique category; thus, we are unable to determine how firms respond to *de facto* single-currency pegs relative to softer pegs.

[9] We also utilized Crowe and Meade's (2007) update of the Cukierman, Webb, and Neyapti index. The Crowe and Meade CBI index data were for the end of 2003, four years after the WBES was conducted. For this reason, we prefer the Polillo and Guillén data. However, regression results using the Crowe and Meade data are substantively the same. We are grateful to Chris Crowe and Ellen Meade for graciously sharing their data.

central banker responses to questions about (1) their statutory obligation to focus on price stability, (2) target independence, (3) their instrument independence, (4) the finance of government deficits, (5) and the term of office of the governor. The index, which we label, "CBI (M&S)," was administrated in 1998 across 94 economies. As such, it provides timely coverage for our purposes; we obtain values for 51 of the 81 countries in the WBES sample.[10]

Our third measure of CBI is a *de facto* indicator. Based on pioneering work by Cukierman (1992), it is the central bank governor turnover rate. This measure relies on the assumption that governors who resist political pressure will be replaced; high governor turnover is interpreted as indicating political interference in the conduct of monetary policy.[11] Our variable, "CBI (TURNOVER)", is the turnover rate of central bank governors for the five years between 1995 and 1999. These data are from Ghosh, Gulde, and Wolf (2002).

Inflation targeting is another institutional framework that can help constrain monetary policy and achieve low and stable inflation. Mishkin's (2004) definition has five elements: (1) an announced, numerical, medium-term inflation target, (2) price stability as primary goal of monetary policy, (3) an information-inclusive strategy in which many variables are used for deciding the setting of policy instruments, (4), high transparency of the monetary policy strategy through communication with the private

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[10] As with other *de jure* CBI indicies, this one is subjective. However, it is open to the additional criticism that the responses of central bankers may be particularly biased.

[11] Of course, low turnover need not indicate independence since a governor that is pliant to (political) pressure would not have to be replaced.

sector about the plans, objectives, and decisions of the monetary authorities, and (5) accountability of the central bank for attaining its inflation objectives.

We draw upon two sources for data on inflation targeting regimes. The first is the Mishkin and Schmidt-Hebbel (2002) classification of countries that met the above criteria prior to the WBES survey. We use a binary indicator for the variable, "IT (MISHKIN)": 1 if an inflation target regime was in place prior to 1999, 0 otherwise. In the WBES sample of countries, inflation targeting countries are Canada, Chile, Czech Rep, Mexico, Poland, Sweden, and the United Kingdom. We exclude Spain since it adopted the Euro in January 1999.

Our second indicator of IT comes from Mahadeva and Sterne (2000) who constructed an index of IT from the responses of central bankers to a 1998 survey. One of the purposes of the survey was to gauge the relative emphasis that a central bank places on targeting inflation, targeting the exchange rate, and money targets.   The survey thus provides a measure of the *degree* to which a country's policy focused on a particular target, rather than assuming that a policy framework could be classified entirely committed to a single target. The index for "inflation target focus" is the equally-weighted average of numerical responses to four questions: (1) Is your regime described as inflation targeting? (2) Do you publish a specific target/monitoring range now? (3) In practice, how highly do you rank this objective? (4) Does inflation prevail when there are policy conflicts? The variable, "IT (M&S)" ranges from 0, for a country that does not focus on targeting inflation at all, to 1, for a central bank whose focus is entirely on targeting inflation.

We thus have multiple indicators of each monetary institution, as well as a mix of *de jure* and *de facto* indicators of these institutions. See **Appendix A** for country values of all our data; summary statistics are in **Table 3**.

Having described our data, we provide preliminary comparisons of firms' concerns about inflation (INFLATION CONCERN) across these monetary commitment regimes. **Figures 2-4** groups firm owners by the anchoring institution they operate under--PEG, CBI, and IT--and reports their average responses to the WBES query about inflation. Values range from 1, indicating that firm owners think inflation is a "no obstacle," to 4, which means inflation is perceived as "major obstacle." **Figure 2** illustrates how the exchange-rate regime relates to firms' inflation concerns, using the three-way (Float, Intermediate, Fixed) *de facto* indicator from Reinhart and Rogoff (2004). The average response among firms operating in fixed exchange-rate environments is 2.4, which is closest to the "minor obstacle" response, versus the 3.2 average for firms in floating exchange-rate regimes, which is above the "moderate obstacle" response. **Figure 3** and **Figure 4** repeat the exercise using regime indicators from Levy-Yeyati and Sturzenegger and the IMF. Regardless of the measure we use-- RR, LYS, or IMF-- these distributions reveal that firms operating in pegged regimes are consistently less concerned about inflation than firms in floats or intermediate regimes.

Figures 5-7 explore the link between inflation concerns and CBI. To do so, we collapsed our three indicators for CBI into binary variables, where 0 indicates a level of CBI that is below the mean level in our data, and 1 indicates CBI above the mean. The figures are average responses across the regimes. With respect to *de jure* CBI as proxied by the Cukierman, Webb, and Neyapti (Polillo and Guillén) measure, firms in high CBI

countries are slightly *more* concerned about inflation than firms in low CBI settings, which runs against our priors (**Figure 5**). However, the *de jure* indicator from Mahateva and Sterne (**Figure 6**), and the *de facto* measure based on governor turnover (**Figure 7**), both suggest that CBI reduces inflation concerns among business owners and managers.

Figures 8 and 9 plot the relationship between inflation targets and firms' average inflation concerns. As with the distributions for CBI, the alternative indicators for IT regimes yield conflicting results. When IT is proxied by the Mishkin sample (**Figure 8**), there is *prima facia* support for the claim that inflation targets anchor price concerns. But when the Mahateva and Sterne data are used, (**Figure 9**), IT seems to have a perverse effect, as firms in nations that focus more on targeting inflation report *greater* concern with inflation than firms in nations that focus less on targeting inflation.

This preliminary evidence suggests that fixed exchange rates contribute to a perception among businesspeople that inflation is less of a problem to their firms. There is less consistent evidence that CBI and IT have a similar effect. To further assess the evidence and control for other factors that might contribute to these differences, we move to regression analysis.

5. Model and Results

Survey responses may reflect other firm- or country-level characteristics besides monetary institutions. For firm-level controls, we use the responses to five other WBES questions: sales change, firm size, sector of operation, foreign ownership, and export orientation. Firms that experience sales increases may be more successful and therefore less likely to view inflation as a problem. Our variable, SALES CHANGE, is the percent change in firm sales over the previous three years. Larger firms may be more established

and therefore less likely to find inflation a problem. Our measure, FIRM SIZE, is an ordered response where 1=small (5-50 employees), 2=medium (51-500 employees), and 3=large (>500 employees). Firms in manufacturing and services may have greater market power than firms in agriculture and, consequently, may be able to pass through price increases to customers. We use binary indicators for MANUFACTURING and SERVICES, treating agriculture as the reference sector. Firms with foreign ownership and an export orientation might be more diversified internationally and therefore less subject to price shocks in the home market. Our binary indicators are FOREIGN OWNED and EXPORTER, which respectively indicate if some share of the firm is owned by foreign nationals and some portion of its sales are exported.

