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

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Abstract

In this paper, we consider whether long-term inflation expectations have become better-anchored in Brazil, Chile, and Mexico. We do so using survey-based measures as well as financial market-based measures on long-term inflation expectations where we construct the market-based measures from daily data on nominal and inflation-linked bonds. This paper is the first to examine the evidence from Brazil and Mexico, making use of the fact that markets for long-term government debt have become better developed over the past decade. We find that inflation expectations have become much better anchored over the past decade in all three countries. That said, one-year inflation compensation in the far future displays some sensitivity to at least one macroeconomic data release per country, suggesting that new information prompts market participants to revise their views on the long-term inflation outlook. Long-run inflation expectations appear to have been less well-anchored in Brazil than in Chile and Mexico.

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

JEL *classification*: D84, E31, E43, E44, E52, E58, G14

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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] Nonetheless, it is still an open question whether countries that have adopted inflation targeting regimes have lower inflation and better economic performance than countries that follow other monetary frameworks (Ball, 2011; Ball and Sheridan, 2005).[2] Others have taken a different approach by looking for evidence on the extent to which inflation expectations are well anchored using survey and financial market data. Because of data limitations, however, most of the latter work has focused on the experience of industrialized countries. In this study, we overcome some of these data problems for developing countries 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. But if the central bank is viewed as being credibly committed to bringing inflation back to the inflation goal, shocks that affect inflation should be viewed as transitory and should therefore not influence *long*-term inflation expectations.

Although most studies compare inflation targeting countries to non-inflation targeting countries, we believe it is informative to compare the within-group differences between the experiences of Brazil, Chile, and Mexico as inflation targeting countries often practice very different policies. The three Latin American countries have all adopted inflation targeting frameworks over a decade ago and are similar in at least two respects: they are at comparable stages of development and previously had a historical record of monetary and fiscal mismanagement. On the other hand, the central banks of these three countries practice inflation targeting under different institutional settings. The Chilean and Mexican central banks are legally independent and have a mandate to pursue price stability.[3] Brazil's central bank is not legally independent; although the central bank

[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, Norway, Peru, the Philippines, Poland, Romania, Serbia, South Africa, Sweden, Thailand, Turkey, and the United Kingdom. Many observers would also add the Euro Area to this list.

[2] For opposing views on the relative performance of inflation targeting in emerging market economies, see Gonçalves and Salles (2002) and Brito and Bystedt (2010).

[3] Chile's central bank became independent in 1988 and Mexico's central bank was granted independence in 1993.

has exercised sole control over the monetary policy instrument, the lack of legal independence has at times fueled concerns about *de facto* independence. In addition, the inflation targeting frameworks in these countries have undergone changes over time.[4]

Our approach is a blend of a formal and informal 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. Long-horizon financial market-based expectations of future inflation with a sufficiently long history have been unavailable to date for Brazil and Mexico (and somewhat less so for Chile) as a result of insufficient historical data on local-currency denominated sovereign bond prices. Therefore, we first collected a comprehensive set of historical prices on nominal and inflation-linked sovereign bonds for Brazil and Mexico –the Chilean data were provided to us by RiskAmerica– and used these to construct daily far-forward inflation compensation estimates for each country, as we detail below. We exploit the fact here that over the past decade, bond markets in Brazil and Mexico have made remarkable strides in terms of depth and liquidity, which allows us to construct these types of high-frequency market-based measures.

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.[5] 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. In our informal analysis, we compare far-forward inflation compensation with long-term inflation expectations derived from survey data. 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 to 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 the time did not have an explicit inflation target in place. Far-forward inflation compensation for Sweden did not react significantly to news suprises during a period from 1996 to 2005, while

[4]For example, the Bank of Mexico did not explicitly target a short-term interest rate until 2008, but rather targeted non-borrowed reserves under an operating procedure that was known as *"el corto"*. Ramos-Francia and Torres-García (2005) write that beginning in the late 1990s, the Bank of Mexico's announcements about *el corto* were intended to signal its views about interest rates. By late 2005, the central bank explicitly linked its announcements about *el corto*to the desired direction and magnitude of short-term interest rates and in early 2008, it adopted an explicit interest rate target.

[5]Besides reflecting these two factors, Hördahl (2009) notes that inflation compensation also reflects liquidity premia and "technical" market factors. While we do not explicitly take these into account in our baseline regression analysis in Section 4.1, we do consider controlling for these in a sensitivity analysis to our baseline results.

U.S. forward inflation compensation did significantly react to surprises during a very similar period (1998 to 2005). These authors 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 that of Canada and Chile, using data for 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 a short sample period (2002 to 2005). Details on this empirical approach are in 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.

All of these studies have 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. That long-term bond markets in Brazil, Chile, and Mexico have developed rapidly over the past decade allows us to construct our financial market-based inflation compensation measures. Although market liquidity problems for some long-term bonds in these countries will still certainly pose an issue, we believe it is well worth taking a closer look at what the results from the event study analysis imply. Whereas we follow the lead of the studies referred to above by considering the sensitivity of far-forward inflation compensation in each of the Latin countries to domestic macroeconomic new surprises, in addition, we also consider whether inflation compensation in these countries is sensitive to news from the United States and China. We consider China because of its increasing importance over the past decade as an export destination for Brazil and Chile.

