Are Long-Term Inflation Expectations Well-Anchored in Brazil, Chile and Mexico?*

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Abstract

Over a decade ago, Brazil, Chile, and Mexico adopted inflation targeting frameworks as part of an effort to put an end to their historical records of high and variable inflation. We consider whether long-term inflation expectations have become better-anchored, using survey-based measures as well as financial market-based measures on long-term inflation expectations. Markets for long-term government debt in Brazil, Chile, and Mexico have become better developed over the past decade, enabling us to collect daily data on nominal and inflation-linked government bonds. From these data, we construct far-forward inflation compensation, which provides a reading on expected inflation and the risk that investors attach to the long-term inflation outlook. We first compare the survey and market-based long-run inflation expectations and find that these do not necessarily imply the same conclusion; whereas survey measures typically track each country's inflation target quite well, the high-frequency measures are more volatile and regularly deviate from the inflation target. We then regress daily changes in inflation compensation on news surprises of monetary policy, prices, and the real economy. Our results show that far-forward inflation compensation does not significantly react to domestic news surprises, implying that inflation expectations in Brazil, Chile, and Mexico are well-anchored. However, inflation compensation does react to some U.S. and Chinese news surprises. Subsample analysis shows that inflation expectations have become better anchored predominantly in recent years. Overall, we argue that it may be too premature to conclude that long-term inflations expectations in Brazil, Chile and Mexico have truly become well-anchored.

Keywords: Inflation targeting, survey expectations, inflation compensation, Nelson-Siegel model, macro news suprises, Brazil, Chile, Mexico

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1 Introduction

Nearly 30 countries have adopted inflation targeting frameworks, driven by a conviction that defining an explicit inflation target and communicating how the central bank will strive to meet that goal is the best monetary policy strategy for maintaining inflation at a relatively low and stable level without sacrificing long-term growth.[1] Several studies have found that countries with inflation targeting frameworks have had lower inflation and generally better economic performance than countries without inflation targeting frameworks but it has not been clear whether it was adopting inflation targeting framework or other factors have been driving those results.[2] There is some evidence that an explicit inflation target can help coordinate private agents' inflation expectations and anchor long-term inflation expectations to the specified target (references below). However, because of data limitations, most of the work has focused on the experience of industrialized countries. In this study, we overcome some of these data problems and explore whether, and to what degree, long-term inflation expectations are well-anchored in three emerging market economies: Brazil, Chile, and Mexico.

The behavior of long-term inflation expectations provides insight into the success of inflation targeting as a monetary policy strategy. Unforeseen shocks can drive inflation away from the target, monetary policy influences inflation with a considerable lag, and there is uncertainty about the transmission process itself (Svensson, 1999 and many others make this point). These circumstances will influence inflation expectations over the *short-* and *medium-* term. Nonetheless, if the central bank is viewed as being committed to bringing inflation back to the inflation goal, shocks that affect inflation should be viewed as transitory and therefore should not influence *long*-term inflation expectations.

Because Brazil, Chile, and Mexico all have inflation targeting frameworks, this study is a first step at assessing within-group differences. Studies tend to compare inflation targeting countries to non-inflation targeting countries, but inflation targeting countries often practice very different policies and some aspects of inflation targeting may work better than others. The three Latin American countries that we study are similar in some respects: they are at similar stages of development, have had inflation targeting frameworks in place for over a decade, and previously had a historical record of monetary and fiscal mismanagement. On the other hand, their inflation tar-

[1] According to Hammond (2012), 27 countries are considered to have inflation targeting frameworks: Armenia, Australia, Brazil, Canada Chile, Colombia, the Czech Republic, Ghana, Guatemala, Hungary, Indonesia, Iceland, Israel, Korea, Mexico, New Zealand, Peru, the Philippines, Poland, Romania, Serbia, South Africa, Sweden, Thailand, and Turkey, and the United Kingdom.

[2] See, for example, Mishkin and Schmidt-Hebbel (2007). de CarvalhoFilho (2011) finds that countries with inflation targeting frameworks experienced lower output loss during the recession that followed the global financial crisis of 2008, even after taking into account other potential drivers of economic performance. But countries that have adopted inflation targeting tend to be the ones that have also undertaken other economic reforms.

geting frameworks differ and have undergone changes over time[3], and we would only be able to speculate on the reasons for differences that we find in the data.

Our approach is a blend of an informal and formal analysis. In our formal analysis, we follow the approach that was first used by Gürkaynak, Levin, Marder, and Swanson (2007a) by examining evidence from financial market-derived measures of long-term inflation expectations. To the best of our knowledge, long-horizon financial market based expectations of future inflation with a sufficiently long history have been unavailable to date for Brazil and Mexico (and to a lesser extent for Chile) as a result of insufficient data on sovereign bond prices. We therefore first collected a comprehensive set of historical prices on nominal and inflation-linked sovereign bonds for these two countries, and used these to construct far-forward inflation compensation estimates for each individual country.

Inflation compensation provides a reading on investors' expectations for inflation plus the premium that investors demand for the risk that inflation may exceed its expected level.[4] Far-forward inflation compensation covers a period that is several years in the future, beyond the period over which shocks to inflation and monetary policy influence the inflation outlook. We compare forward inflation compensation with long-term inflation expectations derived from survey data.[5] We can compare the two measures to assess whether they convey differences in the degree to which countries' inflation targeting frameworks are successful in shaping agents' expectations about future inflation.

Similar as in Gürkaynak, Levin, Marder, and Swanson (2007a) and Gürkaynak, Levin, and Swanson (2010a), among others, we then assess whether our market-based measures of far-forward inflation compensation respond significantly to news surprises in monetary policy decisions, prices, and macroeconomic data releases. Gürkaynak *et al.* (2010a) find that long-term inflation expectations were better-anchored in Sweden, an inflation targeting country, than in the United States, which at that time did not have an explicit inflation target. Far-forward inflation compensation for Sweden did not significantly react to news suprises during a period from 1996 to 2005, while U.S. forward inflation compensation did significantly react to surprises during a very similar period

[3]The Bank of Mexico, for example, took several steps to improve its communications with the public. In 2007, the Bank of Mexico began to publish its inflation forecasts and in January 2011 began to release the minutes to its monetary policy meetings.

[4]Besides reflecting these two factors, Hördahl (2009) notes that inflation compensation also reflects liquidity premia and "technical" market factors, both of which we consider below and which we control for in our regression analysis in Section 4.1.

[5]Ideally, the available survey data would include measures of dispersion in inflation expectations. The dispersion in inflation expectations - the degree of disagreement among forecasters - is considered to be a reasonable proxy for inflation uncertainty (the aggregate distribution of inflation forecasts). Beechey, Johanssen, and Levin (2011) compare survey-based measures of long-term inflation expectations in the euro area with those for the United States and find that the dispersion of long-term inflation expectations was higher in the United States than in the euro area. Capistrán and Ramos-Francia (2010) find that the dispersion in *short*- and *medium*-term inflation expectations is lower in countries with inflation targeting than in countries without.

(1998 to 2005). They also find that long-term inflation expectations in the United Kingdom became well-anchored after the Bank of England gained legal independence in the late 1990s.[6] Gürkaynak *et al.* (2007a) compare the experience of the United States with those of Canada and Chile, using data for the somewhat different periods for each country. Long-term inflation expectations were found to be well-anchored in Canada and Chile, although the evidence for Chile is based on only a short sample period (2002 to 2004). Details on this empirical approach are Section 4 below. Galati, Poelhekke, and Zhou (2011) explore whether the global financial crisis unhinged long-term inflation expectations. Although the evidence is inconclusive, long-term inflation expectations in the United Kingdom drifted up.

What all these studies have in common, is that they have all focused on the experience of *industrialized* countries because market-based measures of long-term inflation expectations have been unavailable to date for many emerging market economies. The fact that long-term bond markets in Brazil, Chile, and Mexico have been developing allows us to construct our financial market-based inflation compensation measures. Although market liquidity for some long-term bonds in these country will certainly be an issue, we believe that it is well worth taking a closer look at what the results from the event study analysis imply.

After reviewing the evidence, we conclude that although long-term inflation expectations seem to have become better anchored in all three countries over the past decade, it is premature to conclude that long-term inflation expectations are truly well-anchored. On the one hand, we did not find evidence that market participants systematically revised their views on long-term inflation in response to domestic macroeconomic and monetary policy news. This result, by itself, would suggest that long-term inflation expectations are well-anchored. On the other hand, we find that inflation compensation does tend to react to certain foreign macroeconomic news suprises. Furthermore, the level of far-forward inflation compensation is persistently above the target in Brazil. Far-forward inflation compensation has hovered above the inflation target in Mexico, particularly since 2009. And we do not have an explanation for the sizeable variations in far-forward inflation compensation for Chile. As in all empirical studies that look at the response of financial market variables to economic news, the explanatory power of the regressions is quite low. It may just be that other types of news that we are not able to capture in our regressions have been important drivers of long-term inflation expectations and inflation risk premiums for these countries.

[6] See also Spiegel (1998).

2 Inflation Targeting in Brazil, Chile, and Mexico

2.1 Inflation Targeting in Brazil, Chile and Mexico

The top panels of Figures 1 through 3 display 12-month inflation (headline and core) in Brazil, Chile, and Mexico, as well as the inflation target and the tolerance range for the inflation targets from 2001 to October 2012. Brazil and Chile adopted inflation targeting frameworks in 1999 and Mexico adopted its inflation targeting framework in 2001.[7] Chile's inflation target was reduced to its steady state level in 2001, when it was set at a range of 2 to 4 percent. In 2007, a 3 percent target was adopted.[8] Mexico's inflation target reached its steady state level in 2003.

By contrast, Brazil's inflation target has been altered repeatedly. The target, which is announced a year and a half in advance was reduced to a low of 3 percent for 2003 but was subsequently raised and has been $4\frac{1}{2}$ percent since 2005.[9] Whether $4\frac{1}{2}$ percent actually represents policy makers' preferences for the steady state level of inflation is an open question. In mid-2004, then-Central Bank Henrique Meirelles stated that "[w]e are making for 2005 and 2006 a smooth transition for [an inflation] target of 4 percent, which is the long-term goal..." (Novo, 2004, translation is ours. See also Radowitz, 2007 and Gazeta Mercantil, 2007.) Meirelles' successor, Alexandre Tombini, stated: that "[w]e have to have the ambition of having inflation converge to [inflation] of our trading partners, as this, in the medium and long-term, would make a difference. Nonetheless, at the moment, we have to consolidate [the current level of inflation]." (O Estado de So Paulo 2012, translation is ours). The central bank president has one seat on the 3-member council that sets the annual inflation target. (The other two members are the finance and planning ministers.)

3 Survey and Market-Based Measures of Inflation Expectations

3.1 Survey-Based Inflation Expectations

The middle panels of Figures 1 through 3 display the inflation target against a widely-used measure of long-term expected inflation from the Consensus Forecasts survey, which is taken in the spring and fall of every year.[10] Consensus Forecasts releases the average of participants' expectations. Levin, Natalucci, and Piger (2004) showed that long-term inflation expectations had already been falling in the years preceding the adoption of formal inflation targets. Average expected inflation

[7] On Brazil's experiences under inflation targeting, see Fraga, Goldfajn, and Minella (2004), Tombini and Lago Alves (2006), Bevilaqua, Mesquita, and Minella (2007). On Chile's experiences, see Valdés (2007). On Mexico's experiences, see Ranos-Francia and García (2005).

[8] Chile's government had been setting annual inflation targets since the early 1990s. A "fully fledged" inflation target was adopted in 1999, when the central bank abandoned its heavily managed exchange rate policy.

[9] Panel A of Figure 1 shows only the target that is announced a year and a half in advance. Between 2002 and 2005, adjusted (and higher) inflation targets were announced to accommodate unforseen shocks.

[10] Consensus Forecasts' long-term inflation survey measures for Brazil, Chile and Mexico are released twice a year, in April and October, and reflect respondents' perception of the expected average annual inflation rate between five and ten years out.

for Chile had been very close to 3 percent even before the formal 3 percent target was adopted in early 2007. Long-term inflation expectations for Mexico have been at or very near $3\frac{1}{2}$ percent since 2005, $\frac{1}{2}$ percentage point above the target. The Bank of Mexico's monthly survey of expectations, the blue line in the Panel B, first polled views on long-term inflation in 2008, and the average expectation from this survey has also been at about $3\frac{1}{2}$ percent.

For Brazil, long-term inflation expectations have been more variable, jumping up during the 2002 crisis, then drifting down to below the (revised upward) inflation target, and then drifting up again to $4\frac{1}{2}$ percent. One possible interpretation of these movements is that signals from government officials on the desirable level of long-term inflation have been unclear, and as a result, long-term expected inflation may be less well-anchored than what otherwise would have been the case. That is even if, for inflation targeting countries as a whole, Alichi *et al.* (2011) found that long-term inflation expectations in inflation targeting emerging market economies are less sensitive to changes in short-term inflation expectations than are countries with alternative monetary arrangements.[11]

3.2 Financial Market-Based Inflation Expectations

The drawback of using survey-based measures or realized inflation measures to assess how well-anchored are inflation expectations, which is what the emerging market literature so far has typically done, is that these measures are typically available only at relatively low frequencies; either monthly, quarterly, or even semi-annually. Long-horizon survey measures, which tend to be uncontaminated by short-term shocks to inflation and can therefore shed the most light on the behavior of inflation expectations, are currently only available at a semi-annual frequency. It is therefore difficult to truly gauge whether a central bank's inflation targeting framework is successful in shaping agents' expectations about future inflation.