We also include several country-level variables in our models to control for national factors other monetary institutions. Firms in less developed countries may have more concern with inflation, so we control for per capita GDP in 1999. Firms in countries with lower rates of economic growth may be more concerned with inflation so we control for growth performance with the change in GDP per capita between 1998 and 1999. Lastly, we control for the variability of inflation because unstable prices might affect the types of monetary institutions a nation adopts, as well as individuals' perceptions of inflation. For instance, volatility in the price level could positively influence worries about inflation while at the same time increasing the likelihood that a government fixes the exchange rate, grants greater autonomy to the central bank, or adopts inflation targeting. Leaving inflation out of the model would thus bias the effects of monetary institutions on private sector inflation expectations. Our measure, "VARIANCE INFLATION," is the log of 1 + the standard deviation of inflation

(monthly change in the consumer price index) from 1996 to 1998, the three years period

before the survey was administered.[12]

We run ordered probit models with robust standard errors clustered by country to

estimate the following equation:

$$(INFLATION\ EXPECTATIONS)_{ij} = \alpha + \beta_1\ (REGIME)_{ij} + \beta_2\ (FIRM)_{ij} + \beta_3\ (ECONOMY)_j + \varepsilon_{ij}$$

where the subscripts stand for firm i in country j. The dependent variable is INFLATION

EXPECTATIONS, the response of firm i in country j. We use two ordered responses

from the WBES as alternative measures of the dependent variable: INFLATION

CONCERN and POLICY PREDICTABILITY. Our variable of interest is REGIME,

which represents one of three monetary institutions designed to credibly commit policy to

low inflation: fixed exchange rates, CBI, and inflation targeting. The vectors FIRM and

ECONOMY are the firm- and country-level controls described above.

Table 4 presents results of regressing our first indicator of business inflation

expectations, INFLATION CONCERN, on the type of exchange-rate regime and a set of

control variables. The dependent variable records firms' ordered responses to the WBES

inquiry, "How problematic is inflation to the operation and growth of your business?"

Answers range from 1="No Obstacle" to 4="Major Obstacle". Model 1 estimates the

effects controlling for firm-level characteristics; all coefficients are signed correctly and

significant. Model 2 adds country-level control variables. Intuitively, higher inflation

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[12] The monthly CPI data are from International Financial Statistics. Our results are
robust to longer and shorter lags of inflation volatility, such as the log of 1 + std. dev.
(monthly percent change in CPI, 1994-1998), and the log of 1 + std. dev. (monthly
percent change in CPI, 1998). They are also robust to substituting the inflation rate
(percent change in CPI) for inflation volatility.

volatility increases the likelihood that a firm will perceive inflation to be a problem while the level of economic development and recent economic growth both significantly reduce businesses' concern about inflation.

Models 3-5 introduce our three measures of exchange rate regime: RR, LYS and IMF. Each is coded as 0=Float, 1=Intermediate, and 2=Peg, so negative estimates indicate that pegging reduces concerns about inflation. The estimates are all negative and statistically significant. Overall, firms in floating and intermediate regimes report more problems with inflation than do firms operating under pegged exchange rates.

Model 6 controls for CBI and IT to show that the effect of pegging is robust to the inclusion of these domestic anchors. Indeed, pegs have a significant effect even where the other two mechanisms do not. We ran all combinations of *de jure* and *de facto* IT, CBI, and PEG that we have and, in every case (not reported), the results are similar to Model 6: the only negative and significant result was for pegging.

Table 5 explores the relationship between business inflation concerns and domestic anchors in more depth. In Model 1-3, we introduce our three indicators of CBI to the baseline model of firm and country level controls. Although CBI (CWN) and CBI (TURNOVER) have the correct sign, these estimates are not significant. Models 4 and 5 introduce the proxies for inflation targeting regimes: IT (Mishkin) and IT (M&S). Both indicators have the "wrong" sign--targeting inflation is associated (insignificantly) with greater concerns about inflation.

The perverse effect of IT on firms' inflation concerns is puzzling. To pursue the matter further, we ran Models 4 and 5 with a control for central bank "transparency." Since IT requires transparency in order to compensate for its relatively high level of

discretion, our thought was that we should control for central bank transparency to obtain more predictable results on the IT variables.[13] Inclusion of this control (not reported) does not change our initial results as IT (Mishkin) and IT (M&S) remain positive and insignificant. It may be that inflation targeting is an endogenous variable, such that countries that had greater long-run problems with inflation in the past were more likely to have selected IT as a focus for central bank policy. As a crude test for endogeneity, we substituted a longer five-year (1994-1998) lag of INFLATION VARIANCE for our three-year measure but, again, our results are unchanged.

Several scholars argue that domestic monetary anchors like CBI and IT require a certain level of domestic political development to operate effectively, which suggests an interactive effect between political institutions and effectiveness of these domestic anchors. For example, Broz (2002), Keefer and Stasavage (2003), Acemoglu, et al (2008) each make and test interactive arguments about the political institutional preconditions of controlling inflation with CBI. In Models 6 and 7, we explore such interactions. Model 6 uses the Polity IV measure of democratic institutional development as a constitutive term in an interaction with CBI (CWN). The estimate is negative, as expected, but not significant. Model 7 runs an interaction of Polity and IT (Mishkin) and here, for the first time, we obtain a negative (but insignificant) estimate for IT. We experimented with many other interactions using various measures of political institutions--executive constraints, checks and balances, civil liberties--as well as

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[13] The transparency variable if from Crowe and Meade (2007), who create a transparency index from five dimensions of central bank transparency: political, economic, policy, procedural, and operational.

alternative indicators of IT and CBI. In every instance, we failed to obtain significant results.

We now assess the robustness of our initial results to an alternative proxy for "inflation expectations": POLICY PREDICTABILITY. Although this measure is derived from a WBES survey question that does not mention inflation, it asks firm owners to assess the stability and predictability of government economic and financial policies. Firm owner perceptions of economic policy stability and predictability are associated with the concept of "expectations" in analyses of inflation, so we draw on their responses to this WBES question:

> "Do you regularly have to cope with unexpected changes in economic and financial policies which materially affect your business? Changes in economic and financial policies are ..."

Answers vary between 1 (completely predictable), 2 (highly predictable), 3 (fairly predictable), 4 (fairly unpredictable), 5 (highly unpredictable), and 6 (completely unpredictable).

In **Table 6** we give results of ordered probit regressions of POLICY PREDICTABILITY. Our estimates once again support a role for exchange-rate pegs in anchoring private-sector inflation expectations and building credibility for the commitment to low inflation. In Models 1-3, the estimates for PEG (RR) and PEG (LYS) estimates are negative and significant; PEG (IMF) is negative but not significant. By contrast, CBI (CWN) and CBI (M&S) are wrongly signed and insignificant in Models 4 an 5. In Model 6, the estimate for CBI (TURNOVER)--the *de facto* indicator of independence comprised of the rate at which central bank governors are replaced--is

positive and significant as expected, but seemingly trivial. It is no surprise that business owners would find policy more unpredictable in environments where central bankers are being replaced at higher rates over the previous five-year period. The result suggests that the turnover rate is simply capturing the level of policy instability in a country, not CBI. If central bankers kept there jobs during periods of unstable economic and financial policies, they would not be "independent" as much as "unaccountable."

To this point, we have not discussed the magnitudes of our estimates. Since ordered probit results are difficult to interpret directly, in **Table 7a** we simulated the change in the predicted probability of observing a "4 = Major Problem" response as we move PEG from float to fixed (from 0 to 2), holding other variables in Table 4, Model 3-5 at their means. We used the "Clarify" software from Tomz, Wittenberg, and King (1998) for the simulations. The effects of pegging are substantively important. The probability that a firm will report inflation to be a "Major Obstacle" decreases by 19 percentage points as the currency regime moves from an RR float to an RR peg. A move from an LYS float to an LYS peg reduces the likelihood of this response by 12 percentage points. The impact of a change in official IMF regimes falls between these two estimates: firm owners are 13 percentage points less likely to report that inflation is a major obstacle under a *de jure* peg.