Overall, we find that inflation expectations have become much better anchored over the past decade in all three countries, which is a major achievement, considering these countries' high-inflation past. That said, survey-based and financial market-based readings on the long-term inflation outlook have been consistently above the target in Brazil and Mexico. Moreover, although we do not find evidence that market participants systematically revise their beliefs on long-term inflation in response to domestic macroeconomic and monetary policy news, one-year inflation compensation in the far future displays some sensitivity to at least one macroeconomic data release in each country. New information appears to prompt market participants to revise either their expectations on inflation or their assessment of risks to the inflation outlook more generally (that is, the inflation risk premium may vary in response to news). While one might expect that only domestic data releases would shape views on long-term inflation prospects, long-run inflation compensation for Mexico is sensitive to U.S. data (in particular, to the nonfarm payroll release), likely reflecting both the tight linkages between the two economies and the fact that the more important Mexican

[6] See also Spiegel (1998).

macroeconomic data are released with a considerable delay. Far-forward inflation compensation in Brazil, but not in Chile, exhibits some sensitivity to data releases from China. Evidence from both financial markets and survey data suggest that long-run inflation expectations have been less well-anchored in Brazil than in Chile and Mexico. 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. Although in our case this is consistent with the null that inflation expectations have become better anchored, the volatility in some of our inflation compensation measures indicate that it may simply 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.

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 January 2001 to April 2013.[7] Brazil and Chile adopted inflation targeting frameworks in 1999 while Mexico formally adopted its inflation targeting framework in 2001.[8] All three countries had historical records of high inflation, including hyperinflation in Brazil in the early 1990s, and inflation was at double digit levels as recently as the late 1990s in Chile and Mexico and the early 2000s in Brazil.

Although Chile's inflation target has been 3 percent since 2001, the tolerance range of 2 to 4 percent was given greater emphasis until January 2007, when the policy horizon was lengthened from a 12 to 24-month period to 24 months.[9] For Mexico, a long-term inflation goal of 3 percent with a tolerance interval of $\pm$ 1 percentage point was announced in late 2002 and became effective

[7] The core inflation measures plotted differ by country. For Brazil, the core inflation shown excludes food at home and energy, which together have about a 16 percent weight in the headline index. For Chile, core inflation is the CPIX, which excludes fuels and fresh fruits and vegetables. These items have a weight of about 8 percent in the headline CPI. For Chile and Mexico, a broader measure of core inflation that removes all government-regulated prices is a bit smoother, especially for Chile. Core inflation for Mexico excludes fruits and vegetables, meat and eggs, and energy and regulated prices.

[8] Chile's government had been setting annual inflation targets since the early 1990s, but a so-called "fully fledged" inflation target was adopted in 1999, when the central bank abandoned its heavily-managed exchange rate policy. In 1999, the Bank of Mexico announced its goal to reduce inflation to external inflation by 2003. In 2001, inflation targeting was formally adopted. On Mexico's experiences under inflation targeting, see Ramos-Francia and Torres-García (2005). 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).

[9] Central Bank of Chile (2000) states that "to preserve price stability, the Central Bank has committed to orienting its monetary policy to maintain inflation over time in a *range* of 2 to 4 percent. The central value of this range, 3 percent, constitutes the *operational goal* that guides monetary policy in the medium term. The central value as well as the [tolerance] range adequately represent the concept of price stability in the Chilean economy...(Translation is the authors', italics in the original.), see also Central Bank of Chile (2007).

in 2003.

Brazil's inflation target, which is announced in the middle of every year for 12-month inflation ending the following year, has been more variable, although the target has been set at $4\frac{1}{2}$ percent since 2003.[10] The mid-2003 decision to set the inflation target for 2005 at $4\frac{1}{2}$ percent marked the first target to be set by the Lula government (2003-10). (Lula and his protégé and sucessor, Dilma Rousseff, are of the Workers' Party.) The tolerance interval for Brazil's inflation target is wider than those of Chile and Mexico (who have a tolerance interval of $\pm$ 1 percentage point versus $\pm$ 2 percentage points for Brazil in recent years). It has not been entirely clear whether the target reflects political preferences on long-term inflation. For example, in mid-2007, after the target for 2009 was announced, Minister Mantega stated that "the inflation targets to 2008 and 2009 should be seen as a transition in the direction of a long-term inflation target that I judge appropriate to be in the neighborhood of 4 percent, given the characteristics of the Brazilian economy." (Goldfajn, 2007, translation is the authors'.) Central Bank President Tombini and his predecessor, Henrique Meirelles, also expressed a preference for a lower long-term inflation target.[11] As we detail below, there is some evidence that uncertainty about the long-term inflation goal has been feeding into survey and financial market-based readings on the longer-term inflation outlook.