Luckily, we can derive much higher-frequency gauges of inflation expectations from financial market data. Using data on inflation swaps and/or nominal and real interest rates, all typically available at a daily frequency, one can construct daily measures of (far-forward) inflation compensation.[12] Market participants and policy makers alike heavily track these financial market-based measures to gauge the effect of macroeconomic news announcements or monetary policy decisions on market participants' perception of future inflation (at least in the major industrialized countries). Several studies, including Gürkaynak, Levin, Marder, and Swanson (2007a), Gürkaynak, Levin, and Swanson (2010a), Beechey, Johanssen, and Levin (2011), and Galati, Poelhekke, and Zhou (2011), have used these market-based inflation compensation measures in event study regression analyses to assess their sensitivity to macroeconomic news and to see how well-anchored

[11] They follow the methodology in Levin *et al.* (2004).

[12] Beechey and Wright (2009) even go one step further and use high-frequency *intra*day quotes on U.S. Treasury Inflation Protected Securities and nominal Treasury securities to construct intraday inflation compensation measures.

inflation expectations are.

One important caveat to using these measures, however, is that they do necessarily offer a fully clean read on inflation expectations. As pointed out by Hördahl (2009), besides reflecting the level of expected inflation, inflation compensation also embed inflation risk premia, liquidity premia, and technical factors. It is difficult, if not impossible to distinguish these different factors without having to resort to strong identifying assumptions.

In this section we first construct inflation compensation measures for Brazil, Chile and Mexico. In particular, we use term structure estimation techniques to construct full term structures of inflation compensation at various horizons. To the best of our knowledge, we are the first to construct these measures in detail for Brazil and Mexico (and in a certain sense for Chile as well, although most of the work was done for us by RiskAmerica). We first construct a sufficiently large history of marked-based inflation compensation measures and then use these in Section 4 in an event study analysis, similar to the studies mentioned above, to assess the sensitivity of inflation compensation to news surprises about monetary policy actions, prices, and the real economy.

3.2.1 Estimating Inflation Compensation Measures

We estimate our financial market-based inflation compensation measures as the spread between yields on nominal and inflation-indexed (real) sovereign bonds. The latter bonds have a principal value that is linked to inflation and therefore protect investors from inflation risk. Brazil, Chile and Mexico all have had a history of monetary mismanagement resulting in periods of very high inflation. It should therefore not be surprising that each of these countries have substantial experience with issuing inflation-linked bonds.[13] The fact that each country has a spectrum of both nominal and real sovereign bonds outstanding allows us to construct nominal and real zero-coupon curves from these bonds, respectively. The zero curve estimation method we apply is that of Nelson and Siegel (1987) which has increasingly become the workhorse method for estimating zero curves from bond prices.[14]

A zero-coupon yield curve consists of the collection of interest rates earned on non-coupon-paying bonds with increasing maturities. Because zero-coupon yields are not directly observable but are instead embedded in coupon-bearing bonds, we must resort to curve estimation techniques such as the Nelson and Siegel (1987) model. This model postulates that the curve of continuously-compounded zero -coupon yields at any given time t can be well described by a smooth parametric

[13] In contrast, even some developed economies, including for example Canada and Germany, still have much less developed inflation-linked bond markets with only a small number of bonds outstanding at any given time. This greatly complicates, or even makes it impossible, to estimate reliable real zero coupon curves for these countries.

[14] For example, the Bank of International Settlements, (BIS, 2005), reports that nine out of the thirteen (predominantly European) central banks which report their zero coupon curve estimates to the BIS use either the Nelson and Siegel (1987) model or an extension of it, the Svensson (1994) model, to construct zero-coupon yield curves.

function which is governed by just four parameters;

$$y_t(\tau) = \beta_{1,t} + \beta_{2,t}\left[\frac{1-\exp\left(-\frac{\tau}{\lambda_t}\right)}{\left(\frac{\tau}{\lambda_t}\right)}\right] + \beta_{3,t}\left[\frac{1-\exp\left(-\frac{\tau}{\lambda_t}\right)}{\left(\frac{\tau}{\lambda_t}\right)} - \exp\left(-\frac{\tau}{\lambda_t}\right)\right] \tag{1}$$

where $y_t(\tau)$ is the model-implied τ-period zero-coupon yield and $\{\beta_{1,t}, \beta_{2,t}\beta_{3,t}, \lambda_t\}$ is the parameter vector. These parameters can be interpreted as the level parameter, $\beta_{1,t}$, the slope parameter, $\beta_{2,t}$, and the curvature parameter, $\beta_{3,t}$, judging from the effect that a change in each of these respective parameters has on the shape of the curve, see for example Diebold and Li (2006). The fourth parameter, λ_t, is a shape parameter that influences the factor loading associated with the slope and curvature parameters. We follow the approach of Gürkaynak, Sack, and Wright (2007b) and Gürkaynak, Sack, and Wright (2010b) to estimate nominal and real zero coupon curves from observed bond prices, respectively. In particular, we estimate the Nelson-Siegel parameters by minimizing the sum of squared *approximate yield errors*; bond price fitting errors weighted by the inverse of modified duration (MDur):

$$\min_{\{\beta_{1,t},\beta_{2,t}\beta_{3,t},\lambda_t\}} \sum_{i=1}^{N_t}\left[\frac{P_{i,t}(\tau) - \widehat{P_{i,t}}(\tau)}{\text{MDur}_{i,t}}\right]^2 \tag{2}$$

where $P_{i,t}(\tau)$ are the prices for N_t observable bonds on day t, and $\widehat{P_{i,t}}(\tau)$ are the bond price estimates implied by the Nelson-Siegel model.

When implementing the Nelson-Siegel model we must ensure that the optimization procedure converges to sensible and reliable zero curves. To accomplish this we impose several restrictions on the model parameters: (i) the level parameter $\beta_{1,t}$ is restricted to be positive and in the range $[0, 25]$, (ii) the slope and curvature parameters, $\beta_{2,t}$ and $\beta_{3,t}$, respectively, are restricted to be in the range $[-100, 100]$, (iii) the shape parameter, λ_t, is restricted to be contained in the range $[0.5, 5]$. As discussed below, we only include bonds in the optimization which have a remaining maturity between three months and 15 years. An immediate problem arising from this particular maturity window is that our estimated yield curves could show odd behavior for maturities between zero and three months. Specifically because there are no data points on short-term rates by construction, the short end of the curve could therefore in theory go to either plus of minus infinity. To prevent this, we impose that the Nelson-Siegel implied instantaneous short rate, the sum of $\beta_{1,t}$ and $\beta_{,2t}$, has to be equal to the overnight rate, or, if the overnight rate shows erratic behaviour, the central banks' official target rate.[15]

Once we have estimates of the nominal and real zero coupon curves for each day in the sample for our three countries, we difference the two curves to construct an estimate of the inflation

[15]This restriction on the model-implied instantaneous short rate turns out to work well as we were able to eliminate the occasional odd yield curves that resulted when not imposing the short rate restriction.

compensation curve. Furthermore, with the estimated Nelson-Siegel, we can construct zero yields for any desired maturity. We can also easily compute nominal and real forward rates, and therefore forward inflation compensation estimates. In the remainder of the paper we will focus primarily on 1-year far-forward rates: 1-year forward rates ending in 1, 2, ... , 7 years in the future for Brazil and Mexico and 1-year forward rates ending in 1, 2, ... , 10 years for Chile.

3.2.2 Bond Data

Brazil and Mexico

We collected historical prices on nominal and inflation-linked bonds for Brazil and Mexico from several sources. Because our goal was to construct long-enough time series of far-forward inflation compensation, we combined data from different sources. For Brazil we obtained daily prices for all current and previously outstanding bonds from Bloomberg and MorganMarkets.[16] For Mexico we combined data from Bloomberg and Proveedor Integral de Precios (PIP).[17]

As is standard practice, we apply the usual filters to the available bond data; we do not include any bonds that have option-like features or floating coupon payments, and we do not include any Treasury bills out of concern that the behavior of bills can be quite different from that of bonds. From the remaining bonds, on any given day we only include those bonds that have a remaining maturity between three months and fifteen years.[18] The top two panels of Figure 4 show the number of bonds over time that were included in the estimation.[19] For both Brazil and Mexico, the number of outstanding bonds has increased throughout the sample, in particular for nominal bonds. The total number of bonds continues to remain relatively small, however, likely introducing some degree of noise in our curve estimates. To shed some light on this issue, Figure 5 shows the average absolute bond price fitting error for bonds with maturities between two and ten years. This metric is used in for example Gürkaynak, Sack, and Wright (2010b) to assess the fit of zero coupon curve models. On average, we fit bond prices with an error of about 0.25 percent. This is higher than the yield fitting errors that Gürkaynak, Sack, and Wright (2010b) report for likely more-liquid U.S. Treasury Inflation Protected Securities, but is certainly reasonable.[20] Note that

[16] See `https://mm.jpmorgan.com/`

[17] See `https://www.precios.com.mx/`

[18] Gürkaynak, Sack, and Wright (2007b) show that for estimating zero coupon curves from U.S. Treasury bonds, one needs the Svensson (1994) model to accurately fit bond prices in the very longest end of the curve. However, the Svensson model requires estimating additional parameters compared to the Nelson-Siegel model. Therefore, due to the relatively small number of bond prices that we have available for each day, we only consider maturities of up to fifteen years. In practice, only a few very long-maturity bonds have been issued in Brazil, Chile, and Mexico and imposing this restriction never removes more than one or two bonds.

[19] Because the Nelson-Siegel model is a four-parameter model, we can only construct zero coupon curves on days where at least four bond prices are available.

[20] J.P. Morgan reports (see J. P. Morgan (2006, 2012), that liquidity in Mexican bond markets has improved over time, stating that the liquidity in 10-year Mexican bonds has "increased markedly", with bid-ask spreads having fallen and foreign holdings having risen from 18 percent in early 2006 to about 60 percent in August 2012.

for both Brazil and Mexico the fitting errors, in particular for inflation-index bonds in Mexico, spiked up in the 4^{th} quarter of 2008 when both countries underwent a sudden stop with investors partially withdrawing from the countries.[21]

The bottom panels of Figure 4 show the longest-maturity bond used in the estimation. Panel C shows that Brazil did not issue its first long-maturity nominal bond until July 2006. We therefore start our data sample for Brazil in July 2006. Furthermore, even though Brazil has issued 10-year bonds at several times throughout our sample, the longest maturity that is consistently outstanding throughout the sample is seven years. In order to prevent having to extrapolate our zero-coupon curves for longer maturities, we therefore estimate our curves only up to maturities of seven years. We do the same for Mexico.[22]

Chile

For Chile we use nominal and real zero coupon curves that were graciously supplied to us by RiskAmerica.[23] RiskAmerica estimates zero-coupon curves from prices on Chilean nominal and inflation-linked sovereign bonds, in a comparable fashion as we do here for Brazil and Mexico. RiskAmerica's zero coupon estimates were similarly used by Gürkaynak *et al.* (2007a) to construct 1-year forward inflation compensation rates when they examined whether inflation expectations were well-anchored in Chile between August 2002 and Octover 2005 (see the discussion in Section 4). Compared to Gürkaynak *et al.* (2007a), our sample for Chile is much longer; October 2, 2002 to October 18, 2012.

As noted by Gürkaynak *et al.* (2007a), it was not until 2002 that Chile began issuing long-term nominal bonds.[24] However, since that time, the maturity of the longest-outstanding bond has consistently been above ten years. We therefore use 1-year forward inflation compensation rates ending in 10 years, similar to Gürkaynak *et al.* (2007a), and in contrast to our forward inflation compensation measures for Brazil and Mexico, which end in seven years. Because Chilean forward rates are also based on fewer bonds in comparison to for example U.S. and U.K. forward rates, they will tend to be more noisy.[25]

[21] While many emerging market countries experienced a sudden stop as investors fled to safety following the bankruptcy of Lehman Brothers in September 2008, Brazil and Mexico experienced an additional source of instability when it was revealed that firms in both countries, including several large ones such as Aracruz Celulose SA in Brazil and CEMEX and Gruma in Mexico, were found to have had unhedged dollar liabilities.

[22] While the longest maturity that is consistently available for Mexico is eight years, we chose the same 7-year maximum maturity out of convenience. While studies that have examined far-forward inflation compensation for developed economies typically look at 1-year forward rates ending in 10 years, our 1-year forward rates ending in 7 years are still far enough in the future such that unforeseen shocks to prices and the real economy should not drive inflation away from the target if inflation expectations are well-anchored.

[23] See `www.riskamerica.com`

[24] Chile has had inflation-indexed bonds outstanding for decades.

[25] Gürkaynak *et al.* (2007a) show this point in their Figure 5B.

3.2.3 Far-Forward Inflation Compensation Estimates

Figure 6 shows our market-based time-series estimates of far-forward nominal yields in Panel A, far-forward real yields in Panel B, and far-forward inflation compensation in Panel C. The far-forward inflation compensation measures in the bottom panel are the spread between the forward rates in the top two panels. Far-forward inflation compensation is also plotted in the bottom panels of Figures 1 to 3. We make three observations here. First, the fact that all three governments were able to issue long-term nominal debt by the mid-2000s is a sign that inflation expectations have become better anchored, for previously, investors had demanded higher yields for long-term debt than what governments were willing to pay. Second, far-forward inflation compensation varies considerably, particularly for Brazil, where it spikes in late 2008. Third, far-forward inflation compensation for Brazil and Mexico has nearly always been above the inflation target, but for Chile has been both below and above 3 percent.