Table 7b reports the substantive effects of pegging with respect to firm owners POLICY PREDICTABILITY responses. That is, we simulated the change in the predicted probability of observing a "6 = Completely Unpredictable" response to this query as we moved PEG from float to fixed (from 0 to 2), holding all other variables in Table 6, Models 1-3 at their means. The magnitudes are smaller here than in **Table 7a**,

but consistently negative. Moreover, we find that the *de jure* measure of regimes, PEG (IMF), produces the smallest negative effect and is also insignificant. This suggests that the officially announced exchange rate regime is less important to private sector actors than information provided by currency markets, upon which the *de facto* indicators are based.

6. Implications and Conclusion

We examined micro-level evidence to see if monetary regimes actually influence the perceptions of price-setting businesses in the manner stipulated in theory. Micro-processes underlie the rational expectation theory of inflation but empirical scholarship has largely skipped over individual-level analysis in favor of macro-level treatments that regress inflation on monetary institutions. In this paper, we utilized firm-level data from a large cross-national survey to assess the correlation between three types of monetary institutions and individual inflation perceptions in the private sector. We found that exchange-rate pegging reduces concerns about inflation and improves perceptions of economic policy predictability among business people. However, firm-owner concerns with inflation and assessments of policy predictability are not related to inflation targeting or central bank independence in our data.

Our micro-level findings parallel the results of country-level studies. As we discussed in Section 2, empirical work on the association between exchange rate regimes and country-level inflation performance is generally consistent and robust: pegs--especially hard pegs and single currency pegs--are associated with lower and more stable inflation. By contrast, the jury is still out on whether central bank independence and inflation targeting improve inflation performance, either unconditionally or conditionally.

In principle, all three monetary anchors should yield improvements in private sector credibility. But pegging the exchange rate has three characteristics that give it an advantage over inflation targets and central bank independence in raising credibility. First, pegs are transparent. Choosing the exchange rate as the nominal anchor and importing credibility from abroad has the advantage of being a more easily observable commitment to monetary policy than either CBI or IT (Atkeson and Kehoe 2001, Frankel 2002, Broz 2002). An exchange-rate target is a simple and easily verifiable promise to which the government is held accountable. When a government adopts policies that are inconsistent with its promised exchange-rate target, wage and price inflation will set in and the exchange rate will become steadily overvalued. Intervention in support of the currency will drain international reserves. When speculators anticipate the exhaustion of the country's reserves, they will run the central bank, forcing an abandonment of the peg. Devaluations are, in turn, highly visible events that impose political costs on governments. Devaluations have been found to severely damage governments' approval ratings, increase the likelihood that the finance minister will lose his job, and raise the odds the government will fall (Cooper 1971, Bernhard 1998). Doubts about the timing of devaluation are less important than the fact that it is bound to happen if a government's policies are inconsistent with the peg.

Central bank independence and inflation targeting, by contrast, are not inherently transparent. Transparency must be added to these regimes by legislation, proclamation, or commitment. Even then, it is difficult for the private sector to evaluate the filtered and potentially biased information provided by the central bank. While information on the credibility of a peg is continuously available in the foreign exchange market, no

analogous market exists to continuously evaluate the credibility of the commitment to CBI or IT. Instead, the best information available is produced by academic specialists who toil to construct relatively crude and subjective indicies of CBI and IT. The problem of transparency is so crucial that it informs nearly all academic and policy discussions of these institutions.

A second advantage of exchange-rate targeting over other anchors is that pegging is an act of *international* delegation. Pegging the exchange rate forces domestic policymakers to mimic (in lockstep, in the case of hard pegs) the policy actions of the foreign central bank, regardless of domestic macroeconomic conditions. In a currency union, the constraint on autonomy is even tighter, as members must abandon their own currencies and hand over monetary authority to a single region-wide central bank. By delegating its authority to a foreign central bank with a reputation for price stability, the pegging country effectively "borrows" credibility from abroad.

Of course, delegation is also a feature of CBI and IT. But, in these cases, the delegation is entirely domestic and the limits on discretion are not complete as under a peg. In an important critical paper, McCallum (1995) observed that it is a fallacy to think that domestic delegation schemes like CBI, IT, and incentive contracts for central bankers can resolve the time-inconsistency problem. These arrangements merely "relocate" the source of the problem domestically to the legislation or contract establishing the arrangement. That is, the government must *enforce* the enabling legislation or contract before the institution will be taken seriously by the private sector. The fallacy arises because the same government that needs to delegate to improve its credibility in the first place will have no incentive to enforce the arrangement once it is in place (e.g., fire a

central banker that gives into political pressures to inflate the economy, reduce the pay of a central banker that misses an inflation target). In fact, if a domestic delegation regime *is* effective in changing private sector expectations, then that would be the ideal time to revoke the regime, following the Barro-Gordon model.

Unlike pegging the exchange rate, which provides an automatic punishment to policymakers that break commitments to price stability--devaluation--central bank independence and inflation targeting rely on the same low credibility domestic actors for enforcement. In this sense, there is marked credibility disadvantage to delegating monetary policy domestically rather than internationally. Furthermore, domestic delegation is not as constraining as pegging. In fact, the logic of adopting CBI or IT is to allow a modicum of policy flexibility so that monetary instruments can be used for domestic stabilization purposes. Unfortunately, there appears to be no free lunch; our results suggest that the increase in discretion may result in a loss of credibility.

A third factor that may bolster the credibility effectiveness of pegging is that it is more costly to employ than domestic anchors. Not only does pegging require governments to sacrifice domestic monetary policy as a tool of macroeconomic management, it can also leave countries exposed to speculative currency attacks. In the spirit of signaling models, the costliness of adopting a peg could be what makes pegging so credible in the eyes of the private sector. The knowledge that costly trade-offs exist lends credibility to the commitment since it would not be optimal to incur the costs of pegging unless the commitment to low inflation is unusually strong (Flood and Isard 1989).

The private sector may well understand that a government that is not fully committed to a peg faces a strong possibility of dismissal. This is because exchange rate pegs that are not fully supported by monetary policy and accompanied by fiscal discipline tend to end badly, in devaluations, for which politicians are held accountable.

These theoretical considerations provide a foundation for interpreting our results. Of course, further research is needed before we draw definitive conclusions.

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Figure 1: The Causal Pathway from Institutions to Aggregate Outcomes

Cross-Country Inflation Regressions

Precommitment institution → Private sector inflation expectations → Private sector price/wage setting → Inflation outcome