3 Survey and Market-Based Measures of Inflation Expectations

3.1 Survey-Based Inflation Expectations

The middle panels of Figures 1 through 3 show each country's inflation target between January 2001 and April 2013 against a widely-used measure of long-term expected inflation from the Consensus Forecasts survey. This survey, which is taken in April and October of every year, polls analysts' expectations of average annual inflation five to ten years in the future. Using Consensus Forecasts data, 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 in Brazil, Chile and Mexico.

[10] Panel A of Figure 1 shows only the initial target, that is, the target that is announced a year and a half in advance. Between 2002 and 2005, the targets were adjusted upwards to accommodate for unforseen and adverse supply-side shocks.

[11] In 2004, Meirelles stated that: "we are making in 2005 and 2006 a smooth transition to a [long-term inflation] goal of 4 percent." (Gomes, 2004, translation the authors'). Meirelles was reported to have advocated reducing the inflation target to 4 percent in 2007, see Veríssimo (2012). Verissimo also reports that in mid-2012, the economic team deemed it appropriate to maintain the 2014 inflation target at $4\frac{1}{2}$ percent, given uncertainties about the external environment. This view, however, sounds more like a willingness to tolerate temporary deviations from a long-term inflation target than expressing a view on the appropriate long-term inflation goal. In October 2012, Central Bank President 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]." (Grinbaum, 2012, translation is ours.) Former central bank president Arminio Fraga (1999-2002) suggested a lower long-term inflation goal, see Fraga (2009).

Average expected inflation for Chile, shown in Panel B of Figure 2, has been very close to 3 percent. Also plotted in Panel B is the median expectation for 12-month inflation ending 23 months in the future from the Central Bank of Chile's monthly survey of forecasters, the longest horizon at which the central bank polls long-term inflation expectations. The median expectation strayed from the target during the run-up in inflation in 2008, but otherwise has been close to the 3 percent target. Meanwhile, the interdecile range of expectations, a measure of disagreement among forecasters that is viewed as a proxy for uncertainty (not shown), widened considerably during the runnup in inflation in 2008.

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, both in the Consensus Forecast survey and in the Bank of Mexico's monthly survey of analysts' expectations, which became available in 2008, the blue line in Panel B of Figure 3. The Bank of Mexico survey asks forecasters for their views on average inflation 5 to 8 years in the future – the average expectation from this survey is shown.

For Brazil, long-term inflation expectations have been more variable but far less so than headline inflation. Note that the scales of the charts differ; for Panel B (and also for Panel C), the range for Brazil is twice that of Chile and Mexico. The average long-term inflation expectation rose during the 2002-03 crisis, fell down to below the $4\frac{1}{2}$ percent target in the years following the crisis, and in 2007 began to drift up. This pattern can be see more clearly in Panels A and B of Figure 4, which plot the average and median expectations of medium- to long-term inflation from the Brazilian central bank's weekly survey of professional forecasters. The central bank surveys expectations for up to 4 calendar years ahead. For each year, the figure displays the average and median expectation for inflation 4 calendar years ahead, so as the year marches on, the forecast horizon shortens from about 4 to 5 years ahead to about 3 to 4 years ahead (see the notes to the figure for more details). Following the crisis of 2002-03, medium to long-term inflation expectations trended down and hit a trough of about 4 percent in 2007. As in the Consensus Forecast survey, since 2007, inflation expectations have drifted up, surpassing 5 percent in April 2013.

Besides the interdecile range for Chile, and the standard deviation of the Central Bank of Brazil's weekly survey shown in Panel C of Figure 4, we would ideally have more measures available of the dispersion in inflation expectations.[12] Dispersion measures reflect the degree of disagreement among forecasters and are considered to be a reasonable proxy for inflation uncertainty.[13] Unfortunately, Consensus Forecasts only releases the average of participants' expectations, not the dispersion, which makes it difficult to gauge how the dispersion in survey inflation expectations, a key factor

[12]The dispersion of the Central Bank of Mexico's survey is not publicly available.

[13]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.

underlying the inflation risk premium, has evolved over time.

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 economies literature so far has typically done, is that these measures are usually 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 now derive much higher-frequency gauges of inflation expectations for Brazil, Chile, and Mexico from financial market data. Note that as recently as one decade ago this was still impossible because bond markets in these countries were not well-developed yet. Since then, however, each country has made important strides forward and depth and liquidity in these markets has risen substantially. As a result, using data on nominal and real bond prices, all typically available at a daily frequency, we can now construct daily measures of (far-forward) inflation compensation.[14] 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 inflation expectations are. These studies have predominantly performed their analysis on measures for developed markets. Here we apply this type of analysis specifically to developing countries.

One important caveat to using these measures, however, is that they do not 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 embeds 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

[14] 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.

construct these measures in detail for Brazil and Mexico (and in a certain sense for Chile as well, although most of the work for Chile was done for us by RiskAmerica). We first construct a sufficiently large history of market-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 both domestic and foreign 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.[15] It is the nominal bonds market that has seen the most growth over the past decade. The fact that each country now 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.[16]

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 function which is governed by just four parameters;

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

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

[15] In contrast, some developed economies, including for example Canada and Germany, still have inflation-linked bond markets which are much less developed, 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.