Far-forward inflation compensation for Mexico declines considerably between 2003 and 2005, and for a period in 2007 and 2008 is very close to 3 percent. It appears that although financial market participants viewed the inflation target as higher than 3 percent, the inflation risk premium was seen as small. (In a future draft, we will obtain measures of the inflation risk premium by subtracting the Consensus measure of long-term expected inflation from inflation compensation.) The inflation compensation jumps up in 2009 and slowly moves down until late 2012.

4 Sensitivity of Yields and Inflation Compensation to News

Previous studies that use financial market-based estimates of far-forward inflation compensation to examine whether inflation expectations are well-anchored, e.g. Gürkaynak *et al.* (2005), Gürkaynak *et al.* (2007a), Gürkaynak *et al.* (2010a), and Beechey *et al.* (2011), have all focused on developed economies such as the U.S., U.K., Canada or Sweden. For emerging market economies, the lack of sufficiently-long time series of far-forward inflation compensation measures has, to date, precluded similar studies. Using the inflation compensation measures that we constructed in Section 3.2 we fill in this gap in the literature for Brazil, Chile and Mexico.[26]

We build upon the regression analysis used in the studies referenced above by regressing daily changes in forward nominal and real yields and, in particular, far-forward inflation compensation on the surprise component of news announcements on monetary policy, prices, and the real economy, while controlling for several other factors that may influence inflation compensation. The premise

[26] Gürkaynak *et al.* (2007a) also study inflation compensation in Chile and find that these do not react significantly to Chilean and U.S. news surprises. However, due to data limitations, they only analyzed the relatively short sample from August 2002 to October 2005. Furthermore, their set of news surprises was small and, as the authors note, the survey measures used were likely to be somewhat stale. Here we use a much longer time series of inflation compensation, as well as a larger set of economic news surprises (see Section 4.2).

here is that if inflation expectations are well-anchored, far-ahead forward inflation compensation should not react significantly to news surprises. If they do react significantly then this is a indication that agents' inflation expectations remain unhinged.

4.1 Regression Approach

We estimate the parameters of the following linear regression specification:

$$\Delta y_{t,n} = \alpha_n + \beta_n X_t + \gamma_n Z_t + \epsilon_{t,n} \qquad \epsilon_{t,n} \sim IID(0, \sigma_n^2) \tag{3}$$

where $\Delta y_{t,n}$ is the daily change in either (forward) nominal or real rates, or far-forward inflation compensation ending in n years[27] and X_t is the vector of news surprises. We follow Galati *et al.* (2011) by also including a vector of control variables, Z_t, to control for the fact that inflation compensation not only reflects inflation expectations, but also inflation risk premia, liquidity, and technical factors. By including variables that are aimed at controlling for the latter two factors, we attempt to restrain the influence of variation in the liquidity and other technical factors not directly related to inflation expectations.[28]

We not only examine whether *domestic* news surprises move inflation compensation for Brazil, Chile, and Mexico, but also whether news surprises from the U.S. and China have a significant impact. All three countries that we analyze are open economies that rely heavily on imports and exports, with the U.S. and China being major trading partners. It is therefore important to gauge whether developments abroad have an influence on inflation expectations in Brazil, Chile and Mexico domestically.

In the end we are interested in which, if any, of the surprises included in the regression have a significant impact on inflation compensation. To assess whether, overall, inflation expectations are well-anchored or not, we perform a standard test of the joint hypothesis that all coefficients in the regression are equal to zero (i.e. we test the hypothesis that $\beta_n = \gamma_n = 0$). Furthermore, Galati *et al.* (2011) examine the effect that the financial crisis, which erupted in mid-2007, has had on the anchoring properties of inflation expectations in the U.S., U.K. and the euro area. They found that expectations may have become less well-anchored. We therefore also examine subsamples of before and after mid-2007 to assess the stability of our full sample results.

4.2 News Surprise Data and Controls

Similar to the previous literature, we include surprises on three types of announcements for which we have sufficient data available; news on (i) the stance of monetary policy, (ii) prices, (iii) the

[27] Recall that we use $n = 7$ for Brazil and Mexico, while for Chile $n = 10$.

[28] As noted by Galati *et al.* (2011), because inflation compensation is defined at the difference between nominal and real (forward) rates, we already filter out most of the impact of liquidity and technical factors, provided that these affect nominal and real bond prices in a similar way.

real economy. We included data on the following eight announcements (when available) in the regressions: (1) the central bank policy rate, (2) headline consumer prices (CPI), (3) industrial production (IP), (4) purchasing managers index (PMI)[29], (5) retail sales, (6) trade deficit, (7) real GDP, and (8) the unemployment rate. We obtained all data releases and survey expectations from Bloomberg and the above announcement are the ones for which we have sufficient data available.[30] Besides these, for the U.S. surprises, we also included: (9) consumer confidence, (10) initial jobless claims, (11) new home sales, (12) and the nonfarm payrolls report.

To measure the size of the surprise surrounding each data release, we compute the difference between the actual release and the median Bloomberg survey forecast. By including only the surprise component, we take out the expected component of the information contained in any news release and which should already have been incorporated in bond markets. We normalize all surprises by their standard deviation, with the exception of policy rate surprises which are recorded in basis points.

As control variables we include daily changes in (1) the VIX, (2) the 12-month WTI futures contract, and (3) the 3-month Food futures contract, all of which we obtained from Bloomberg. The VIX serves as a control of general market volatility, and can also be seen as control for general investor risk appetite. We include oil and food futures contracts to control for the passthrough from international price developments to domestic prices.[31] For example, passthrough from food prices tends to be higher in emerging markets compared to developed economies because food is typically a larger component of CPI in emerging markets. In contrast, passthrough from oil prices tends to be small for Brazil and Mexico because of government influence. In Chile more passthrough for global oil prices is allowed.

4.3 Full-Sample Results

Tables 1 through 3 present the main empirical results of our analysis, showing the full-sample results for the regression in (3) where we include domestic new surprises while controlling for liquidity and technical factors.[32] In each regression we used our full available history of inflation compensation and news surprises. We did exclude the fourth quarter of 2008 because of sudden stop discussed

[29] Instead of Markit Group's PMI, for Mexico we instead include the business climate index produced by the Mexican Institute of Finance Executives (IMEF).

[30] To construct survey expectations for economic data releases, Bloomberg initially asks respondents to input their forecasts two weeks prior to the actual release. Respondents can then submit their forecast, or change their previously submitted forecast up until roughly one hour before the release time of the announcement.

[31] For an analysis of the level of passthrough across developed and emerging countries, see (Alichi *et al.*, 2011)

[32] We run the regressions including only the days with one or more surprises. Regression results when we included all days (which entails including a substantial number of days with zero values for surprises) were very similar and are available upon request.

earlier and to not contaminate the regression results with such a potentially influential period.[33] In all tables, we show results using as dependent variables the 1-year nominal rate (column 1), the 1-year forward nominal rate ending in 7 or 10 years depending on the country (column 2) and the breakdown of this into the 1-year forward real rate (column 3) and our main variable of interest, the 1-year far-forward inflation compensation rate (column 4). In all tables we used standard OLS standard errors to assess the significance of individual surprise variables, and we highlight surprises that enter the regression significantly (*** indicates significance at the 1% level, ** at the 5% level and * at the 10% level). T-statistics are reported in parentheses underneath each regression coefficient. The result for the joint-significance test are reported in the bottom two rows of each table.

The first observation to make from Tables 1 through 3 is that short-term interest rates, as represented by the 1-year nominate rate in the first column, react significantly to sometimes an array of different surprises, but in particular to surprises in the policy rate[34], consumer prices and industrial production. This is not surprising, given how strongly correlated short-term interest rates are with the state of the economy, and the R^2s confirm that news surprises explain changes in 1-year rates quite well.

The final columns of each table show that surprises do, however, not significant affect far-forward inflation compensation, with the exception of GDP for Brazil, CPI for Chile, and IP (weakly) for Mexico. The R^2s in these regressions are low. Moreover, the F-test of joint significance for all news surprises fails to reject the null-hypothesis (at the 5% level) that news surprises do not have a significant effect on far-forward inflation compensation. This result indicates that for the sample periods under consideration, inflation expectations seem to be well-anchored in Brazil, Chile and Mexico.[35]

Next we examine the regression results where we include U.S. news surprises (Tables 4 through 6) and Chinese news surprises (Tables 8 through 10). The top part of each table shows the coefficients on domestic surprises, while the middle part shows the regression coefficients and significance results on U.S. and Chinese news surprises. In the regressions for the daily changes in 1-year nominal rates for Brazil and Chile, domestic surprises that were significant before remain significant and none of the U.S. surprises come in significantly. In contract, for Mexico, several U.S. surprises are significant, in particular nonfarm payrolls. Table 7 shows that a potential explanation for this result could be that Mexican macro figures are released with a substantial lag, more so than for

[33] It turns out to matter little for the results whether we include the fourth quarter of 2008 or not. However, as shown in Figure 6, inflation compensation does exhibit an outlier-level amount of volatility during those months.

[34] Instead of incorporating surprises in the policy rate directly, we also used the daily change in the 3-month Treasury Bill rate which some authors have claimed is a better measure of monetary policy surprises. The results were virtually the same.

[35] For Chile, this corroborates the conclusion of Gürkaynak *et al.* (2007a).

Brazil and Chile. As a result, one of the first news releases for a particular month is the nonfarm payrolls release. Because of the strong economic linkages between Mexico and the U.S. it seems that this release also has a high informational content for Mexico. Meanwhile, in Brazil and Chile several macro figures are released early in the month, thereby seemingly reducing the informational content of U.S. news releases.

Far-forward inflation compensation measures do react significantly to U.S. news releases, as judged by the final column of each table. News about the U.S. real economy (in particular nonfarm payrolls) significantly affects inflation compensation. In fact, for both Brazil and Chile, the joint F-test now *rejects* the null that inflation expectations are well-anchored. This result could indicate that even if the central banks of Brazil and Chile are able to make long-term inflation expectations resilient to domestic news surprises, it cannot overcome the destabilizing effects on expectations of U.S. news surprises. However, another explanation could be that perhaps inflation expectations do remain well-anchored and that one of the other components of inflation compensation is reacting significantly to U.S. news surprises. Judging which explanation holds true is difficult, if not impossible, in the context of these regressions, as we cannot separate out these different components.

The results for Chinese news surprises show that inflation compensation in Brazil and Chile is affected by releases from China, while Mexican inflation compensation is not affected. This is line with the fact that there is very little trade between Mexico and China while the trade share with China is more important for Brazil and Chile.[36]

4.4 Subsample Regressions and Results

To address the potentially destabilizing effects of the financial crisis, we re-estimate our regressions (but include only domestic news surprises when doing so) by splitting up the sample in a pre-crisis sample (using data up until July 2007) and a crisis period (using data from July 2007 onwards). Tables 11 and 12 show results for Brazil. The pre-crisis results show that the joint test rejects, suggesting that prior to the financial crisis, inflation expectations in Brazil were not well-anchored. However, our pre-crisis sample only consists of one year of data, with few observations on surprises. Since the crisis, inflation expectations have been well-anchored. The same results hold for Chile (Tables 13 and 14). The pre-crisis period results for Chile are in contrast with the results in Gürkaynak *et al.* (2007a) who found that inflation expectations were well-anchored. However, as noted earlier, our sample is longer and incorporates more news surprises. For example, Gürkaynak *et al.* (2007a) did not include the unemployment rate, the variable that is significant in our regression. Finally, the results for Mexico (Tables 15 and 16) show that inflation expectations were

[36] Over 80% of Mexico's trade is with the U.S.

well-anchored before the crisis and have stayed well-anchored since the crisis.[37]

5 Conclusion

In this paper, we explore whether long-term inflation expectations have been well anchored in Brazil, Chile, and Mexico, countries that adopted inflation targeting frameworks over a decade ago in an effort to put an end to their historical record of high and variable inflation. Overall, although long-term inflation expectations have become better anchored to the announced targets, it would be premature to conclude that long-term inflation expectations are well-anchored. Although the survey-based measures of long-term inflation expectations have been close to the announced targets, particularly in recent years, the evidence from financial market-based measures of inflation expectations is less clear. Far-forward inflation compensation has been volatile and has been above the announced targets. While we did not find evidence that market participants systematically revised their views on long-term inflation in response to domestic macroeconomic and monetary policy news, inflation compensation does tend to react to certain foreign macroeconomic news.

[37] A more sophisticated subsample analysis, for example using rolling windows and testing for breaks as in Galati *et al.* (2011) could shed more light on the anchoring of inflation expectations over time. However, we do not address this here and leave this interesting question for further research.