Our Approach
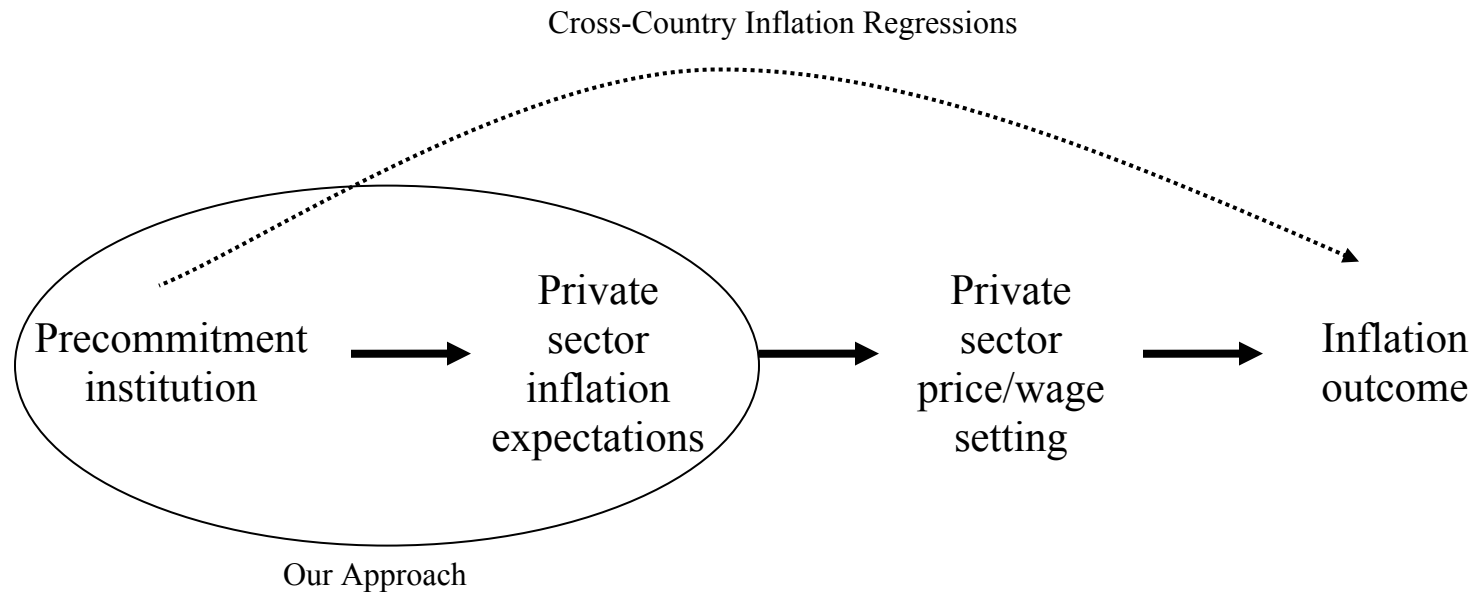
Notes: The heavy horizontal black arrows indicate the causal pathway in the rational expectations theory of inflation. The upper dashed line depicts empirical research that bypasses individual expectations and behavior. Inside the oval is our approach: we estimate the impact of precommitment institutions on private sector inflation expectations.

Figure 2: Firms' Concern with Inflation, by *de facto* Exchange Rate Regime

Major Problem

Average Response

3.23

2.83

2.40

Float   Intermediate   Fixed

Exchange Rate Regime, 1999 (Reinhart and Rogoff)
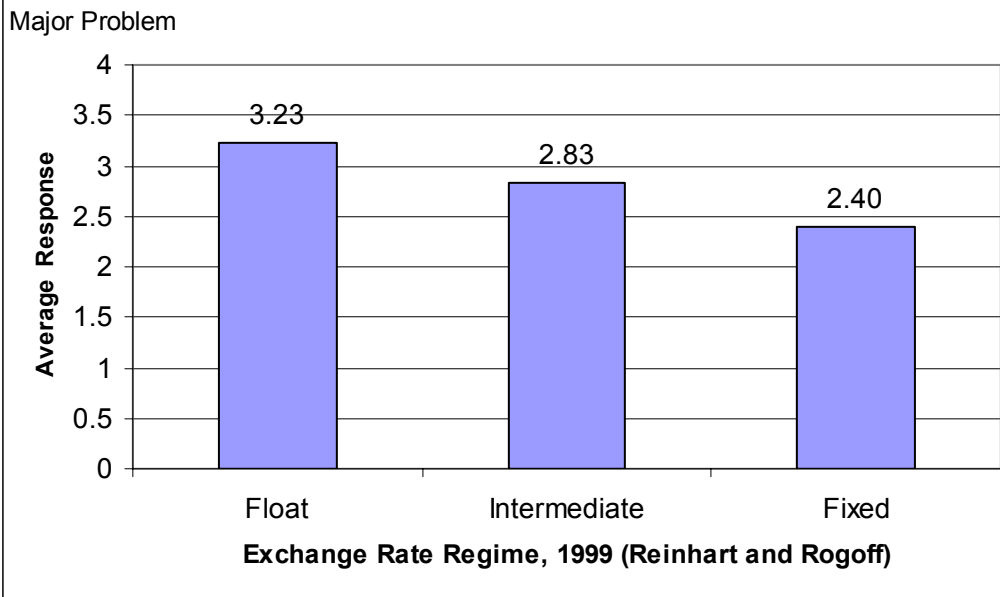
Figure 3: Firm Owners' Concern with Inflation, by *de facto* Exchange Rate Regime

Major Problem

Average Response

3.00

2.88

2.45

Float   Intermediate   Fixed

Exchange Rate Regime, 1999 (Levy-Yeyati & Sturzenegger)

Figure 4: Firms' Concern with Inflation, by *de jure* Exchange Rate Regime

Major Problem

Average Response

2.97   2.87   2.39

Float   Intermediate   Peg

Exchange Rate Regime, 1999 (Official IMF classification)

Figure 5: Firms' Concern with Inflation, by *de jure* Central Bank Independence

Major Obstacle

Average Response

2.74   2.90

CBI < mean (N=3,782)   CBI > mean (N=3,360)

Central Bank Independence, 1999

Cukierman, Webb, Neyapti (Polillo and Guillén)

Figure 6: Firms' Concern with Inflation, by *de jure* Central Bank Independence

Major Problem

Central Bank Independence, 1998
(Mahateva and Sterne, 2000)

Figure 7: Firms' Concern with Inflation, by *de facto* Central Bank Independence

Major Problem

Central Bank Independence
(Turnover Rate, 1995-99)

Figure 8: Firms' Concern with Inflation, by Inflation Targeting

Major Problem

Inflation Targeting, 1999 (Mishkin)
(Canada, Chile, Czech Rep, Mexico, Poland, Sw eden, UK)

Figure 9: Firms' Concern with Inflation, by Inflation Targeting

Major Problem

Inflation Targeting, 1998
(Mahadeva and Sterne, 2000)

Table 1: Face Validity of "INFLATION CONCERN"

	Country	Inflation Concern	Variance of Inflation	Inflation Rate
1.	Singapore	1.56	1.07	-0.27
2.	Sweden	1.69	0.71	-0.27
3.	Tunisia	1.74	0.38	3.13
4.	Germany	1.86	0.38	0.94
5.	Botswana	1.95	0.70	6.66
6.	France	1.97	0.29	0.60
7.	Argentina	2.01	0.27	0.92
8.	Panama	2.02	0.54	0.56
9.	Cameroon	2.02	1.22	3.17
10.	Portugal	2.09	0.46	2.72
...	*top 10 mean*	*1.89*	*0.60*	*1.82*
70.	Russia	3.51	29.21	27.68
71.	Zambia	3.52	4.31	24.46
72.	Turkey	3.56	10.56	84.64
73.	Kazakhstan	3.57	3.02	7.15
74.	Malawi	3.60	14.26	29.75
75.	Belarus	3.65	45.38	72.87
76.	Kyrgizstan	3.73	2.77	10.46
77.	Ecuador	3.76	5.77	36.10
78.	Zimbabwe	3.84	7.56	31.82
79.	Moldova	3.84	2.65	7.66
...	*bottom 10 mean*	*3.66*	*12.55*	*33.26*

Note: "Inflation Concern" is the country average of firm owner responses to the WBES inquiry: "Please judge on a four point scale how problematic inflation is to the operation and growth of your business:" (1 = "No Obstacle" to 4 = "Major Obstacle*")*. "Variance of Inflation" is the standard deviation over calendar year 1998 of month-on-month inflation rates, based on the consumer price index (CPI) basket. "Inflation Rate" is the annual percentage change in CPI for 1998.