[16] For example, the Bank of International Settlements, (BIS, 2005), reports that nine out of the thirteen (predominantly European) central banks that 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.

fourth parameter, λ_t, is a shape parameter that influences the factor loadings 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 the N_t observable bonds on day t, either nominal or real bonds, 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 that 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.[17]

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 compensation curve. Furthermore, with the estimated Nelson-Siegel parameters, 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. We thus compute 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, but in this paper we only use the 1-year forward rate ending in 7 years for Brazil and Mexico and the 1-year forward rate ending in 10 years for Chile.[18]

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

[18] We leave analyzing the effects of macroeconomic news surprises on the full term structure of forward inflation compensation, such as is done in Beechey *et al.* (2011), for future research.

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. Since our goal is 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.[19] For Mexico we combined data from Bloomberg and Proveedor Integral de Precios (PIP).[20]

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.[21] The top two panels of Figure 5 show the number of bonds over time that were included in the estimations.[22] 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 6 shows the average absolute bond price fitting errors 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.[23] Note that 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.

The bottom panels of Figure 5 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

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

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

[21] 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 any given day in our sample, 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.

[22] 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.

[23] 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.

bonds at several times throughout our sample and has even issued a 15-year inflation indexed bond in 2009, 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 use our curves only up to maturities of seven years. We do the same for Mexico. 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.

Chile

For Chile we use nominal and real zero coupon curves that were graciously supplied to us by RiskAmerica.[24] 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 (ending in 10 years) when they examined whether inflation expectations were well-anchored in Chile between August 2002 and October 2005 (see the discussion in Section 4). Compared to Gürkaynak *et al.* (2007a), our sample for Chile is much longer; October 2, 2002 to April 30, 2012.

As noted by Gürkaynak *et al.* (2007a), it was not until 2002 that Chile began issuing long-term nominal bonds.[25] 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), as opposed to our forward inflation compensation measures for Brazil and Mexico, which end in seven years. Since Chilean forward rates are also based on fewer bonds than U.S. and U.K. forward rates, for example, they will tend to be more noisy.[26]

3.2.3 Far-Forward Inflation Compensation Estimates

Figure 7 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

[24] See `www.riskamerica.com`

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

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

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. 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 $3\frac{1}{2}$ 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. Inflation compensation moves up in 2009 and slowly comes back down until early 2013.

By taking the difference between our far-forward inflation compensation measures in Figure 7 and the long-term survey forecasts in the middle panels of Figure 1 - 3 we can calculate a rough estimate of the inflation risk premium in each of these countries. Doing so implies an inflation risk premium of about $1\frac{1}{2}$ percent for Brazil, $\frac{1}{2}$ percent in Mexico and 0 percent in Chile (compared to an estimate of about 5 percent for e.g. the United States. These relatively low figures indicate the progress that these countries have made towards convincing market participants that their central banks have the ability to contain inflation.

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.[27]

We build upon the regression analyses 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.

[27] Gürkaynak *et al.* (2007a) also study inflation compensation in Chile and find that it does 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).

The premise here is that if inflation expectations are well-anchored, far-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 unanchored.

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[28] and X_t is the vector of news surprises. In our baseline regressions, Z_t includes a dummy that equals one on the first business day of each calendar year and zero elsewhere. In a sensitivity analysis to our baseline results, see Section 4.5, we follow Galati *et al.* (2011) by also including a vector of control variables in Z_t, to account 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.[29]

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. Therefore, it is important to gauge whether developments abroad have an influence on inflation expectations in Brazil, Chile and Mexico domestically.

We are interested in which, if any, of the surprises included in the regression have a significant impact on inflation compensation. Furthermore, to assess whether, overall, inflation expectations are well-anchored or not, we perform a standard Wald test, testing the joint hypothesis that all news surprise coefficients in the regression are equal to zero (i.e. we test the hypothesis that $\beta_1 = \beta_2 = \ldots = \beta_K = 0$ with K the number of news surprises in the regression.). 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 find 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. Finally, we present some regression results using 5-year rolling windows.

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

[29] As noted by Galati *et al.* (2011), because inflation compensation is defined as 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.

4.2 News Surprise Data and Controls

Similar to the previous literature, we include surprises on a range of real economy, price and monetary policy-related announcements; (1) the central bank policy rate, (2) headline consumer prices (CPI), (3) industrial production (IP), (4) purchasing managers index (PMI), (5) retail sales, (6) trade deficit, (7) real GDP, and (8) the unemployment rate. We obtained all data releases and survey expectations from Bloomberg[30] and these eight announcements are the ones for which we have data available with a sufficiently long history.[31] For the U.S. surprises, we follow others, in particular Gürkaynak *et al.* (2007a), by also including: (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 have already been incorporated in bond yields. We normalize all surprises by their standard deviation, with the exception of policy rate surprises which are recorded in basis points.