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Table 1: BRAZIL: Baseline Model (Full Sample: Jul-2006 - Oct-2012)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.31***	-0.26*	-0.31***	0.05
	(4.85)	(-1.71)	(-4.00)	(0.31)
CPI	2.03**	1.21	-0.80	2.01
	(2.42)	(0.60)	(-0.79)	(0.98)
IP	3.54***	0.60	-0.26	0.86
	(4.58)	(0.32)	(-0.28)	(0.46)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	1.48*	1.80	-0.63	2.42
	(1.92)	(0.97)	(-0.67)	(1.29)
TRADE DEFICIT	-1.12	0.45	-2.37**	2.82
	(-1.22)	(0.21)	(-2.12)	(1.26)
GDP	5.27***	8.56**	0.50	8.06**
	(3.68)	(2.50)	(0.29)	(2.31)
UNEMPL. RATE	-2.00***	-0.90	0.90	-1.80
	(-2.58)	(-0.48)	(0.96)	(-0.95)
Controls				
OIL FUTURES	0.52**	0.07	0.35	-0.28
	(2.29)	(0.12)	(1.27)	(-0.51)
FOOD FUTURES	-0.11	-0.21	-0.04	-0.17
	(-0.40)	(-0.31)	(-0.13)	(-0.24)
VIX	0.33	1.25**	1.00***	0.24
	(1.41)	(2.21)	(3.52)	(0.43)
Number of obs.	395	395	395	395
R^2	18%	5%	8%	4%
adj.R^2	16%	3%	5%	1%
$F-$statistic	7.65	2.95	2.95	1.40
(pval)	(0.00)	0.03	0.00	0.17

Notes: The table shows regression results for the full sample period July 2006 - October 2012, including only those days on which at least one Brazilian macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 2: CHILE: Baseline Model (Full Sample: Oct-2002 - Oct-2012)

variable	1-yr nominal rate	1-yr forward nominal rate ending 10 yrs	1-yr forward real rate ending 10 yrs	1-yr forward infl. comp. ending 10 yrs
Macro News Surprises				
POLICY RATE	0.07**	-0.03	-0.03	0.00
	(2.37)	(-0.66)	(-0.76)	(-0.05)
CPI	3.95***	5.74***	1.98**	3.56***
	(5.56)	(5.28)	(2.28)	(2.86)
IP	1.85***	0.04	1.38*	-1.34
	(2.86)	(0.04)	(1.74)	(-1.18)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	2.05	2.26	0.02	2.17
	(1.37)	(0.99)	(0.01)	(0.83)
TRADE DEFICIT	-0.22	-0.54	0.15	-0.66
	(-0.35)	(-0.55)	(0.19)	(-0.59)
GDP	-0.84	-2.19	-1.82	-0.31
	(-0.76)	(-1.30)	(-1.35)	(-0.16)
UNEMPL. RATE	0.29	1.58*	-0.11	1.61
	(0.50)	(1.76)	(-0.15)	(1.56)
Controls				
OIL FUTURES	0.34*	0.04	-0.15	0.19
	(1.71)	(0.12)	(-0.64)	(0.54)
FOOD FUTURES	-0.22	0.39	-0.07	0.44
	(-0.86)	(1.00)	(-0.23)	(0.99)
VIX	-0.27	-0.08	-0.46**	0.38
	(-1.49)	(-0.28)	(-2.06)	(1.19)
Number of obs.	459	459	459	459
R^2	11%	8%	3%	4%
adj.R^2	9%	6%	1%	2%
$F-$statistic	4.97	1.36	1.36	1.72
(pval)	(0.00)	0.00	0.19	0.07

Notes: The table shows regression results for the full sample period October 2002 - October 2012, including only those days on which at least one Chilean macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 3: MEXICO: Baseline Model (Full Sample: Jan-2003 - Oct-2012)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.50***	0.16	0.31***	-0.16
	(6.07)	(1.14)	(3.35)	(-1.25)
CPI	0.96	0.57	-0.52	1.08
	(1.36)	(0.48)	(-0.65)	(1.00)
IP	1.33**	2.70**	0.79	1.89*
	(2.12)	(2.55)	(1.09)	(1.96)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	-0.03	-0.43	-0.38	-0.02
	(-0.05)	(-0.40)	(-0.52)	(-0.02)
TRADE DEFICIT	0.09	-0.22	0.40	-0.59
	(0.14)	(-0.20)	(0.54)	(-0.59)
GDP	-1.79	-0.63	-0.20	-0.07
	(-1.58)	(-0.33)	(-0.15)	(-0.04)
UNEMPL. RATE	0.18	-0.97	-0.24	-0.73
	(0.28)	(-0.90)	(-0.33)	(-0.74)
Controls				
OIL FUTURES	0.04	-0.47	0.08	-0.54*
	(0.20)	(-1.49)	(0.37)	(-1.88)
FOOD FUTURES	-0.53**	-0.31	-0.64**	0.33
	(-2.39)	(-0.83)	(-2.54)	(0.97)
VIX	0.34*	1.11***	0.72***	0.39
	(1.91)	(3.75)	(3.57)	(1.45)
Number of obs.	639	639	639	639
R^2	8%	5%	6%	2%
adj.R^2	7%	3%	4%	1%
$F-$statistic	4.81	3.24	3.24	1.32
(pval)	(0.00)	0.00	0.00	0.21

Notes: The table shows regression results for the full sample period January 2003 - October 2012, including only those days on which at least one Mexican macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 4: BRAZIL: Baseline Model with U.S. Surprises (Full Sample)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
BRAZILIAN Macro News Surprises				
POLICY RATE	0.30***	-0.27*	-0.32***	0.05
CPI	2.10**	1.20	-0.52	1.72
IP	3.45***	0.64	-0.23	0.87
PMI	-	-	-	-
RETAIL SALES	1.59**	1.56	-0.42	1.98
TRADE DEFICIT	-1.23	0.33	-2.12*	2.46
GDP	5.40***	8.86***	0.47	8.39**
UNEMPL. RATE	-2.11***	-0.69	0.73	-1.41
U.S. Macro News Surprises				
POLICY RATE	0.28	0.47	0.13	0.34
	(1.07)	(0.79)	(0.42)	(0.55)
CPI	1.34	1.98	-0.02	2.01
	(1.56)	(1.01)	(-0.02)	(0.98)
IP	0.60	-3.94*	0.89	-4.83**
	(0.62)	(-1.77)	(0.77)	(-2.08)
PMI	-1.06	0.89	-1.68*	2.57
	(-1.28)	(0.47)	(-1.71)	(1.30)
RETAIL SALES	0.00	3.41*	-0.13	3.54*
	(0.00)	(1.81)	(-0.14)	(1.81)
TRADE DEFICIT	0.41	1.32	-1.24	2.57
	(0.51)	(0.72)	(-1.30)	(1.34)
GDP	0.98	-3.02	-0.43	-2.59
	(0.68)	(-0.91)	(-0.25)	(-0.75)
CONS. CONFIDENCE	0.29	-0.57	1.42	-1.99
	(0.35)	(-0.30)	(1.45)	(-1.01)
INITIAL CLAIMS	0.04	0.94	0.08	0.87
	(0.09)	(1.00)	(0.16)	(0.88)
ISM	0.78	0.09	-0.14	0.23
	(0.88)	(0.04)	(-0.14)	(0.11)
NEW HOME SALES	0.08	0.02	-1.23	1.25
	(0.11)	(0.01)	(-1.30)	(0.66)
NONFARM PAYROLLS	-0.38	0.97	0.71	0.26
	(-0.44)	(0.49)	(0.69)	(0.13)
UNEMPL. RATE	0.17	1.36	0.09	1.27
	(0.21)	(0.73)	(0.09)	(0.65)
Controls				
OIL FUTURES	0.32**	0.31	0.17	0.14
FOOD FUTURES	-0.13	-0.46	-0.14	-0.32
VIX	0.21	1.55***	0.50***	1.05***
Number of obs.	902	902	902	902
R^2	9%	6%	4%	5%
adj.R^2	7%	3%	2%	2%
$F-$statistic	3.68	1.71	1.71	1.74
(pval)	(0.00)	0.00	0.02	0.02

Notes: The table shows regression results for the full sample period July 2006 - October 2012, including only those days on which at least one Brazilian or U.S. macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 5: CHILE: Baseline Model with U.S. surprises (Full Sample)

variable	1-yr nominal rate	1-yr forward nominal rate ending 10 yrs	1-yr forward real rate ending 10 yrs	1-yr forward infl. comp. ending 10 yrs
CHILEAN Macro News Surprises				
POLICY RATE	0.06**	-0.02	-0.02	0.00
CPI	4.06***	5.88***	1.87**	3.81***
IP	1.72***	0.06	1.37*	-1.30
PMI	-	-	-	-
RETAIL SALES	2.01	2.28	0.16	2.04
TRADE DEFICIT	-0.29	-0.42	0.20	-0.60
GDP	-0.74	-2.05	-1.62	-0.38
UNEMPL. RATE	0.29	1.50	-0.26	1.68
U.S. Macro News Surprises				
POLICY RATE	0.06	0.06	0.01	0.05
	(0.39)	(0.22)	(0.04)	(0.17)
CPI	-0.14	-1.29	0.73	-1.97*
	(-0.25)	(-1.27)	(0.98)	(-1.72)
IP	-0.05	0.62	0.27	0.33
	(-0.08)	(0.59)	(0.35)	(0.27)
PMI	0.05	-0.21	-0.09	-0.12
	(0.10)	(-0.22)	(-0.13)	(-0.11)
RETAIL SALES	-0.53	1.44	0.73	0.65
	(-0.98)	(1.50)	(1.03)	(0.60)
TRADE DEFICIT	-0.79	0.53	-0.37	0.88
	(-1.52)	(0.57)	(-0.54)	(0.85)
GDP	-1.05	1.39	3.11***	-1.73
	(-1.17)	(0.86)	(2.61)	(-0.95)
CONS. CONFIDENCE	0.08	2.67***	-0.35	2.92***
	(0.16)	(2.85)	(-0.51)	(2.79)
INITIAL CLAIMS	0.33	-0.08	-0.19	0.11
	(1.27)	(-0.18)	(-0.56)	(0.22)
ISM	-0.08	1.80*	0.31	1.42
	(-0.15)	(1.86)	(0.44)	(1.31)
NEW HOME SALES	0.34	-0.69	0.24	-0.90
	(0.64)	(-0.74)	(0.35)	(-0.86)
NONFARM PAYROLLS	0.54	1.50	-2.15***	3.56***
	(1.03)	(1.59)	(-3.09)	(3.38)
UNEMPL. RATE	0.11	-1.35	1.26*	-2.53**
	(0.21)	(-1.44)	(1.83)	(-2.42)
Controls				
OIL FUTURES	0.22**	0.25	0.16	0.08
FOOD FUTURES	-0.03	0.36*	-0.05	0.39
VIX	-0.14	0.10	-0.25*	0.34*
Number of obs.	1486	1486	1486	1486
R^2	5%	4%	3%	3%
adj.R^2	3%	2%	1%	2%
$F-$statistic	3.22	1.62	1.62	1.99
(pval)	(0.00)	0.00	0.03	0.00

Notes: The table shows regression results for the full sample period October 2002 - October 2012, including only those days on which at least one Chilean or U.S. macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 6: MEXICO: Baseline Model WITH U.S. Surprises (Full Sample)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
MEXICAN Macro News Surprises				
POLICY RATE	0.51***	0.17	0.32***	-0.14
CPI	0.87	0.89	-0.62	1.49
IP	1.23*	2.71**	0.81	1.87*
PMI	0.97	-0.79	1.50	-2.25
RETAIL SALES	-0.01	-0.31	-0.36	0.07
TRADE DEFICIT	0.02	-0.35	0.34	-0.67
GDP	-1.88	-0.32	0.16	-0.19
UNEMPL. RATE	0.08	-1.04	-0.29	-0.77
U.S. Macro News Surprises				
POLICY RATE	0.17	0.14	-0.32	0.47
	(0.67)	(0.34)	(-1.17)	(1.17)
CPI	-0.07	-2.27**	-0.38	-2.07*
	(-0.10)	(-1.97)	(-0.51)	(-1.86)
IP	1.82**	-1.50	-1.36*	0.33
	(2.41)	(-1.22)	(-1.69)	(0.28)
PMI	-0.15	2.67**	1.86***	0.81
	(-0.23)	(2.50)	(2.66)	(0.79)
RETAIL SALES	-0.45	0.83	-0.12	1.28
	(-0.68)	(0.77)	(-0.17)	(1.24)
TRADE DEFICIT	-1.23*	2.51**	0.90	1.58
	(-1.88)	(2.36)	(1.29)	(1.54)
GDP	1.14	1.81	-0.32	2.14
	(1.00)	(0.97)	(-0.26)	(1.20)
CONS. CONFIDENCE	1.36**	0.91	0.50	0.51
	(2.07)	(0.85)	(0.72)	(0.49)
INITIAL CLAIMS	-0.38	-0.70	-0.58*	-0.17
	(-1.17)	(-1.32)	(-1.68)	(-0.33)
ISM	0.60	2.35**	2.19***	0.29
	(0.88)	(2.11)	(3.00)	(0.27)
NEW HOME SALES	0.53	-0.21	1.05	-1.14
	(0.81)	(-0.20)	(1.50)	(-1.11)
NONFARM PAYROLLS	1.87***	3.50***	1.28*	2.30**
	(2.83)	(3.25)	(1.82)	(2.21)
UNEMPL. RATE	-0.68	-1.40	-1.85***	0.52
	(-1.04)	(-1.31)	(-2.65)	(0.51)
Controls				
OIL FUTURES	-0.06	-0.16	0.10	-0.30*
FOOD FUTURES	-0.43***	-0.47**	-0.52***	0.09
VIX	0.00	0.69***	0.50***	0.15
Number of obs.	1620	1620	1620	1620
R^2	5%	4%	5%	2%
adj.R^2	3%	3%	3%	0%
$F-$statistic	3.25	3.30	3.30	1.21
(pval)	(0.00)	0.00	0.00	0.22