Table 2: Face Validity of "PREDICTABILITY"

	Country	Predictability	Variance of Inflation	Inflation Rate
1	Singapore	2.81	1.07	-0.27
2	Azerbaijan	2.88	2.51	-0.81
3	China	2.94	0.71	-0.85
4	Chile	3.01	0.54	5.11
5	Portugal	3.01	0.46	2.72
6	Panama	3.20	0.54	0.56
7	United States	3.21	0.10	1.55
8	Uruguay	3.22	1.72	10.81
9	Peru	3.28	0.92	7.25
10	Costa Rica	3.34	0.93	11.67
...	*top 10 mean*	*3.09*	*0.95*	*3.77*
51	Colombia	4.28	1.62	18.68
52	Georgia	4.31	3.30	3.57
53	Brazil	4.34	1.14	3.20
54	Venezuela	4.36	3.33	35.78
55	Moldova	4.36	2.65	7.66
56	Haiti	4.49	2.85	10.63
57	Belarus	4.50	45.38	72.87
58	Ukraine	4.52	4.54	10.58
59	Russia	4.78	29.21	27.68
60	Kazakhstan	4.88	3.02	7.15
...	*bottom 10 mean*	*4.48*	*9.70*	*19.78*

Note: "Predictability" is the country average of firm owner responses to the WBES inquiry: "Do you regularly have to cope with unexpected changes in economic and financial policies which materially affect your business? Changes in economic and financial policies are: 1=completely predictable to 6=completely unpredictable. "Variance of Inflation" is the standard deviation over calendar year 1998 of month-on-month inflation rates, based on the consumer price index (CPI) basket. "Inflation Rate" is the annual percentage change in CPI for 1998.

Table 3: Summary Statistics

Firm-Level Variables	Mean	Std. Dev.	Min.	Max.
INFLATION CONCERN	2.083	1.074	1	4
POLICY PREDICTABILITY	3.86	1.298	1	6
SALES CHANGE	0.124	0.477	-1	9
FIRM SIZE	1.792	0.753	1	3
MANUFACTURING	0.362	0.481	0	1
SERVICES	0.431	0.495	0	1
FOREIGN OWNERSHIP	0.189	0.391	0	1
EXPORTER	0.359	0.48	0	1

Country-Level Variables	Mean	Std. Dev.	Min.	Max.
INFLATION VOLATILITY	0.798	0.460	0.151	2.812
GDPpc	4.002	6.448	.1169	33.748
dGDPpc	3.541	3.841	-6.299	11.91
PEG (RR)	1.006	0.68	0	2
PEG (LYS)	0.928	0.819	0	2
PEG (IMF)	0.657	0.866	0	2
CBI (CWN)	0.552	0.19	0.21	0.92
CBI (M&S)	0.781	0.122	0.416	0.978
CBI (TURNOVER)	0.19	0.25	0	1
IT (MISHKIN)	0.087	0.283	0	1
IT (M&S)	0.456	0.285	0	1

Table 4: INFLATION CONCERN and the Exchange Rate Regime
(Ordered Probit Regressions of Firm-Level Responses)

	(1)	(2)	(3)	(4)	(5)	(6)
Sales Change	-0.067	-0.050	-0.041	-0.050	-0.040	-0.043
	(0.039)*	(0.030)*	(0.029)	(0.030)*	(0.028)	(0.029)
Firm Size	-0.057	-0.061	-0.079	-0.068	-0.064	-0.072
	(0.028)**	(0.030)**	(0.026)***	(0.028)**	(0.027)**	(0.028)***
Manufacturing	-0.212	-0.185	-0.141	-0.186	-0.167	-0.168
	(0.065)***	(0.064)***	(0.060)**	(0.061)***	(0.059)***	(0.069)**
Services	-0.332	-0.220	-0.207	-0.226	-0.194	-0.222
	(0.064)***	(0.056)***	(0.054)***	(0.053)***	(0.053)***	(0.061)***
Foreign Owed	-0.227	-0.169	-0.149	-0.140	-0.153	-0.167
	(0.060)***	(0.044)***	(0.041)***	(0.043)***	(0.041)***	(0.039)***
Exporter	-0.226	-0.140	-0.141	-0.139	-0.128	-0.122
	(0.067)***	(0.055)**	(0.050)***	(0.050)***	(0.050)**	(0.053)**
Variance-Inflation		0.537	0.428	0.492	0.516	0.437
		(0.244)**	(0.176)**	(0.200)**	(0.191)***	(0.187)**
GDPpc, 1999		-0.028	-0.027	-0.027	-0.024	-0.025
		(0.009)***	(0.008)***	(0.008)***	(0.008)***	(0.008)***
dGDPpc, 1999		-0.040	-0.041	-0.039	-0.049	-0.040
		(0.014)***	(0.016)**	(0.014)***	(0.015)***	(0.018)**
PEG (RR)			-0.258			-0.261
			(0.104)**			(0.123)**
PEG (LYS)				-0.167		
				(0.067)**		
PEG (IMF)					-0.197	
					(0.063)***	
CBI (CWN)						0.026
						(0.294)
IT (Mishkin)						-0.047
						(0.149)
Observations	7886	7491	7020	7414	7491	6248
Pseudo R2	0.014	0.066	0.079	0.072	0.073	0.080

Robust standard errors, clustered by country, in parentheses. * significant at 10%; ** at 5%; *** at 1%

Note: The dependant variable, INFLATION CONCERN, is the firm owner response to the WBES inquiry: "Please judge on a four point scale how problematic inflation is to the operation and growth of your business:" (1 = "No Obstacle"...to... 4 = "Major Obstacle").

Table 5: "INFLATION CONCERN," by Monetary Anchor
(Ordered Probit Regressions of Firm-Level Responses)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sales change	-0.054	-0.057	-0.057	-0.050	-0.052	-0.052	-0.052
	(0.030)*	(0.028)**	(0.035)	(0.030)*	(0.027)*	(0.031)*	(0.031)*
Firm size	-0.057	-0.044	-0.065	-0.060	-0.038	-0.057	-0.064
	(0.031)*	(0.036)	(0.031)**	(0.030)**	(0.033)	(0.032)*	(0.030)**
Manufacturing	-0.206	-0.161	-0.137	-0.185	-0.170	-0.194	-0.192
	(0.068)***	(0.067)**	(0.055)**	(0.064)***	(0.066)***	(0.064)***	(0.059)***
Services	-0.233	-0.202	-0.186	-0.221	-0.225	-0.224	-0.225
	(0.063)***	(0.056)***	(0.058)***	(0.056)***	(0.056)***	(0.062)***	(0.053)***
Foreign owned	-0.180	-0.201	-0.134	-0.169	-0.199	-0.177	-0.169
	(0.045)***	(0.056)***	(0.045)***	(0.045)***	(0.058)***	(0.045)***	(0.045)***
Exporter	-0.121	-0.133	-0.084	-0.141	-0.146	-0.120	-0.141
	(0.060)**	(0.069)*	(0.053)	(0.055)**	(0.068)**	(0.060)**	(0.055)***
Inflation, 1999	0.523	0.489	0.795	0.538	0.524	0.495	0.534
	(0.256)**	(0.301)	(0.144)***	(0.244)**	(0.256)**	(0.254)*	(0.246)**
GDPpc, 1999	-0.027	-0.031	-0.022	-0.028	-0.030	-0.026	-0.028
	(0.010)***	(0.010)***	(0.008)***	(0.009)***	(0.011)***	(0.009)***	(0.009)***
dGDPpc, 1999	-0.034	-0.029	-0.034	-0.040	-0.034	-0.033	-0.039
	(0.018)*	(0.023)	(0.017)**	(0.014)***	(0.024)	(0.018)*	(0.015)***
CBI (CWN)	-0.161					0.112	
	(0.262)					(0.538)	
CBI (M&S)		0.167					
		(0.627)					
CBI (Turnover)			0.225				
			(0.312)				
IT (Mishkin)				0.017			0.403
				(0.138)			(0.321)
IT (M&S)					0.294		
					(0.213)		
Polity						0.013	0.003
						(0.032)	(0.012)
CBI (CWN)*Polity						-0.041	
						(0.067)	
IT (Mishkn)*Polity							-0.046
							(0.035)
Observations	6313	5237	6484	7491	5354	6313	7491
Pseudo R2	0.071	0.073	0.083	0.066	0.078	0.072	0.066