As control variables in our sensitivity analysis, 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 overall 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 of international price developments to domestic prices.[32] 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. For Chile, more passthrough of 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 news surprises plus a constant and the dummy that equals 1 only on the first business day of the year. In our baseline, we run the

[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] The PMIs for Brazil and Chile are not available. Instead of Markit Group's PMI for Mexico, we include the business climate index produced by the Mexican Institute of Finance Executives (IMEF). This series starts in mid-2009. For Chile, we use total IP until the end of 2011 and manufacturing IP after that. Finally, we shifted announcement days for the Central Bank of Brazil's Selic rate forward by one working day as the policy rate decisions are typically released later in the day so that they do not fully affect interest rates until the following day.

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

regressions including only the days that have at least one data announcement. In our sensitivity analysis below, among other alternative specifications, we also address the approach of including all days, which entails including a substantial number of days with zero values for surprises. 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 the sudden stop discussed earlier and to not contaminate the regression results with such a volatile period. In all tables, we show results using as dependent variables the one-day changes in 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). We used standard OLS standard errors to assess the significance of individual surprise variables (using HAC-style standard errors resulted in very similar results). We highlight surprises that enter the regression significantly, with *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. Student t-statistics are reported in parentheses underneath each regression coefficient. The result for the joint-significance test of news surprises 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 nominal rate in the first column, react significantly to sometimes an array of different surprises, but in particular to surprises in the policy rate, consumer prices, industrial production and GDP growth. This is not surprising, given how strongly correlated short-term interest rates are with the state of the economy. The R^2s confirm that news surprises explain changes in 1-year rates quite well.

The final columns of each table show that R^2s in the regressions for far-forward inflation compensation are low. Surprises do not significantly affect far-forward inflation compensation according to the joint Wald test, as its null hypothesis that news surprises do not have a significant effect on inflation compensation cannot be rejected at the standard 5% level for Brazil and Mexico. However, we find that inflation compensation does react significantly to some individual coefficients, in particular to GDP for Brazil and IP (weakly) for Mexico. For Chile, we find that the null is rejected for the Wald test for the full data sample, which seems driven in particular by the strong significance of CPI (and weak significance of GDP) in the regression. As we show below, however, the full-sample result for Chile seems to be driven by pre-crisis factors as inflation compensation for Chile does not react significantly to macro surprises during the most recent years.

Before we analyze sub-sample results in more detail below, we first examine the full-sample results of also including U.S. news surprises, in Table 4, and Chinese news surprises, in Table 5, in the baseline regressions (we only report results for the 1-year nominal rate and 1-year far-forward inflation compensation). The top part of each table shows the coefficients on domestic surprises, while the bottom part shows the regression coefficients and significance results on U.S. and Chinese

news surprises, respectively. In the regressions for the daily changes in 1-year nominal rates, domestic surprises that were significant before remain significant and none of the U.S. surprises come in significantly. For Mexico, at least, this result seems surprising because important macroeconomic data, in particular IP and GDP, are released with a considerable delay. As shown in Table 6, several U.S. macro figures are released before the first domestic news release in Mexico (similarly for Brazil and Chile). Therefore, because of the substantial lag with which domestic news figures are released, and because of the strong economic linkages between Mexico and the U.S., one could expect that at least some of the U.S. news surprises would have an impact on short-term rates. However, we do not find evidence of this.

In contrast, however, far-forward inflation compensation measures do react significantly to U.S. news releases, as judged by the second column in the table for each country. News about the U.S. real economy (in particular nonfarm payrolls) significantly affects inflation compensation. This result could indicate that even if the central banks of Chile and Mexico are able to make long-term inflation expectations resilient to domestic news surprises, they 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 short-term rates and inflation compensation in Brazil and Chile are affected by some releases from China, while Mexican rates and inflation compensation are not affected. This is in 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.[33]

4.4 Subsample and Rolling Regression 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). The results for each country are shown in Tables 7 - 9. The pre-crisis results for Brazil in Table 7 show that the joint test rejects, driven by (weakly) significant coefficients on the policy rate and the unemployment rate, suggesting that prior to the financial crisis, inflation expectations in Brazil were not well-anchored. However, the pre-crisis sample for Brazil only consists of one calendar year

[33]In recent years, over 75 percent of Mexico's exports have gone to the United States. Since the mid-2000s, the share of Brazilian and Chilean exports to China has grown from about 5 and 15 percent in the mid-2000s to 15 and 20 percent more recently. The United States remains important as an export destination for these two countries but less so since the mid-2000s. Over the past 3 years, about 10 percent of Brazil's and Chile's exports went to the United States.

of data, with just over sixty observations on surprises. Since the crisis, inflation expectations have been well-anchored, as judged by the Wald statistic. However, GDP surprises continue to have significant impact on far-forward inflation compensation.

Table 8 shows the high Wald statistic for Chile in the pre-crisis period, while for the sample that starts in mid-2007 the statistic is much lower such that the Wald test no longer rejects the null. Therefore, the full-sample rejection of the null is likely driven by the pre-crisis sample. Since mid-2007, inflation compensation does seem much better anchored, although far-forward inflation compensation still reacts significantly to CPI surprises. Our pre-crisis results for Chile are in contrast with the results in Gürkaynak *et al.* (2007a) who found that inflation expectations were well-anchored between August 2002 and October 2005. However, as noted earlier, our sample is longer and incorporates more news surprises. Finally, the results for Mexico in Table 8 show that inflation expectations were well-anchored before the crisis and have stayed well-anchored since then.