Notes: The table shows regression results for the full sample period January 2003 - October 2012, including only those days on which at least one Mexican or U.S. macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 7: Time table of data releases

	Month X				Month X+1				Month X+2			
week number:	1	2	3	4	1	2	3	4	1	2	3	4
Brazil												
CPI (IPCA)	-	-	-	-	X	-	-	-	-	-	-	-
IP	-	-	-	-	-	-	-	-	X	-	-	-
PMI	-	-	-	-	X	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	-	-	-	-	X	-	-
Trade Deficit	-	-	-	-	X	-	-	-	-	-	-	-
GDP	-	-	-	-	-	-	-	-	-	-	-	X
Unempl. rate	-	-	-	-	-	-	-	X	-	-	-	-
Chile												
CPI	-	-	-	-	X	-	-	-	-	-	-	-
IP	-	-	-	-	-	-	-	X	-	-	-	-
PMI	-	-	-	-	X	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	-	-	X	-	-	-	-
Trade Deficit	-	-	-	-	X	-	-	-	-	-	-	-
GDP	-	-	-	-	-	-	-	X	-	-	-	-
Unempl. rate (*)	-	-	-	-	-	-	-	X	X	-	-	-
Mexico												
CPI	-	-	-	-	-	X	-	-	-	-	-	-
IP	-	-	-	-	-	-	-	-	-	X	-	-
PMI (IMEF)	-	-	-	-	X	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	-	-	-	-	-	-	X
Trade Deficit	-	-	-	-	-	-	-	X	-	-	-	-
GDP	-	-	-	-	-	-	-	-	-	X	-	-
Unempl. rate	-	-	-	-	-	-	X	-	-	-	-	-
United States												
CPI	-	-	-	-	-	X	-	-	-	-	-	-
IP	-	-	-	-	-	-	X	-	-	-	-	-
PMI	-	-	-	X	-	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	X	-	-	-	-	-	-
Trade Deficit	-	-	-	-	-	-	-	-	X	-	-	-
GDP (Advance)	-	-	-	-	-	-	-	X	-	-	-	-
Cons. Confidence	-	X	-	-	-	-	-	-	-	-	-	-
Initial Claims (**)	-	X	X	X	X	-	-	-	-	-	-	-
New Home Sales	-	-	-	-	-	-	-	X	-	-	-	-
Nonfarm Payrolls	-	-	-	-	X	-	-	-	-	-	-	-
Unempl. rate	-	-	-	-	X	-	-	-	-	-	-	-

Notes: The table shows in which weeks different macro figures for month X are released. Data is either released in the actual month (columns 1 through 4), the following month (columns 5 through 8), or in the month after that (columns 9 through 13). The timetable for U.S. data releases is from Andersson, Overby, and Sebestyén (2009).
(*) For Chile, the unemployment rate is the 3-month moving average rate. Before March 2009, unemployment was released the first week of month X+2. Since then, the release has been in the last week of month X+1.
(**) Initial claims for the U.S. are released weekly, with a release always reflecting claims for the week ending on the Friday prior to the release. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 8: BRAZIL: Baseline Model with Chinese Surprises (Full Sample)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
BRAZILIAN Macro News Surprises				
POLICY RATE	0.31***	-0.24	-0.32***	0.08
CPI	2.09**	1.45	-0.65	2.10
IP	3.68***	1.14	-0.17	1.31
PMI	-	-	-	-
RETAIL SALES	1.45*	1.94	-0.41	2.35
TRADE DEFICIT	-1.16	0.65	-2.20*	2.85
GDP	5.84***	9.77***	0.63	9.13**
UNEMPL. RATE	-1.87**	-0.78	0.84	-1.62
CHINESE Macro News Surprises				
CPI	0.97	-0.49	-0.18	-0.31
	(1.14)	(-0.24)	(-0.17)	(-0.15)
IP	-1.51*	4.28*	-0.71	4.99**
	(-1.66)	(1.94)	(-0.62)	(2.21)
PMI	0.10	2.32	0.52	1.80
	(0.09)	(0.87)	(0.38)	(0.66)
RETAIL SALES	1.52	2.03	1.13	0.90
	(1.54)	(0.85)	(0.90)	(0.37)
TRADE DEFICIT	-1.23	-1.02	-0.15	-0.87
	(-1.53)	(-0.52)	(-0.15)	(-0.43)
GDP	-2.16	-7.41*	0.08	-7.49*
	(-1.38)	(-1.95)	(0.04)	(-1.92)
Controls				
OIL FUTURES	0.43**	0.15	0.18	-0.03
FOOD FUTURES	-0.08	-0.50	0.08	-0.58
VIX	0.25	0.41	0.57***	-0.16
Number of obs.	537	537	537	537
R^2	17%	5%	5%	4%
adj.R^2	14%	2%	2%	1%
$F-$statistic	6.10	1.68	1.68	1.38
(pval)	(0.00)	0.09	0.04	0.14

Notes: The table shows regression results for the full sample period July 2006 - October 2012, including only those days on which at least one Brazilian or Chinese macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 9: CHILE: Baseline Model with Chinese surprises (Full Sample)

variable	1-yr nominal rate	1-yr forward nominal rate ending 10 yrs	1-yr forward real rate ending 10 yrs	1-yr forward infl. comp. ending 10 yrs
CHILEAN Macro News Surprises				
POLICY RATE	0.06**	-0.02	-0.03	0.01
CPI	3.97***	5.82***	2.01**	3.62***
IP	1.80***	0.16	1.33*	-1.16
PMI	-	-	-	-
RETAIL SALES	2.02	2.16	0.02	2.07
TRADE DEFICIT	-0.23	-0.50	0.14	-0.62
GDP	-0.82	-2.22	-1.73	-0.43
UNEMPL. RATE	0.27	1.65*	-0.13	1.69*
CHINESE Macro News Surprises				
CPI	0.68	-0.45	0.24	-0.67
	(1.05)	(-0.46)	(0.31)	(-0.60)
IP	-2.15***	0.29	0.18	0.11
	(-2.99)	(0.27)	(0.21)	(0.09)
PMI	1.97*	-2.06	-0.64	-1.33
	(1.92)	(-1.33)	(-0.53)	(-0.75)
RETAIL SALES	-1.14	1.71	-1.44	3.08*
	(-1.24)	(1.23)	(-1.33)	(1.93)
TRADE DEFICIT	0.42	0.52	0.36	0.15
	(0.62)	(0.52)	(0.46)	(0.13)
GDP	1.22	1.16	0.01	1.09
	(1.09)	(0.69)	(0.01)	(0.56)
Controls				
OIL FUTURES	0.38**	-0.07	-0.20	0.13
FOOD FUTURES	0.00	-0.01	0.00	-0.01
VIX	-0.23*	-0.11	-0.34**	0.23
Number of obs.	651	651	651	651
R^2	11%	7%	3%	4%
adj.R^2	8%	5%	0%	1%
$F-$statistic	4.47	1.12	1.12	1.49
(pval)	(0.00)	0.00	0.33	0.09

Notes: The table shows regression results for the full sample period October 2002 - October 2012, including only those days on which at least one Chilean or Chinese macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 10: MEXICO: Baseline Model With Chinese Surprises (Full Sample)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
MEXICAN Macro News Surprises				
POLICY RATE	0.50***	0.16	0.31***	-0.16
CPI	0.96	0.61	-0.52	1.10
IP	1.31**	2.71***	0.76	1.93**
PMI	-	-	-	-
RETAIL SALES	-0.03	-0.39	-0.37	0.00
TRADE DEFICIT	0.07	-0.22	0.39	-0.58
GDP	-1.73	-0.62	-0.23	-0.03
UNEMPL. RATE	0.13	-0.92	-0.22	-0.69
CHINESE Macro News Surprises				
CPI	0.50	-1.10	0.09	-1.14
	(0.71)	(-0.96)	(0.11)	(-1.08)
IP	0.12	1.25	-0.48	1.68
	(0.15)	(0.99)	(-0.55)	(1.43)
PMI	0.58	-2.13	-1.45	-0.63
	(0.52)	(-1.18)	(-1.16)	(-0.38)
RETAIL SALES	-0.64	1.14	1.84	-0.70
	(-0.64)	(0.71)	(1.64)	(-0.46)
TRADE DEFICIT	-0.15	-0.10	0.44	-0.49
	(-0.21)	(-0.08)	(0.54)	(-0.45)
GDP	0.83	0.98	0.21	0.77
	(0.69)	(0.50)	(0.16)	(0.43)
Controls				
OIL FUTURES	0.03	-0.30	0.24	-0.53**
FOOD FUTURES	-0.33*	-0.60*	-0.72***	0.13
VIX	0.22	1.15***	0.70***	0.45**
Number of obs.	814	814	814	814
R^2	6%	6%	7%	3%
adj.R^2	4%	4%	4%	1%
$F-$statistic	3.06	3.10	3.10	1.40
(pval)	(0.00)	0.00	0.00	0.12

Notes: The table shows regression results for the full sample period January 2003 - October 2012, including only those days on which at least one Mexican or Chinese macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 11: BRAZIL: Baseline Model (Pre-Crisis Sample: Jul-2006 - Jun-2007)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.58**	1.65***	-0.26	1.91***
	(2.12)	(3.06)	(-0.91)	(3.46)
CPI	3.61**	1.26	-2.97	4.23
	(2.02)	(0.36)	(-1.57)	(1.17)
IP	2.43	3.10	0.16	2.95
	(1.44)	(0.93)	(0.09)	(0.86)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	2.05	2.34	-1.59	3.93
	(1.29)	(0.75)	(-0.95)	(1.23)
TRADE DEFICIT	4.97*	5.70	1.42	4.28
	(1.84)	(1.08)	(0.50)	(0.79)
GDP	5.71*	-9.41	-0.23	-9.18
	(1.91)	(-1.60)	(-0.07)	(-1.52)
UNEMPL. RATE	0.80	7.20**	1.34	5.86*
	(0.46)	(2.11)	(0.73)	(1.67)
Controls				
OIL FUTURES	0.14	0.87	1.09	-0.22
	(0.19)	(0.60)	(1.40)	(-0.15)
FOOD FUTURES	1.33*	2.40	1.25	1.16
	(1.79)	(1.64)	(1.59)	(0.77)
VIX	1.01	2.87*	-0.39	3.26*
	(1.18)	(1.71)	(-0.43)	(1.89)
Number of obs.	66	66	66	66
R^2	37%	31%	21%	34%
adj.R^2	25%	17%	5%	20%
$F-$statistic	2.93	2.23	1.29	2.48
(pval)	(0.00)	(0.03)	(0.25)	(0.01)

Notes: The table shows regression results for the pre-crisis sample period July 2006 - June 2007, including only those days on which at least one Brazilian macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 12: BRAZIL: Baseline Model (Crisis Sample: Jul-2007 - Oct-2012)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.29***	-0.32*	-0.31***	-0.01
	(4.33)	(-1.91)	(-3.67)	(-0.04)
CPI	1.84*	1.50	-0.40	1.90
	(1.95)	(0.65)	(-0.34)	(0.81)
IP	3.75***	0.28	-0.27	0.55
	(4.38)	(0.14)	(-0.25)	(0.26)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	1.70*	2.06	-0.16	2.22
	(1.94)	(0.96)	(-0.15)	(1.02)
TRADE DEFICIT	-1.45	0.31	-2.62**	2.94
	(-1.44)	(0.13)	(-2.10)	(1.17)
GDP	4.95***	9.58**	0.74	8.84**
	(3.08)	(2.44)	(0.37)	(2.21)
UNEMPL. RATE	-2.33***	-2.63	0.73	-3.35
	(-2.77)	(-1.28)	(0.69)	(-1.60)
Controls				
OIL FUTURES	0.52**	-0.10	0.34	-0.44
	(2.16)	(-0.17)	(1.12)	(-0.73)
FOOD FUTURES	-0.20	-0.42	-0.15	-0.27
	(-0.65)	(-0.55)	(-0.38)	(-0.35)
VIX	0.28	1.07*	1.02***	0.05
	(1.13)	(1.75)	(3.28)	(0.08)
Number of obs.	329	329	329	329
R^2	18%	6%	8%	4%
adj.R^2	15%	3%	5%	1%
$F-$statistic	6.40	1.93	2.57	1.21
(pval)	(0.00)	(0.04)	(0.00)	(0.28)

Notes: The table shows regression results for the crisis sample period July 2007 - October 2012, including only those days on which at least one Brazilian macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 13: CHILE: Baseline Model (Pre-Crisis Sample: Oct-2002 - Jun-2007)

variable	1-yr nominal rate	1-yr forward nominal rate ending 10 yrs	1-yr forward real rate ending 10 yrs	1-yr forward infl. comp. ending 10 yrs
Macro News Surprises				
POLICY RATE	0.03	0.13	-0.15*	0.27**
	(0.65)	(1.24)	(-1.76)	(2.22)
CPI	0.28	4.99**	-0.12	4.97*
	(0.32)	(2.29)	(-0.07)	(1.94)
IP	1.73**	-1.39	1.99	-3.31
	(2.43)	(-0.79)	(1.36)	(-1.60)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	-	-	-	-
	-	-	-	-
TRADE DEFICIT	1.09*	-1.12	0.90	-1.97
	(1.77)	(-0.73)	(0.71)	(-1.10)
GDP	-0.85	-0.55	-2.64	2.08
	(-0.74)	(-0.19)	(-1.11)	(0.62)
UNEMPL. RATE	0.17	2.56*	-1.92*	4.32***
	(0.31)	(1.90)	(-1.70)	(2.72)
Controls				
OIL FUTURES	-0.12	-0.10	-0.37	0.27
	(-0.58)	(-0.18)	(-0.85)	(0.44)
FOOD FUTURES	-0.19	-0.08	-0.24	0.16
	(-0.78)	(-0.13)	(-0.47)	(0.22)
VIX	0.48	-0.16	-0.87	0.70
	(1.58)	(-0.22)	(-1.38)	(0.79)
Number of obs.	192	192	192	192
R^2	8%	7%	6%	11%
adj.R^2	3%	2%	1%	6%
$F-$statistic	1.52	1.31	1.26	2.17
(pval)	(0.13)	(0.23)	(0.26)	(0.02)