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sales change	-0.054	-0.057	-0.057	-0.050	-0.052	-0.052	-0.052
	(0.030)*	(0.028)**	(0.035)	(0.030)*	(0.027)*	(0.031)*	(0.031)*
Firm size	-0.057	-0.044	-0.065	-0.060	-0.038	-0.057	-0.064
	(0.031)*	(0.036)	(0.031)**	(0.030)**	(0.033)	(0.032)*	(0.030)**
Manufacturing	-0.206	-0.161	-0.137	-0.185	-0.170	-0.194	-0.192
	(0.068)***	(0.067)**	(0.055)**	(0.064)***	(0.066)***	(0.064)***	(0.059)***
Services	-0.233	-0.202	-0.186	-0.221	-0.225	-0.224	-0.225
	(0.063)***	(0.056)***	(0.058)***	(0.056)***	(0.056)***	(0.062)***	(0.053)***
Foreign owned	-0.180	-0.201	-0.134	-0.169	-0.199	-0.177	-0.169
	(0.045)***	(0.056)***	(0.045)***	(0.045)***	(0.058)***	(0.045)***	(0.045)***
Exporter	-0.121	-0.133	-0.084	-0.141	-0.146	-0.120	-0.141
	(0.060)**	(0.069)*	(0.053)	(0.055)**	(0.068)**	(0.060)**	(0.055)***
Inflation, 1999	0.523	0.489	0.795	0.538	0.524	0.495	0.534

	(0.256)**	(0.301)	(0.144)***	(0.244)**	(0.256)**	(0.254)*	(0.246)**
GDPpc, 1999	-0.027	-0.031	-0.022	-0.028	-0.030	-0.026	-0.028
	(0.010)***	(0.010)***	(0.008)***	(0.009)***	(0.011)***	(0.009)***	(0.009)***
dGDPpc, 1999	-0.034	-0.029	-0.034	-0.040	-0.034	-0.033	-0.039
	(0.018)*	(0.023)	(0.017)**	(0.014)***	(0.024)	(0.018)*	(0.015)***
Polity						0.013	0.003
						(0.032)	(0.012)
CBI (CWN)	-0.161					0.112	
	(0.262)					(0.538)	
CBI (M&S)		0.167					
		(0.627)					
CBI (Turnover)			0.225				
			(0.312)				
IT (Mishkin)				0.017			0.403
				(0.138)			(0.321)
IT (M&S)					0.294		
					(0.213)		
IT (Mishkn)*Polity							-0.046
							(0.035)
CBI (CWN)*Polity						-0.041	
						(0.067)	
Observations	6313	5237	6484	7491	5354	6313	7491
Pseudo R2	0.071	0.073	0.083	0.066	0.078	0.072	0.066

Robust standard errors, clustered by country, in parentheses. * significant at 10%; ** at 5%; *** at 1%

Note: The dependant variable, INFLATION CONCERN, is the firm owner response to the WBES inquiry: "Please judge on a four point scale how problematic inflation is to the operation and growth of your business:" (1 = "No Obstacle"...to... 4 = "Major Obstacle").

Table 6: "POLICY PREDICTABILITY," by Monetary Anchor
(Ordered Probit Regressions of Firm-Level Responses)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sales change	-0.007	-0.017	-0.011	-0.008	-0.030	-0.009	-0.014	-0.022
	(0.033)	(0.032)	(0.031)	(0.025)	(0.024)	(0.033)	(0.030)	(0.026)
Firm size	-0.095	-0.082	-0.078	-0.083	-0.111	-0.079	-0.078	-0.117
	(0.027)***	(0.027)***	(0.028)***	(0.033)**	(0.032)***	(0.030)***	(0.028)***	(0.032)***
Manufacturing	-0.018	-0.040	-0.053	-0.078	-0.109	-0.020	-0.060	-0.100
	(0.045)	(0.042)	(0.043)	(0.044)*	(0.049)**	(0.048)	(0.048)	(0.049)**
Services	-0.062	-0.078	-0.089	-0.131	-0.140	-0.059	-0.099	-0.134
	(0.047)	(0.046)*	(0.044)**	(0.046)***	(0.049)***	(0.049)	(0.048)**	(0.049)***
Foreign-owned	-0.100	-0.106	-0.121	-0.128	-0.181	-0.096	-0.122	-0.174
	(0.042)**	(0.043)**	(0.043)***	(0.050)**	(0.053)***	(0.045)**	(0.045)***	(0.053)***
Exporter	-0.058	-0.066	-0.062	-0.059	-0.046	-0.063	-0.066	-0.045
	(0.040)	(0.043)	(0.045)	(0.050)	(0.054)	(0.039)	(0.046)	(0.053)
VarianceInflation	0.259	0.307	0.333	0.328	0.298	0.619	0.333	0.277
	(0.127)**	(0.162)*	(0.180)*	(0.208)	(0.257)	(0.118)***	(0.195)*	(0.198)
GDPpc, 1999	-0.002	-0.004	-0.004	-0.006	-0.012	0.006	-0.006	-0.010
	(0.007)	(0.006)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)
dGDPpc, 1999	-0.008	-0.004	-0.007	-0.003	0.012	0.000	-0.005	0.011
	(0.016)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)	(0.017)	(0.021)
PEG (RR)	-0.240							
	(0.086)***							
PEG (LYS)		-0.122						
		(0.068)*						
PEG (IMF)			-0.050					
			(0.066)					
CBI (CWN)				0.333				
				(0.294)				
CBI (M&S)					0.507			
					(0.785)			
CBI(turnover)						0.371		
						(0.169)**		
IT (Mishkin)							0.061	
							(0.112)	
IT (M&S)								0.101
								(0.171)
Observations	6401	6473	6517	5623	4961	6016	6517	5074
Pseudo R2	0.022	0.018	0.016	0.018	0.021	0.028	0.016	0.021

Robust standard errors, clustered by country, in parentheses. * significant at 10%; ** at 5%; *** at 1%

Note: The dependant variable, "PREDICTABILITY," is the firm owner response to the WBES inquiry: "Do you regularly have to cope with unexpected changes in economic and financial policies which materially affect your business? Changes in economic and financial policies are: 1 = completely predictable... to...6 = completely unpredictable."

Table 7a: Substantive Impact of Pegging on INFLATION CONCERN

Regime	dPR (INFLCONCERN = 4)	Std. Err.	95% Confidence Interval	
PEG (RR)	-0.19	0.071	-0.337	-0.052
PEG (LYS)	-0.12	0.045	-0.205	-0.032
PEG (IMF)	-0.13	0.044	-0.219	-0.048

Note: Using the "Clarify" software from Tomz, Wittenberg, and King (1998), we simulated the change in the predicted probability of observing a "4 = Major Problem" response as we move PEG from float to fixed (from 0 to 2), holding other variables in Table 4, Model 3-5 at their means.

Table 7b: Substantive Impact of Pegging on POLICY PREDICTABILITY

Regime	dPR (PREDICT = 6)	Std. Err.	95% Confidence Interval	
PEG (RR)	-0.10	0.038	-0.182	-0.028
PEG (LYS)	-0.05	0.031	-0.102	-0.0001
PEG (IMF)	-0.02	0.029	-0.078	0 .036

Note: Using the "Clarify" software, we simulated the change in the predicted probability of observing a "6 = Completely Unpredictable" response as we move PEG from float to fixed (from 0 to 2), holding all other variables in Table 6, Models 1-3 at their means.