A more sophisticated subsample analysis to assess the impact of the financial crisis on inflation expectations, for example using the approach of formally testing for breaks as in Galati *et al.* (2011), could shed more light on the anchoring of inflation expectations before and since the crisis. However, we do not address this here and leave this interesting approach for further research. In Figure 8 we do present a somewhat more structured approach to subsample analysis by showing rolling regressions results. The left-hand side panels in this figure present the Wald statistic and p-value from estimating (3) using five-year rolling windows. These panels confirm the results discussed above. For Chile, the rejection of the null for the full sample seems to be solely driven by the significant response of inflation compensation to news surprises in the early part of the data sample. For Brazil, the first five-year rolling sample ends in 2011 and the result in Panel A shows that the Wald statistic has been slowly decreasing since. Finally, for Mexico the p-value remained well above 5 percent for all subsamples.

The red lines in the right-hand panels of Figure 8 show the t-statistics of the domestic news surprise that was significant in our baseline results for each individual country: GDP for Brazil, CPI for Chile and IP for Mexico. Whereas for Brazil GDP surprises have consistently entered the rolling regressions significantly, for Chile, CPI surprises have become increasingly less impactful. For Mexico, IP is weakly significant at best. The blue lines in the right-hand side panels show the rolling regression t-statistic of U.S. nonfarm payrolls when we include U.S. surprises to our baseline regressions. The rolling regression results show that the significance of these surprises in the full-sample results for Chile and Mexico seems to be primarily due to the impact of nonfarm payrolls in earlier samples, although for Chine nonfarm payrolls has been significant in 2011 and at the beginning of this year as well.

4.5 Sensitivity Analysis

In this section we briefly discuss the results of several alternative specifications of our baseline regressions to assess the robustness of our results. Tables 10 - 12 show results for five alternative specifications: (i) including the fourth quarter of 2008 in the sample, (ii) including all days in the regressions instead of just those days on which at least one macro figure is released, (iii) dropping the annual dummy from the regression, (iv) instead of incorporating surprises in the policy rate directly, incorporating the daily change in the 3-month Treasury Bill rate as some authors have argued that the one-day change in the T-Bill rate is a better measure of monetary policy surprises, and (v) including the control variables that we discussed in Section 4.2. In the first columns of each table, we again report our baseline results for far-forward inflation compensation from Tables 1 - 3. Overall, our baseline results prove to be very robust against each of these alternatives, with joint Wald statistics and coefficients on individual news surprises that are little changed. In particular, the final column in the tables shows whether or not including various control variables does not alter our main results.

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 we find that 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. Even though 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.

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Table 1: BRAZIL: Baseline Model (Full Sample: Jul-2006 - Apr-2013)

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***	-0.25*	-0.31***	0.06
	(4.79)	(-1.67)	(-3.73)	(0.37)
CPI	2.46***	1.76	0.60	1.15
	(3.10)	(0.94)	(0.59)	(0.59)
IP	3.53***	1.17	-0.07	1.25
	(4.76)	(0.67)	(-0.08)	(0.69)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	0.76	1.91	-0.33	2.24
	(1.01)	(1.08)	(-0.34)	(1.22)
TRADE DEFICIT	-1.03	1.18	-1.86	3.04
	(-1.17)	(0.57)	(-1.63)	(1.41)
GDP	5.60***	7.87**	0.53	7.34**
	(4.11)	(2.47)	(0.30)	(2.20)
UNEMPL. RATE	-1.89**	-0.66	0.67	-1.33
	(-2.55)	(-0.38)	(0.70)	(-0.73)
Number of obs.	428	428	428	428
R^2	16%	3%	4%	3%
adj.R^2	15%	2%	2%	1%
Wald-statistic	80.98	11.97	16.69	10.01
(p-value)	(0.00)	(0.10)	(0.02)	(0.19)

Notes: The table shows regression results for the full sample period July 2006 - April 2013 for Brazil, 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. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 2: CHILE: Baseline Model (Full Sample: Oct-2002 - Apr-2013)

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	0.06**	-0.03	-0.03	0.00
	(2.14)	(-0.69)	(-0.91)	(0.03)
CPI	3.99***	5.13***	1.84**	3.12***
	(5.94)	(5.00)	(2.23)	(2.65)
IP	1.80***	0.16	1.31*	-1.15
	(2.94)	(0.17)	(1.75)	(-1.08)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	1.01	1.70	0.15	1.50
	(0.81)	(0.90)	(0.10)	(0.69)
TRADE DEFICIT	-0.09	-0.44	0.84	-1.26
	(-0.15)	(-0.46)	(1.10)	(-1.16)
GDP	1.79*	2.55	-0.60	3.05*
	(1.72)	(1.60)	(-0.46)	(1.67)
UNEMPL. RATE	0.37	1.52*	-0.04	1.48
	(0.66)	(1.76)	(-0.06)	(1.50)
Number of obs.	485	485	485	485
R^2	10%	7%	2%	4%
adj.R^2	8%	6%	0%	2%
Wald-statistic	52.57	31.94	10.14	15.15
(p-value)	(0.00)	(0.00)	(0.18)	(0.03)