Notes: The table shows regression results for the pre-crisis sample period October 2002 - June 2007, including only those days on which at least one Chilean macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 14: CHILE: Baseline Model (Crisis Sample: Jul-2007 - Oct-2012)

variable	1-yr nominal rate	1-yr forward nominal rate ending 10 yrs	1-yr forward real rate ending 10 yrs	1-yr forward infl. comp. ending 10 yrs
Macro News Surprises				
POLICY RATE	0.08**	-0.07	0.01	-0.07
	(2.04)	(-1.34)	(0.13)	(-1.27)
CPI	4.82***	5.97***	2.53***	3.24**
	(4.83)	(4.74)	(2.63)	(2.34)
IP	1.89**	0.41	1.29	-0.89
	(1.97)	(0.34)	(1.40)	(-0.67)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	1.48	1.87	0.24	1.57
	(0.79)	(0.79)	(0.13)	(0.60)
TRADE DEFICIT	-0.72	-0.47	-0.03	-0.42
	(-0.71)	(-0.37)	(-0.03)	(-0.30)
GDP	-0.99	-3.30	-1.49	-1.71
	(-0.58)	(-1.53)	(-0.91)	(-0.72)
UNEMPL. RATE	0.33	0.88	1.33	-0.48
	(0.34)	(0.71)	(1.42)	(-0.35)
Controls				
OIL FUTURES	0.47	0.09	-0.02	0.10
	(1.54)	(0.23)	(-0.05)	(0.24)
FOOD FUTURES	-0.23	0.69	0.05	0.61
	(-0.57)	(1.35)	(0.11)	(1.09)
VIX	-0.33	-0.03	-0.33	0.30
	(-1.37)	(-0.09)	(-1.41)	(0.90)
Number of obs.	267	267	267	267
R^2	14%	12%	5%	5%
adj.R^2	10%	8%	1%	1%
$F-$statistic	3.72	3.02	1.26	1.20
(pval)	(0.00)	(0.00)	(0.25)	(0.29)

Notes: The table shows regression results for the crisis sample period July 2007 - October 2012, including only those days on which at least one Chilean macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 15: MEXICO: Baseline Model (Pre-Crisis Sample: Jan-2003 - Jun-2007)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.61***	0.14	0.16	-0.02
	(3.43)	(0.47)	(0.84)	(-0.05)
CPI	0.99	1.56	-1.29	2.84
	(0.70)	(0.65)	(-0.86)	(1.18)
IP	2.42**	3.99**	1.47	2.50
	(2.40)	(2.31)	(1.36)	(1.45)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	-1.78*	-1.30	-1.15	-0.09
	(-1.66)	(-0.71)	(-1.00)	(-0.05)
TRADE DEFICIT	0.71	0.82	0.60	0.27
	(0.64)	(0.43)	(0.51)	(0.14)
GDP	-4.62**	3.25	1.61	1.62
	(-2.45)	(1.01)	(0.80)	(0.50)
UNEMPL. RATE	-0.32	-2.32	-1.41	-0.91
	(-0.31)	(-1.29)	(-1.26)	(-0.51)
Controls				
OIL FUTURES	-0.42	-0.91	-0.09	-0.84
	(-1.23)	(-1.56)	(-0.24)	(-1.44)
FOOD FUTURES	-0.76*	0.53	-0.23	0.72
	(-1.88)	(0.76)	(-0.54)	(1.04)
VIX	1.64***	2.23**	1.81***	0.48
	(2.91)	(2.31)	(3.01)	(0.50)
Number of obs.	265	265	265	265
R^2	13%	6%	6%	3%
adj.R^2	10%	2%	2%	-1%
$F-$statistic	3.56	1.55	1.41	0.75
(pval)	(0.00)	(0.11)	(0.17)	(0.69)

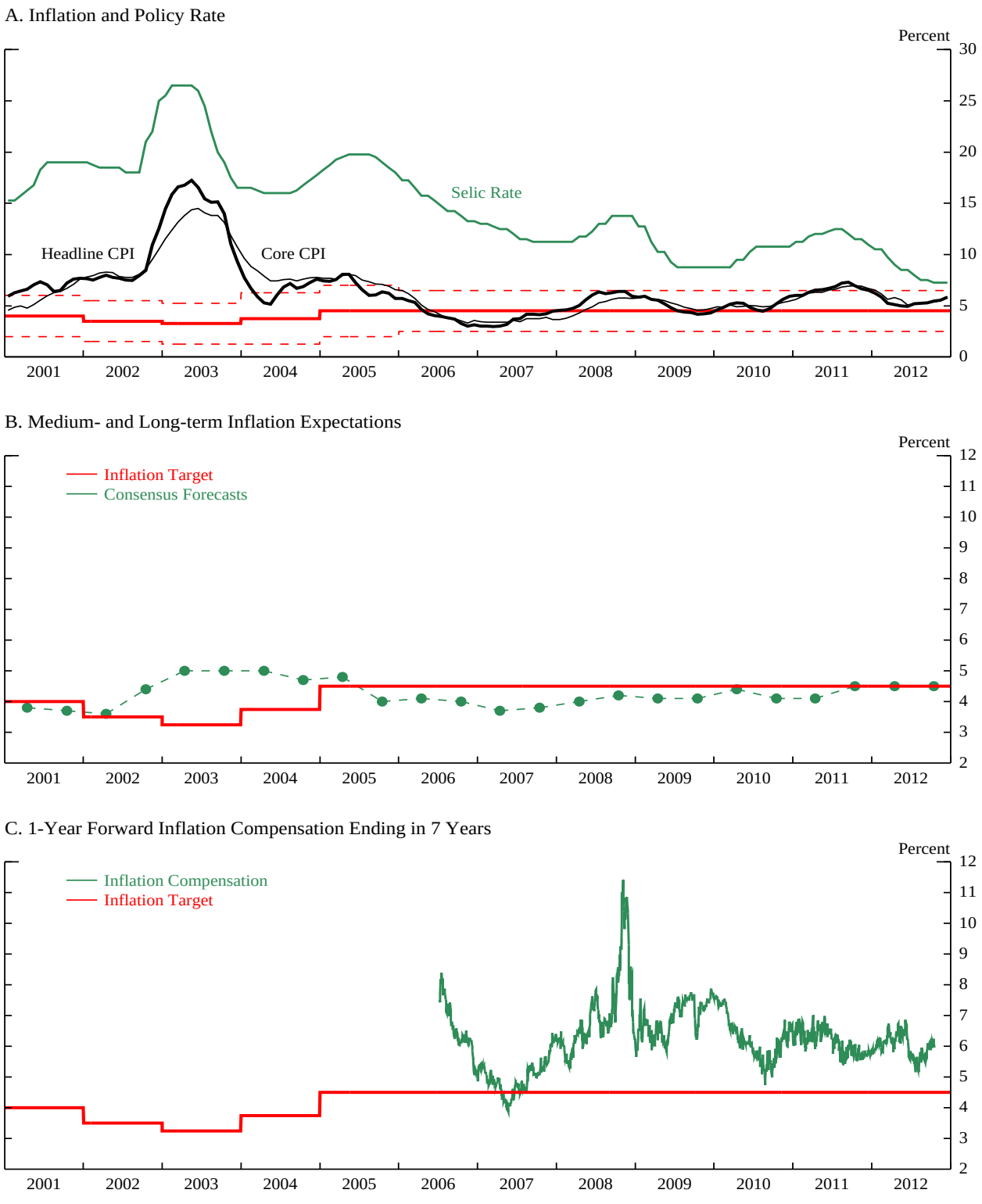
Notes: The table shows regression results for the full sample period January 2003 - June 2007, including only those days on which at least one Mexican macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Table 16: MEXICO: Baseline Model (Crisis Sample: Jul-2007 - Oct-2012)

variable	1-yr nominal rate	1-yr forward nominal rate ending 7 yrs	1-yr forward real rate ending 7 yrs	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.50***	0.16	0.31***	-0.16
	(6.07)	(1.14)	(3.35)	(-1.25)
CPI	0.96	0.57	-0.52	1.08
	(1.36)	(0.48)	(-0.65)	(1.00)
IP	1.33**	2.70**	0.79	1.89*
	(2.12)	(2.55)	(1.09)	(1.96)
PMI	1.02	-1.02	1.22	-2.20
	(0.89)	(-0.53)	(0.93)	(-1.25)
RETAIL SALES	-0.03	-0.43	-0.38	-0.02
	(-0.05)	(-0.40)	(-0.52)	(-0.02)
TRADE DEFICIT	0.09	-0.22	0.40	-0.59
	(0.14)	(-0.20)	(0.54)	(-0.59)
GDP	-1.79	-0.63	-0.20	-0.07
	(-1.58)	(-0.33)	(-0.15)	(-0.04)
UNEMPL. RATE	0.18	-0.97	-0.24	-0.73
	(0.28)	(-0.90)	(-0.33)	(-0.74)
Controls				
OIL FUTURES	0.04	-0.47	0.08	-0.54*
	(0.20)	(-1.49)	(0.37)	(-1.88)
FOOD FUTURES	-0.53**	-0.31	-0.64**	0.33
	(-2.39)	(-0.83)	(-2.54)	(0.97)
VIX	0.34*	1.11***	0.72***	0.39
	(1.91)	(3.75)	(3.57)	(1.45)
Number of obs.	639	639	639	639
R^2	8%	5%	6%	2%
adj.R^2	7%	3%	4%	1%
$F-$statistic	4.81	2.64	3.24	1.32
(pval)	(0.00)	(0.00)	(0.00)	(0.21)

Notes: The table shows regression results for the full sample period July 2007 - October 2012, including only those days on which at least one Mexican macroeconomic figure is released. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Oil and food futures are recorded as the change from the day before, in basis points, while the VIX is recorded as the change from the day before in percentage points. Besides the surprise and control variables shown, also included in the regressions are a constant and a dummy that takes on the value of 1 on the first business day of the year and 0 on all other days. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (F-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

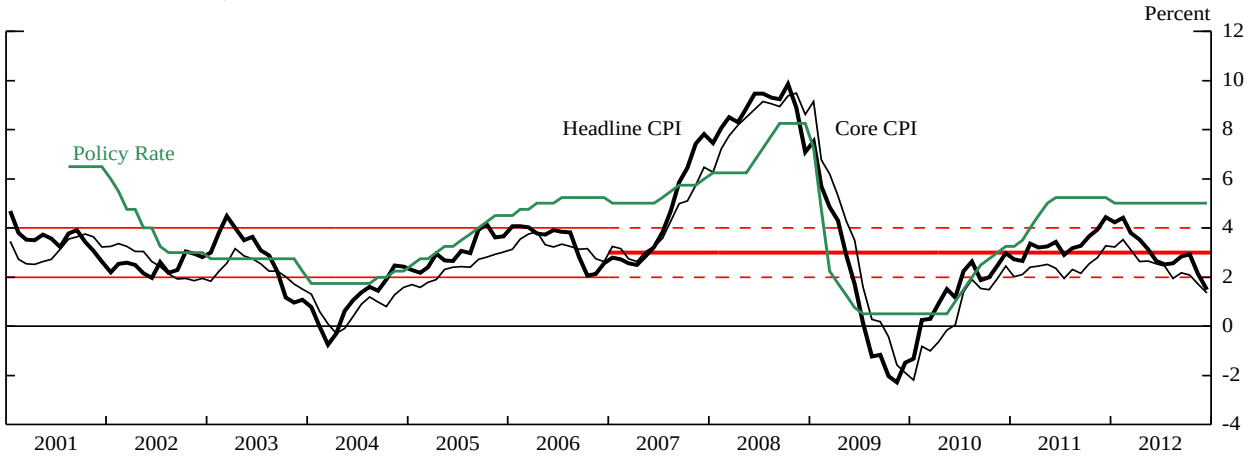
Figure 1: Brazil: Inflation, forward inflation compensation, and survey measures



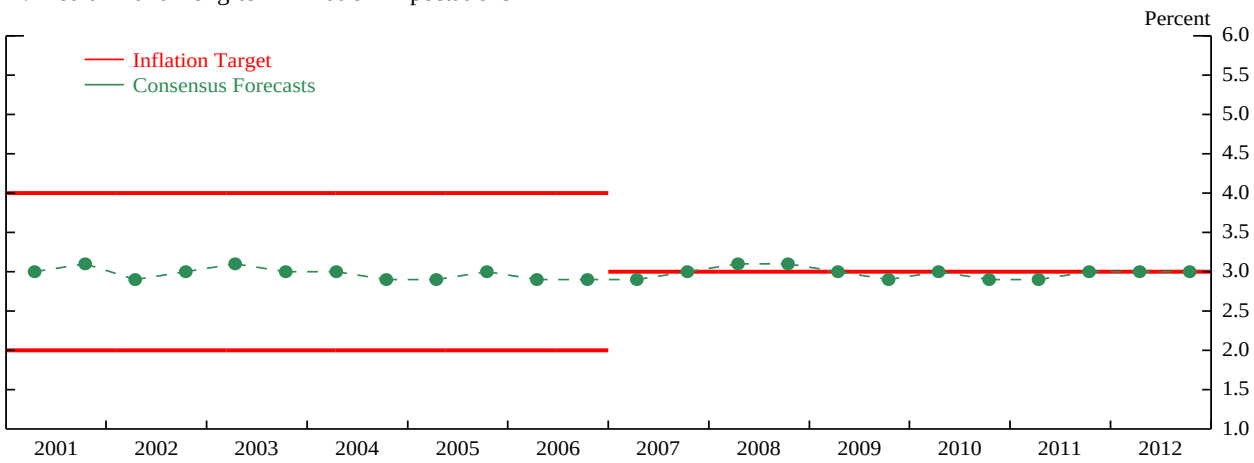
Notes: The figure presents realized inflation, our estimated far-forward inflation compensation measure and Consensus Forecasts' long-term survey measure of inflation for Brazil. Panel A displays year-over-year realized headline and core CPI for Brazil (the thick and thin black lines, respectively), the Central Bank of Brazil's Selic rate (overnight target rate, the green line), and the Central Bank of Brazil's target inflation rate and the tolerance interval around this target (the dashed thick and thin red lines, respectively). Panel B displays our 1-year forward inflation compensation estimate, ending in 7 years. Panel C displays the Central Bank of Brazil's target inflation rate (the dashed red line) and Consensus Forecasts' twice-yearly survey of long-run Brazilian inflation between 5 and 10 years out (the green dotted line).