Appendix A: Country Averages

Country	Firm-Level Variables						Country-Level Variables							CBI (M&S)	CBI (Turnover)	IT (Mishkin)	IT (M&S)
	dSales	Size	Manuf.	Serv.	Foreign	Export	Inflation	GDPpc	dGDPpc	Peg (RR)	Peg (LYS)	Peg (IMF)	CBI (CWN)				
Albania	0.14	1.40	0.29	0.50	0.13	0.20	0.39	1115.05	10.10	0	0	0	0.51	0.66		0	0.94
Argentina	0.06	1.88	0.32	0.54	0.32	0.28	-1.17	7847.37	-3.39	2	2	0	0.74	0.79	0	0	0
Armenia	-0.16	1.40	0.21	0.66	0.02	0.08	0.65	582.28	3.30	1	2	0	0.85	0.76	0	0	1
Azerbaijan	-0.11	1.41	0.30	0.48	0.03	0.06	-8.52	594.49	7.40	1	1	0	0.25		0	0	
Bangladesh	0.13	2.02	0.51	0.29	0.20	0.49	6.11	325.06	4.87			2		0.56		0	0.44
Belarus	0.08	1.89	0.28	0.27	0.06	0.26	293.68	1199.66	3.40	0	0	0	0.73		0.67	0	
Belize	0.06	1.38	0.40	0.49	0.27	0.22	-1.21	3048.29	8.44		2	2		0.43	0	0	0.27
Bolivia	0.03	1.95	0.49	0.47	0.26	0.36	2.16	1005.56	0.43	1	1	1	0.63		0.33	0	
Bosnia	0.49	1.70	0.52	0.42	0.13	0.58	8.36	1369.54	9.60	2	2	2		0.81		0	0
Botswana	0.27	1.84	0.23	0.42	0.47	0.51	7.75	3354.68	7.22	1	2	2	0.45	0.65	0.33	0	0.63
Brazil	0.02	2.00	0.32	0.61	0.24	0.29	4.86	3600.81	0.31	0	1	2	0.21		1	0	
Bulgaria	0.12	1.54	0.51	0.27	0.10	0.33	2.57	1456.37	2.30	2	2	2	0.55	0.79		0	0
Cambodia	0.07	1.31	0.48	0.44	0.21	0.18	4.01	268.21	11.91		1	0				0	
Cameroon	0.15	1.91	0.34	0.27	0.57	0.66	1.87	624.16	4.39	2	2	2				0	
Canada	0.13	2.02	0.28	0.64	0.25	0.47	1.72	22586.70	5.53	1	0	0	0.45	0.91	0	1	0.88
Chile	0.07	2.01	0.45	0.50	0.34	0.41	3.34	4763.95	-0.76	1	0	0	0.77	0.93	0	1	0.88
China	0.03	1.81	0.60	0.36	0.35	0.33	-1.41	881.85	7.60	2	2	2	0.29	0.68	0	0	0.31
Colombia	0.05	2.36	0.38	0.58	0.39	0.40	10.88	1985.11	-4.20	1	0	1	0.44		0	0	
Costa Rica	0.20	2.16	0.53	0.39	0.32	0.44	10.05	4079.52	8.22	1	1	1	0.61		0.33	0	
Cote d'Ivoire	0.08	2.06	0.26	0.22	0.48	0.65	0.79	648.55	1.59	2	2	2				0	
Croatia	0.07	1.98	0.51	0.46	0.13	0.67	4.01	3937.04	-0.86	1	1	2	0.44	0.79		0	0.75
Czech Rep	0.06	1.43	0.18	0.67	0.15	0.32	2.14	5321.85	1.34	1	0	0	0.73	0.98	0.33	1	0.94
Dom Rep	0.18	2.16	0.57	0.33	0.21	0.32	6.47	2126.69	8.15	1	1	0			0	0	
Ecuador	-0.05	1.99	0.52	0.42	0.12	0.23	52.24	1277.43	-6.30	0	1	0		0.93	0.33	0	0.56
Egypt	0.07	2.19	0.17	0.41	0.14	0.58	3.08	1450.47	6.11	2		2	0.55	0.53	0	0	0.44
El Salvador	-0.01	1.92	0.54	0.39	0.18	0.28	0.51	2111.84	3.45	2	2	2				0	
Estonia	0.52	1.66	0.37	0.52	0.20	0.57	3.30	3790.14	0.31	2	2	2	0.78	0.85	0.33	0	0
Ethiopia	0.23	1.86	0.33	0.17	0.09	0.17	7.94	116.92	6.04		1	0	0.44		0.33	0	
France	0.13	1.88	0.40	0.56	0.24	0.44	0.50	21800.36	3.30	2	2	2	0.78	0.90	0	0	0.4
Georgia	0.09	1.53	0.31	0.47	0.14	0.24	19.19	628.88	2.88	1	1	0	0.73	0.80	0	0	0.56
Germany	0.06	1.89	0.20	0.64	0.30	0.36	0.57	22428.94	2.01	2	2	2	0.92	0.96	0	0	0.19
Ghana	0.14	1.91	0.27	0.31	0.30	0.37	12.41	243.80	4.40	1	2	0	0.31	0.60	0.33	0	0.19
Guatemala	0.15	1.83	0.39	0.50	0.21	0.31	4.86	1697.85	3.85	1	0	0			0.33	0	
Haiti	0.00	1.68	0.42	0.47	0.20	0.21	8.67	454.95	2.70	0	0	0			0.33	0	
Honduras	0.06	1.70	0.50	0.46	0.18	0.34	11.65	927.62	-1.89	1	0	1	0.55		0	0	
Hungary	0.21	1.50	0.24	0.50	0.07	0.32	10.00	4451.99	4.17	1	0	1	0.67	0.86	0.33	0	0.19
India	0.11	2.22	0.77	0.05	0.28	0.62	4.67	442.77	7.39	1	1	0	0.34	0.83	0.33	0	0.44
Indonesia	-0.04	1.88	0.20	0.70	0.18	0.25	20.49	772.63	0.79	0	1	0	0.8	0.56		0	0.5
Italy	0.10	2.02	0.27	0.69	0.31	0.34	1.66	18611.54	1.93	2	2	2	0.92	0.88	0	0	0.44
Kazakhstan	0.07	1.66	0.20	0.53	0.06	0.20	8.30	1115.95	2.70	1	1	0	0.44	0.76	0.33	0	0.44
Kenya	0.11	2.27	0.36	0.24	0.36	0.80	5.74	414.69	2.28	1	0	0	0.5	0.66	0	0	0.44
Kyrgizstan	0.00	1.75	0.28	0.25	0.06	0.11	37.57	267.03	3.66	0	1	0	0.52		0.33	0	0.75

Appendix A: Country Averages (cont.)