Notes: The table shows regression results for the full sample period October 2002 - April 2013 for Chile, 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. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 3: MEXICO: Baseline Model (Full Sample: Jan-2003 - Apr-2013)

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	0.53***	0.01	0.16**	-0.15
	(7.74)	(0.06)	(1.99)	(-1.46)
CPI	0.84	0.59	-0.91	1.49
	(1.27)	(0.52)	(-1.17)	(1.46)
IP	1.12*	2.39**	0.78	1.60*
	(1.89)	(2.35)	(1.11)	(1.73)
PMI	0.83	-1.09	0.75	-1.89
	(0.80)	(-0.61)	(0.60)	(-1.17)
RETAIL SALES	-0.03	-0.17	-0.22	0.08
	(-0.06)	(-0.16)	(-0.31)	(0.09)
TRADE DEFICIT	-0.01	-0.70	-0.07	-0.60
	(-0.01)	(-0.66)	(-0.09)	(-0.63)
GDP	-1.66	-0.44	-0.06	-0.03
	(-1.55)	(-0.24)	(-0.05)	(-0.02)
UNEMPL. RATE	0.07	-1.08	-0.50	-0.58
	(0.12)	(-1.04)	(-0.70)	(-0.62)
Number of obs.	682	682	682	682
R^2	9%	1%	1%	1%
adj.R^2	8%	0%	0%	0%
Wald-statistic	69.19	7.77	7.69	9.23
(p-value)	(0.00)	(0.46)	(0.46)	(0.32)

Notes: The table shows regression results for the full sample period January 2003 - April 2013 for Mexico, 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. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

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

variable	Brazil		Chile		Mexico	
	1-yr nom. rate	1-yr fwd infl. comp. end. 7 yrs	1-yr nom. rate	1-yr fwd infl. comp. end. 10 yrs	1-yr nom. rate	1-yr fwd infl. comp. end. 7 yrs
DOMESTIC Macro News Surprises						
POLICY RATE	0.30***	0.06	0.05**	0.00	0.55***	-0.13
CPI	2.53***	1.27	4.04***	3.40***	0.83	1.78*
IP	3.45***	1.55	1.76***	-1.09	1.04	1.62*
PMI	-	-	-	-	1.46	-1.95
RETAIL SALES	0.78	2.04	0.94	1.35	-0.02	0.14
TRADE DEFICIT	-1.10	3.14	-0.13	-1.09	0.01	-0.64
GDP	5.58***	7.81**	1.80*	2.91	-1.91	-0.15
UNEMPL. RATE	-1.99***	-1.10	0.39	1.52	0.07	-0.61
U.S. Macro News Surprises						
POLICY RATE	0.36	0.52	0.05	0.08	0.18	0.49
	(1.39)	(0.86)	(0.34)	(0.26)	(0.39)	(1.23)
CPI	1.00	1.48	-0.08	-1.73	-0.14	-2.05*
	(1.22)	(0.75)	(-0.15)	(-1.58)	(-0.11)	(-1.94)
IP	0.33	-4.12*	-0.02	0.48	1.73	0.25
	(0.36)	(-1.87)	(-0.03)	(0.42)	(1.32)	(0.22)
PMI	-1.02	2.23	0.04	0.08	-0.07	0.73
	(-1.29)	(1.18)	(0.08)	(0.08)	(-0.06)	(0.74)
RETAIL SALES	-0.18	3.07	-0.41	0.55	-0.46	1.21
	(-0.24)	(1.64)	(-0.78)	(0.53)	(-0.40)	(1.23)
TRADE DEFICIT	0.47	1.29	-0.83*	0.91	-1.25	1.38
	(0.61)	(0.70)	(-1.66)	(0.90)	(-1.09)	(1.41)
GDP	1.01	-2.79	-1.06	-1.18	1.24	1.99
	(0.75)	(-0.86)	(-1.25)	(-0.69)	(0.63)	(1.19)
CONS. CONFIDENCE	0.21	-0.87	0.16	2.55**	1.23	0.65
	(0.28)	(-0.47)	(0.32)	(2.56)	(1.08)	(0.67)
INITIAL CLAIMS	0.02	0.81	0.28	0.21	-0.33	-0.16
	(0.06)	(0.87)	(1.13)	(0.42)	(-0.58)	(-0.33)
ISM	0.62	-0.40	-0.07	1.44	1.08	0.39
	(0.75)	(-0.20)	(-0.14)	(1.38)	(0.91)	(0.38)
NEW HOME SALES	0.09	1.52	0.31	-0.84	0.51	-1.18
	(0.12)	(0.84)	(0.62)	(-0.84)	(0.44)	(-1.21)
NONFARM PAYROLLS	0.12	0.46	0.66	3.45***	1.82	2.19**
	(0.15)	(0.24)	(1.31)	(3.40)	(1.56)	(2.20)
UNEMPL. RATE	0.22	2.25	0.08	-2.53**	-0.67	0.58
	(0.28)	(1.20)	(0.16)	(-2.53)	(-0.59)	(0.59)
Number of obs.	978	978	1559	1559	1709	1709
R^2	8%	3%	5%	3%	8%	2%
adj.R^2	6%	0%	3%	1%	7%	0%
Wald-statistic	84.53	24.03	73.92	42.90	27.79	27.43
(p-value)	(0.00)	(0.24)	(0.00)	(0.00)	(0.15)	(0.16)