Figure 2: Chile: Inflation, forward inflation compensation, and survey measures

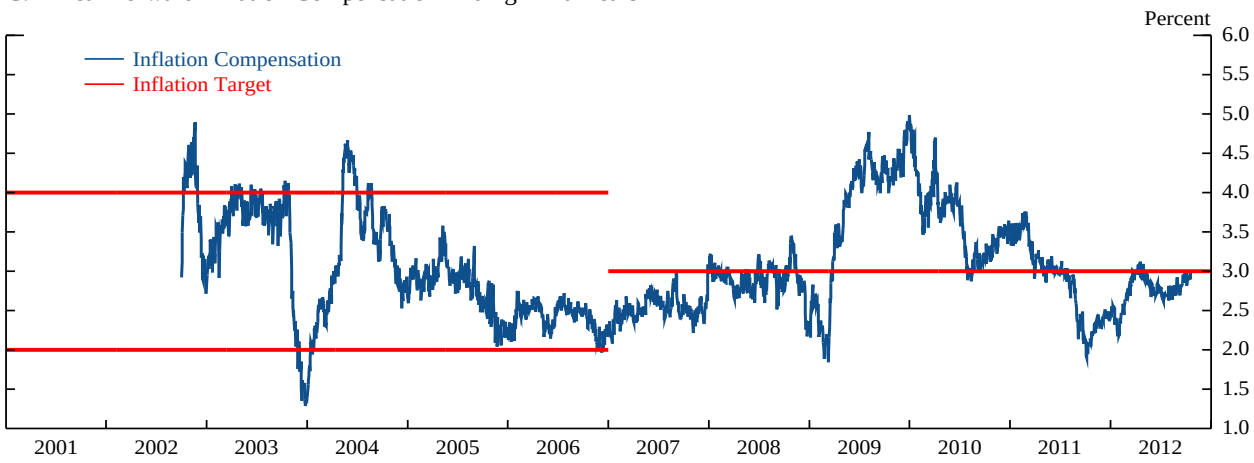
A. Inflation and Policy Rate



B. Medium- and Long-term Inflation Expectations



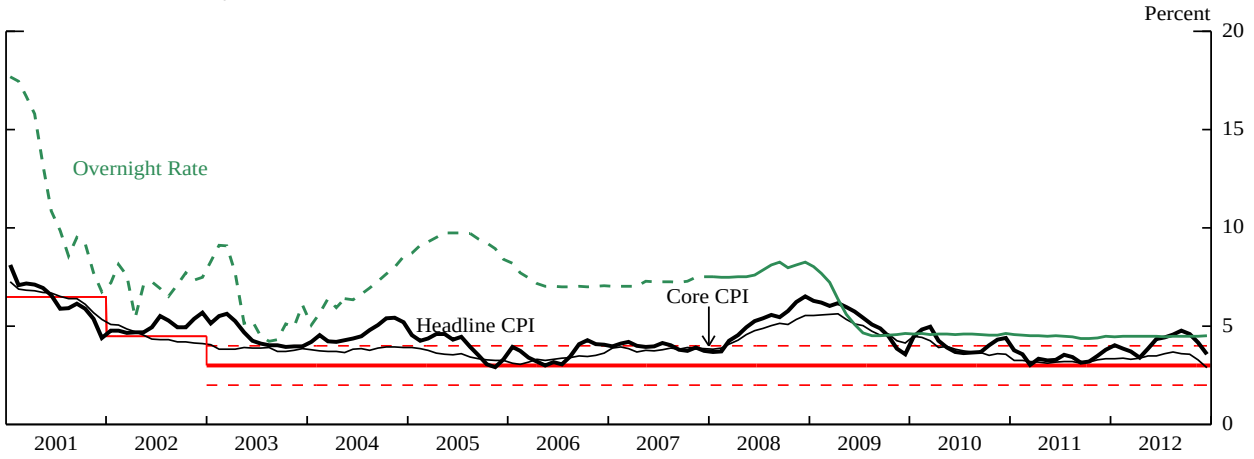
C. 1-Year Forward Inflation Compensation Ending in 10 Years



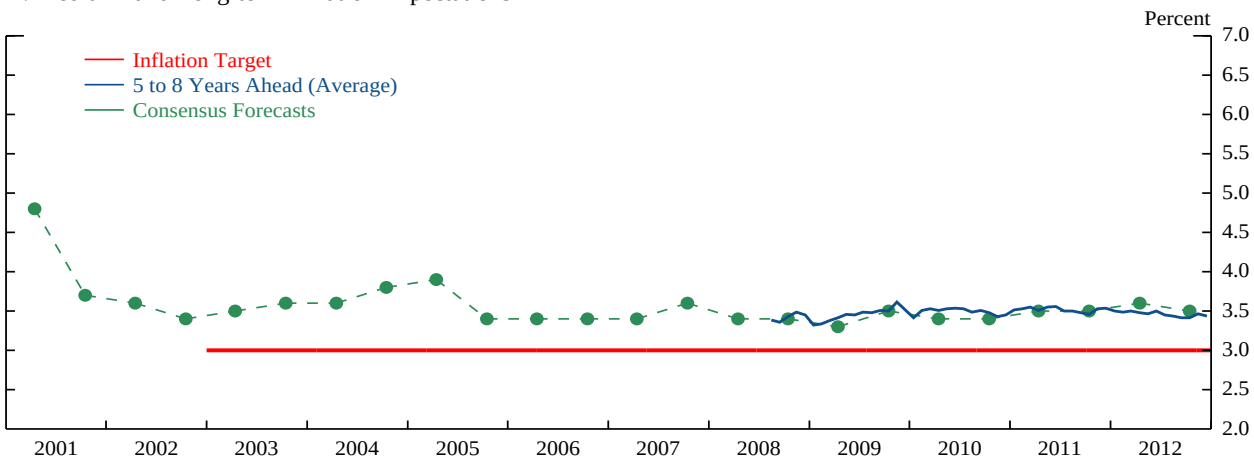
Notes: The figure presents realized inflation, our estimated far-forward inflation compensation measure and Consensus Forecasts' long-term survey measure of inflation for Chile. Panel A displays year-over-year realized headline and core CPI for Chile (the thick and thin black lines, respectively), the Central Bank of Chile's overnight policy rate (the green line), and the Central Bank of Chile's target inflation rate and the tolerance interval around this target (the dashed thick and thin red lines, respectively). Note that before 2007 only a target rate interval was specified for inflation (the solid red lines). Panel B displays our 1-year forward inflation compensation estimate, ending in 10 years. Panel C displays the Central Bank of Chile's target inflation rate (the solid red line) and Consensus Forecasts' twice-yearly survey of long-run Chilean inflation between 5 and 10 years out (the green dotted line).