Country	Firm-Level Variables							Country-Level Variables								
	dSales	Size	Manuf.	Serv.	Foreign	Export	Inflation	GDPpc	dGDPpc	Peg (RR)	Peg (LYS)	Peg (IMF)	CBI (CWN)	CBI (M&S)	CBI (Turnover)	IT (Mishkin)	IT (M&S)
Lithuania	0.05	1.20	0.19	0.68	0.05	0.28	0.75	3111.85	-1.70	2	1	2	0.78	0.89	0.33	0	0
Madagascar	0.13	2.08	0.35	0.15	0.23	0.45	9.93	235.48	4.66	0	0	0				0	
Malawi	0.38	2.18	0.17	0.17	0.31	0.53	44.80	152.07	3.04	0	2	0			0.33	0	
Malaysia	0.00	1.70	0.53	0.40	0.18	0.40	2.74	3646.64	6.14	2	2	2	0.36	0.85	0	0	0.44
Mexico	0.17	2.03	0.53	0.37	0.15	0.39	16.59	5647.06	3.87	1	0	0	0.56	0.82	0.33	1	0.94
Moldova	-0.10	1.78	0.26	0.34	0.02	0.22	39.27	300.38	-3.40	0	0	0	0.73	0.80	0	0	0.38
Namibia	0.19	1.81	0.17	0.40	0.32	0.66	6.49	1791.80	3.37		2	2		0.50		0	0.13
Nicaragua	0.16	1.62	0.46	0.44	0.17	0.17	11.55	752.03	7.04	1	1	1	0.63			0	
Nigeria	0.23	2.15	0.20	0.48	0.26	0.39	6.62	358.95	1.10	1	1	0	0.37	0.42	0	0	0.25
Pakistan	0.03	1.83	0.48	0.50	0.16	0.45	4.14	526.23	3.66	1	0	0	0.21			0	0
Panama	0.07	2.26	0.49	0.47	0.21	0.42	1.25	3910.04	3.92	2	2	2	0.22			0	0
Peru	-0.02	2.06	0.39	0.43	0.26	0.24	3.47	2044.19	0.91	2	0	0	0.74	0.89	0	0	0.44
Philippines	0.06	1.95	0.45	0.53	0.23	0.32	5.95	959.85	3.40	1	0	0	0.48			0	0
Poland	0.25	1.65	0.28	0.56	0.08	0.42	7.28	4250.87	4.52	1	0	1	0.89	0.86	0	1	0.94
Portugal	0.06	1.86	0.25	0.70	0.28	0.22	2.30	10654.18	3.94	2	2	2	0.88	0.85	0	0	0.06
Russia	0.21	1.70	0.27	0.38	0.02	0.08	86.00	1613.70	6.40	0	0	0	0.49	0.76	0.33	0	0.31
Senegal	0.07	1.69	0.23	0.16	0.14	0.47	0.83	451.70	6.35	2	2	2				0	
Singapore	0.09	1.93	0.32	0.53	0.36	0.46	0.02	21280.18	7.20	1	2	0	0.29	0.90	0	0	0.19
Slovakia	0.10	1.53	0.26	0.59	0.05	0.46	10.57	3749.45	0.32	1	2	0	0.62	0.90	0	0	0.52
Slovenia	0.24	1.80	0.49	0.34	0.14	0.74	6.15	9343.18	5.42	1	1	0	0.63	0.86	0	0	0.25
South Africa	0.21	2.43	0.36	0.26	0.30	0.85	5.18	2972.20	2.36	0	0	0	0.48	0.85	0	0	0.31
Spain	0.16	1.81	0.34	0.61	0.26	0.38	2.31	13844.53	4.75	2	2	2	0.86	0.80	0	0	0.56
Sweden	0.17	1.72	0.29	0.55	0.23	0.54	0.46	26187.51	4.53	1	0	0	0.75	0.97	0	1	1
Tanzania	0.16	1.83	0.30	0.25	0.35	0.37	7.89	261.53	3.53	1	0	0	0.5	0.60	0	0	0.25
Thailand	0.30	1.60	0.48	0.45	0.30	0.44	0.30	1949.70	4.45	1	1	0		0.82	0.67	0	0.31
Trin & Tobago	0.14	1.64	0.46	0.40	0.19	0.43	3.44	5931.14	4.39		2	0			0.33	0	
Tunisia	0.14	2.42	0.39	0.41	0.18	0.59	2.69	1963.99	6.05	1	1	2				0	
Turkey	0.08	1.75	0.44	0.31	0.09	0.41	64.87	2806.57	-4.71	1	0	1	0.46	0.70	0.67	0	0.44
Uganda	0.14	1.56	0.21	0.24	0.26	0.49	6.60	234.21	8.05	1	2	0		0.81	0	0	0.69
Ukraine	0.02	1.63	0.37	0.43	0.04	0.23	22.68	594.28	-0.38	1	0	0	0.42	0.63	0	0	0.56
UK	0.19	1.41	0.25	0.58	0.13	0.30	1.56	23656.10	3.02	1	0	1	0.47	0.77	0	1	1
United States	0.10	1.82	0.22	0.66	0.10	0.30	2.19	33748.21	4.49	1	1	1	0.48	0.92	0	0	0.19
Uruguay	0.00	2.03	0.65	0.29	0.17	0.53	5.66	6376.99	-2.85	0	0	0	0.54	0.70	0	0	0.25
Uzbekistan	0.48	1.82	0.30	0.26	0.14	0.16	44.12	543.30	4.30			0	0.56			0	0
Venezuela	-0.01	2.02	0.45	0.46	0.24	0.38	23.57	4733.82	-5.97	1	1	1	0.63		0	0	
West Bank	-0.08	1.20	1.00	0.00	0.10	0.42	5.54	1532.43	8.77							0	
Zambia	0.20	1.90	0.23	0.22	0.30	0.35	26.79	305.74	2.22	0	2	0	0.29	0.66	0.33	0	0.56
Zimbabwe	0.37	1.90	0.23	0.30	0.22	0.54	58.52	641.50	-3.60	2	2	2	0.34			0	

Appendix B: Data and Sources

Variable	Source	Description
Sales change	WBES	Reported percentage change in sales over the past three years
Firm size	WBES	Firm size, ordered (1-3: small, medium, large)
Manufacturing sector	WBES	Firm operates in the manufacturing sector, binary (1, 0; yes, no)
Services sector	WBES	Firm operates in the services sector, binary (1, 0; yes, no)
Foreign ownership	WBES	Foreign ownership of firm, binary (1, 0; yes, no)
Exports	WBES	Firm exports production, binary (1, 0; yes, no)
Variance of inflation	IFS	Standard deviation over calendar year 1998 of month-on-month inflation rates, (CPI).
GDPpc, 1999	WDI	Per capita GDP/1000. 1999 data (in 2000 USD)
dGDPpc, 1999	WDI	Change in GDPpc, 1998-1999, in 2000 USD
PEG (RR)	Reinhart and Rogoff (2004)	*de facto* exchange-rate regime, ordered variable (0=float, 1=intermediate, 2=peg). Taken from mgcode, where 1 = peg, 2-3 = intermediate, 4-5 = float (5 corresponds to "freely falling", which denotes a floating regime with at least forty percent inflation in a given year).
PEG (LYS)	Levy-Yeyati and Sturzenegger (2005)	*de facto* exchange-rate regime, ordered variable (0=float, 1=intermediate, 2=peg).
PEG (IMF)	IMF, *Annual Report on Exchange Arrangements and Exchange Restrictions*	*de jure* exchange-rate regime, ordered variable (0=float, 1=intermediate, 2=peg).
CBI (CWN)	Polillo and Guillén (2005)	*de jure* CBI index for 1999, update of the Cukierman, Webb, and Neyapti (1992) data
CBI (M&S)	Mahadeva and Sterne (2000)	CBI index from a 1998 survey of central bankers. Values range from 0 to 1.
CBI (TURNOVER)	Ghosh, Gulde, and Wolf (2002)	*de facto* CBI: CB governor turnover rate, 1994-1998
IT (MISHKIN)	Mishkin and Schmidt-Hebbel (2002)	Binary indicator; 1 if country was an inflation targeter prior to 1999.
IT (M&S)	Mahadeva and Sterne (2002)	"Inflation focus" is a weighted index of inflation targeting from a 1998 survey of central bankers.