Figure 3: Mexico: Inflation, forward inflation compensation, and survey measures

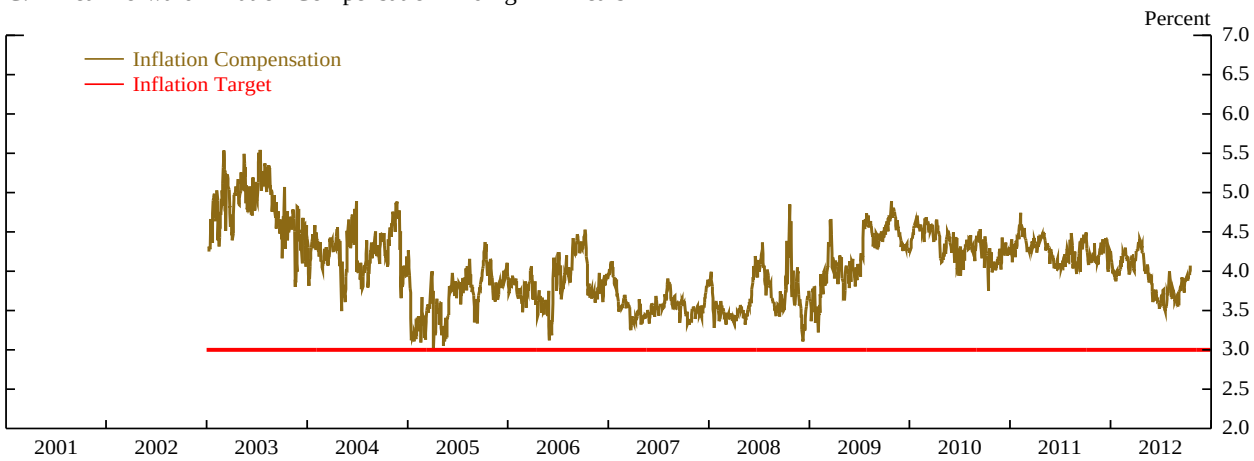
A. Inflation and Policy Rate



B. Medium- and Long-term Inflation Expectations

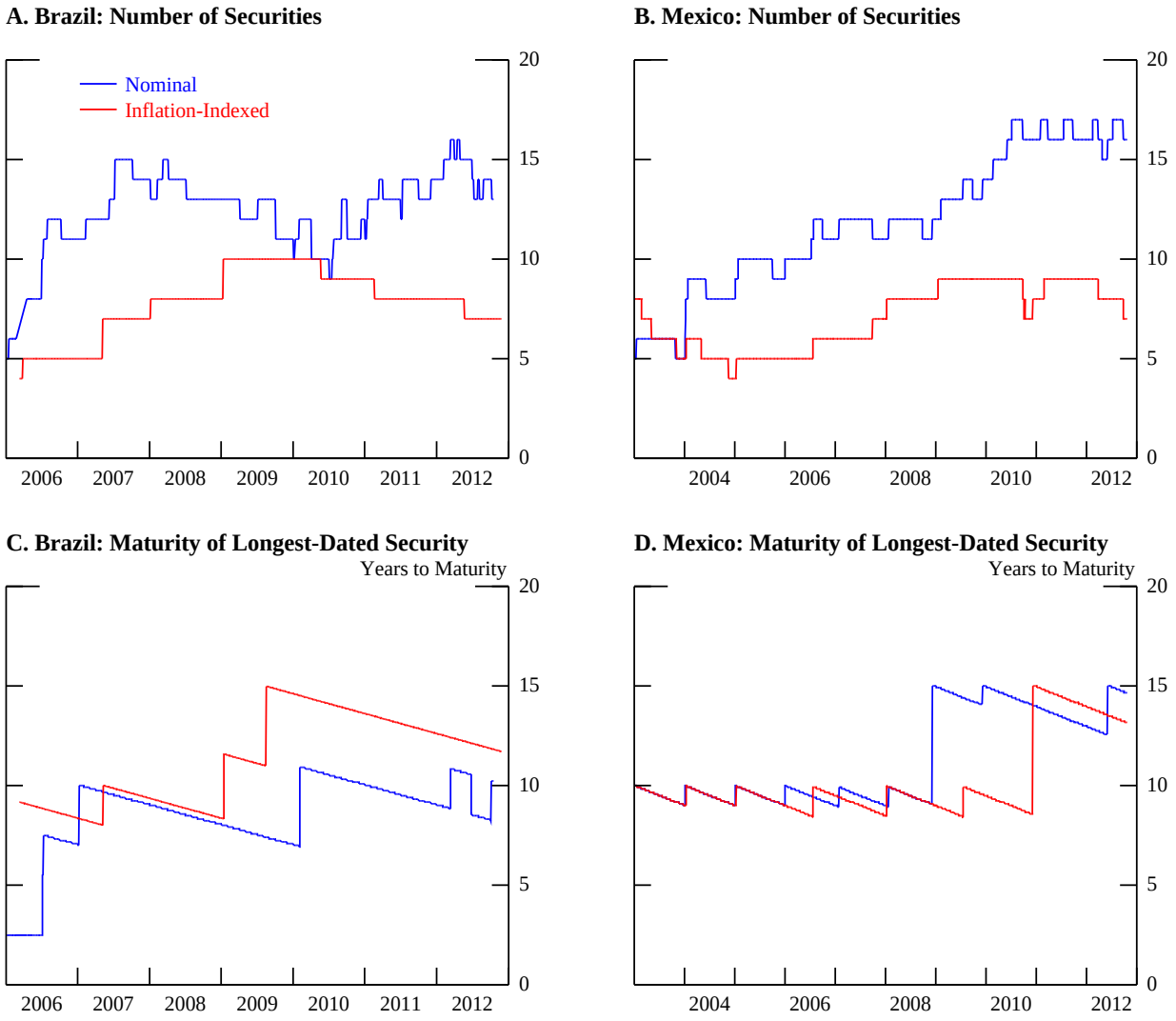


C. 1-Year Forward Inflation Compensation Ending in 7 Years



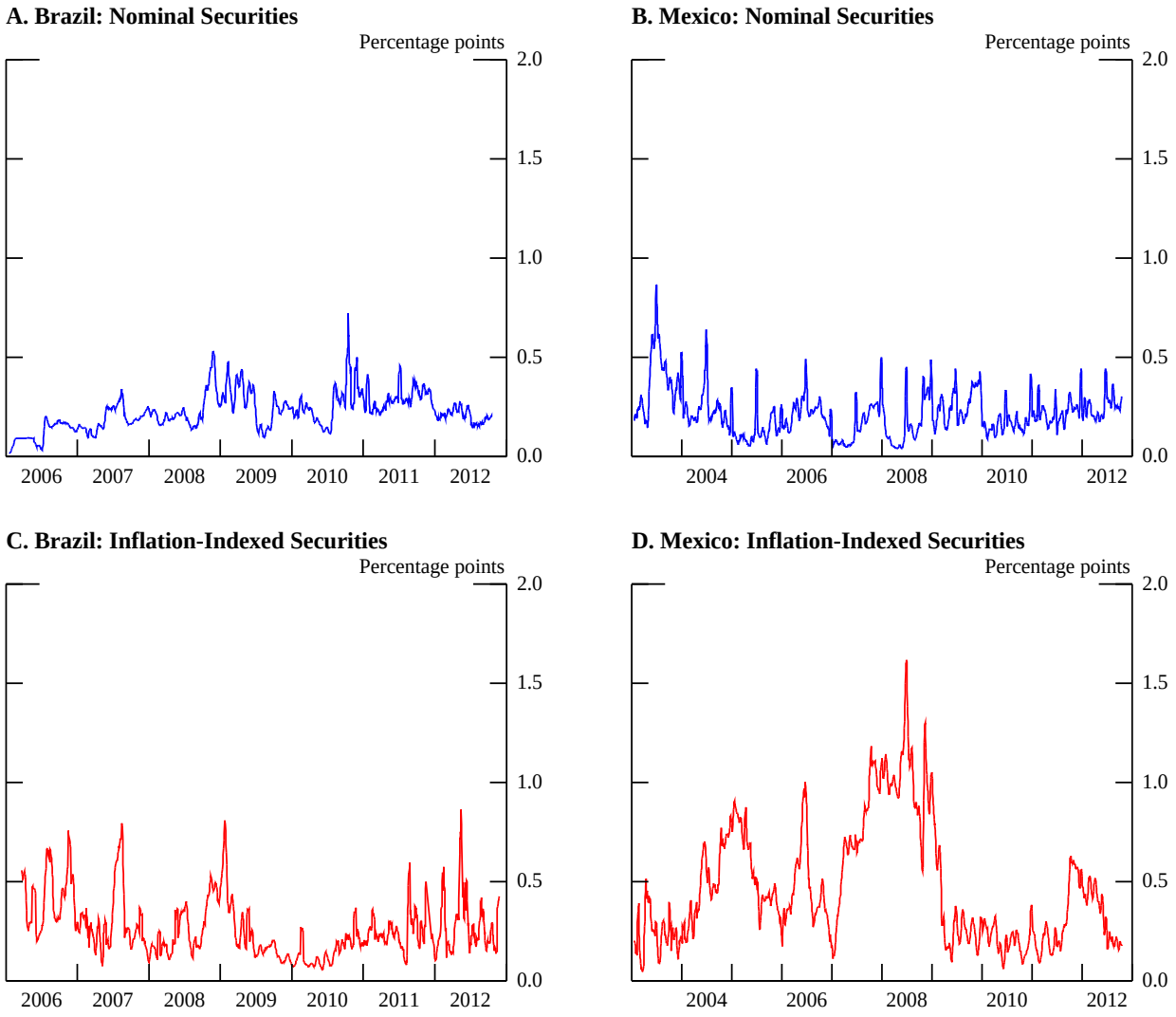
Notes: The figure presents realized inflation, our estimated far-forward inflation compensation measure and Consensus Forecasts' long-term survey measure of inflation for Mexico. Panel A displays year-over-year realized headline and core CPI for Mexico (the thick and thin black lines, respectively), the Bank of Mexico's overnight policy rate (the green line), and the Bank of Mexico's target inflation rate and the tolerance interval around this target (the dashed thick and thin red lines, respectively). Note that before 2002 only a target rate was specified (the solid red line). Panel B displays our 1-year forward inflation compensation estimate, ending in 7 years. Panel C displays the Bank of Mexico's target inflation rate (the solid red line) and Consensus Forecasts' twice-yearly survey of long-run Mexican inflation between 5 and 10 years out (the green dotted line).

Figure 4: Zero curve estimation: outstanding bonds and longest-maturity bond



Notes: The figure presents indicators of the number and maturity of bonds used in the construction of the nominal and real zero coupon curve from prices on nominal and inflation-linked sovereign bonds for Brazil (the left hand side panels) and Mexico (the right hand side panels) using the Nelson and Siegel (1987) model. Panels A and B display the number of nominal and inflation-indexed bonds that were used in the estimation on any given day (the blue and red lines, respectively). Panels C and D display the longest residual-maturity nominal and inflation-indexed bond that was used in the estimation of the zero coupon curves. Note that in the estimation we only include bonds with residual maturities between three months and fifteen years. No indicators are shown for Chile, as we obtained zero curve estimates directly from RiskAmerica.

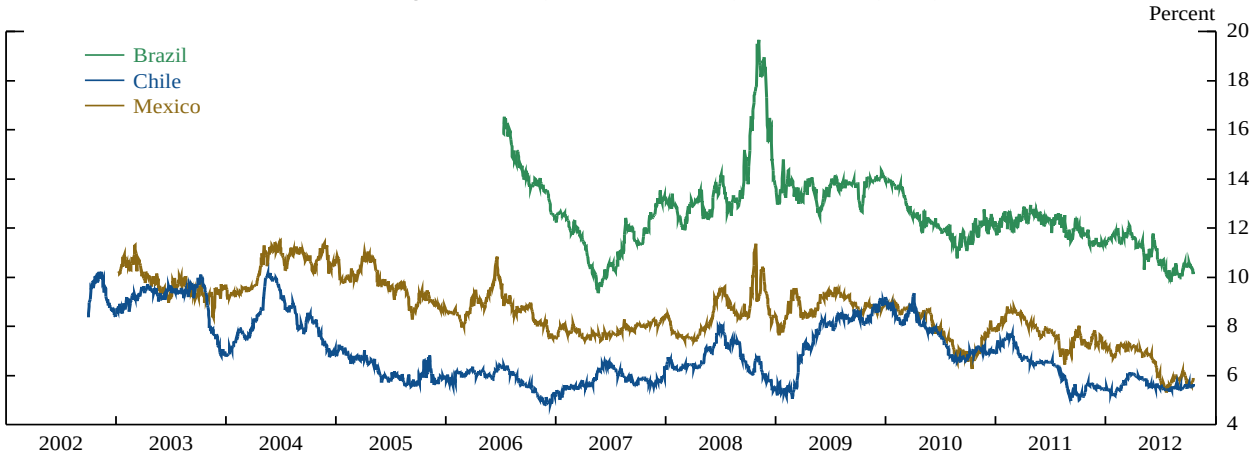
Figure 5: Bond price fitting errors



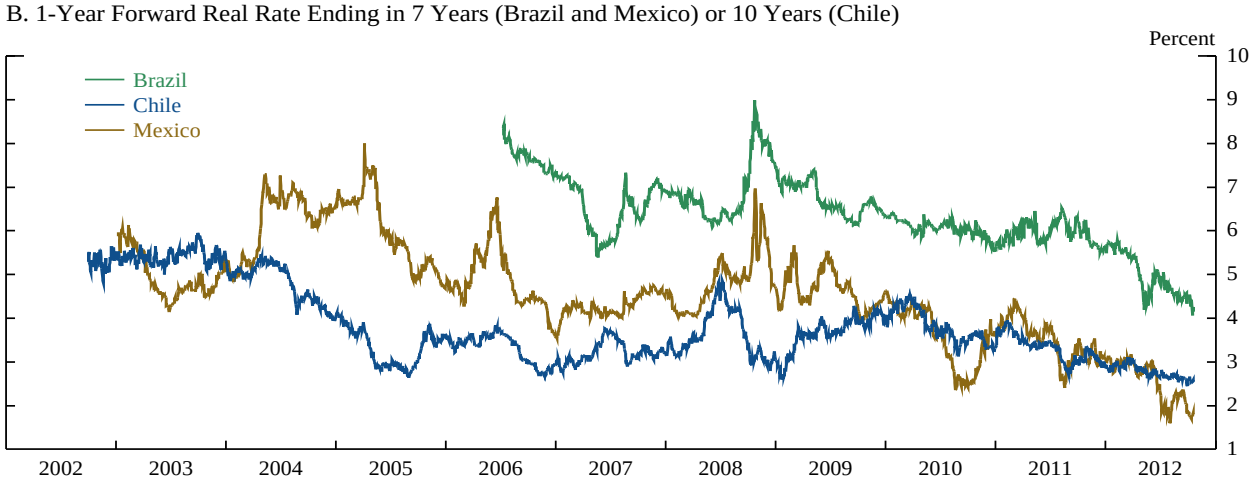
Notes: The figure presents indicators of the bond price fitting error when constructing zero-coupon curves from prices on nominal and inflation-linked sovereign bonds for Brazil (the left hand side panels) and Mexico (the right hand side panels) using the Nelson and Siegel (1987) model. Panels A and B display the aggregate fitting error for prices of nominal bonds, defined as the sum of the absolute values of relative price fitting errors (with the relative price fitting error computed as (fitted price - observed price)/fitted price, and expressed in percentage points) for all bonds with residual maturities between two and ten years. Panels C and D display the bond price fitting errors for inflation-indexed bonds. For representational purposes, all lines shown are two-week rolling averages of daily absolute fitting errors.

Figure 6: Zero-coupon yield and inflation compensation estimates

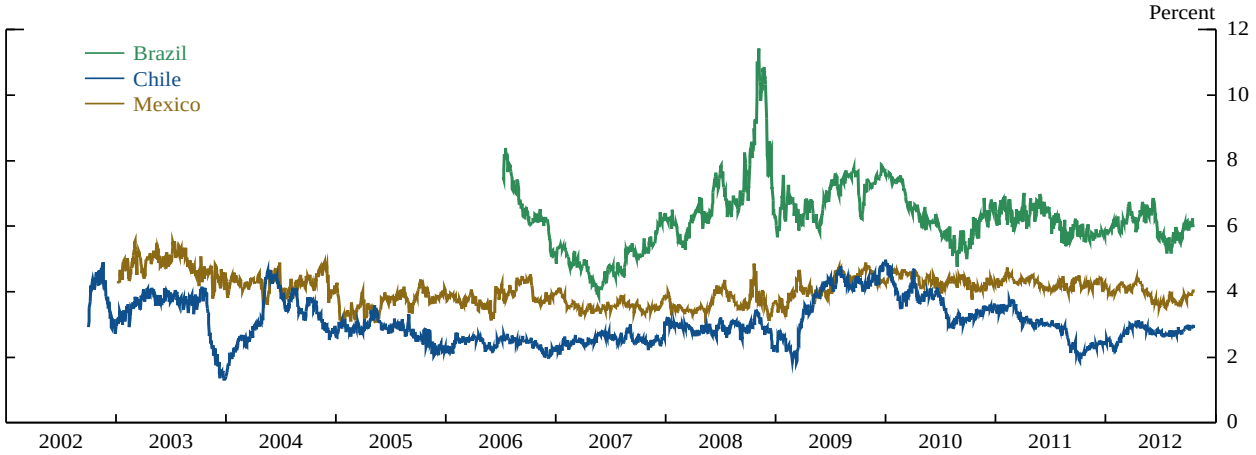
A. 1-Year Forward Nominal Rate Ending in 7 Years (Brazil and Mexico) or 10 Years (Chile)



B. 1-Year Forward Real Rate Ending in 7 Years (Brazil and Mexico) or 10 Years (Chile)



C. 1-Year Forward Inflation Compensation Ending in 7 Years (Brazil and Mexico) or 10 Years (Chile)



Notes: The figure presents our daily time-series estimates of 1-year nominal (Panel A), real (Panel B), and inflation compensation (Panel C) forward rates, ending in 7 years (for Brazil and Mexico) or 10 years (for Chile). The estimates are derived from our estimated daily nominal and real zero-coupon curves, which we fit from prices on outstanding nominal and inflation-indexed sovereign bonds using the Nelson and Siegel (1987) model. The sample period begins on July 7, 2006 for Brazil, on October 2, 2002 for Chile, and on January 10, 2003 for Mexico, and ends on October 18, 2012.