Notes: The table shows full-sample regression results for Brazil (first two columns), Chile (middle two columns) and Mexico (final two columns), including only those days on which at least one Brazilian or U.S. macroeconomic figure is released. Full sample is July 2006 - April 2013 for Brazil, October 2002 - April 2013 for Chile, and January 2003 - April 2013 for Mexico. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 5: Baseline Models with Chinese Surprises (Full Sample)

	Brazil		Chile		Mexico	
variable	1-yr nom. rate	1-yr fwd infl. comp. end. 7 yrs	1-yr nom. rate	1-yr fwd infl. comp. end. 10 yrs	1-yr nom. rate	1-yr fwd infl. comp. end. 7 yrs
BRAZILIAN Macro News Surprises						
POLICY RATE	0.31***	0.08	0.06**	0.01	0.53***	-0.16
CPI	2.44***	1.10	3.99***	3.23***	0.84	1.50
IP	3.63***	1.40	1.77***	-1.06	1.13*	1.60*
PMI	-	-	-	-	0.85	-1.97
RETAIL SALES	0.72	2.24	0.94	1.48	-0.03	0.09
TRADE DEFICIT	-1.03	2.90	-0.03	-1.36	-0.02	-0.58
GDP	5.73***	7.50**	1.80*	3.01*	-1.64	0.03
UNEMPL. RATE	-1.80**	-1.19	0.35	1.53	0.07	-0.57
CHINESE Macro News Surprises						
CPI	0.75	-0.74	0.66	-0.47	0.43	-0.88
	(0.93)	(-0.37)	(1.06)	(-0.44)	(0.66)	(-0.87)
IP	-1.56*	5.20**	-2.24***	0.49	-0.07	1.71
	(-1.65)	(2.22)	(-3.11)	(0.39)	(-0.09)	(1.45)
PMI	-0.02	1.46	1.82**	-1.24	0.51	-0.73
	(-0.02)	(0.59)	(1.98)	(-0.77)	(0.52)	(-0.49)
RETAIL SALES	-0.18	0.99	-0.46	1.58	-0.58	0.07
	(-0.21)	(0.47)	(-0.66)	(1.30)	(-0.77)	(0.06)
TRADE DEFICIT	-0.38	0.52	0.16	-0.31	-0.31	0.13
	(-0.49)	(0.28)	(0.26)	(-0.28)	(-0.46)	(0.13)
GDP	-1.79	-6.93*	1.51	0.39	1.13	0.47
	(-1.18)	(-1.85)	(1.39)	(0.21)	(0.97)	(0.26)
Number of obs.	583	583	687	687	872	872
R^2	14%	3%	9%	3%	8%	2%
adj.R^2	12%	1%	7%	1%	6%	0%
Wald-statistic	95.50	18.10	68.89	19.10	73.45	13.47
(p-value)	(0.00)	(0.15)	(0.00)	(0.12)	(0.00)	(0.49)

Notes: The table shows full-sample regression results for Brazil (first two columns), Chile (middle two columns) and Mexico (final two columns), including only those days on which at least one Brazilian or Chinese macroeconomic figure is released. Full sample is July 2006 - April 2013 for Brazil, October 2002 - April 2013 for Chile, and January 2003 - April 2013 for Mexico. The surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 6: Time table of data releases

	Month X				Month X+1				Month X+2				Month X+3			
week number:	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Brazil																
PMI	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Trade Deficit	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
CPI (IPCA)	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
IP	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-
Unempl. rate	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-
GDP	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-
Chile																
CPI	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Trade Deficit	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
IP	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
Unempl. rate (*)	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
GDP	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-
Mexico																
PMI (IMEF)	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
CPI	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Unempl. rate	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	-
Trade Deficit	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
IP	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
GDP	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Retail Sales	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-
United States																
Cons. Confidence	-	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Initial Claims (**)	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-
PMI	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Unempl. rate	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Nonfarm Payrolls	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
Trade Deficit	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
CPI	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
IP	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
New Home Sales	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
GDP (Advance)	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
China																
PMI	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-
Trade Deficit	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-
CPI	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
IP	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
Retail Sales	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
GDP	-	-	-	-	-	-	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 months after that (columns 9 through 17). 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.

Table 7: BRAZIL: Baseline Model (Pre-Crisis and Crisis Samples)

variable	Pre-crisis: Jul-2006 - Jun-2007		Crisis: Jul-2007 - Apr-2013	
	1-yr nominal rate	1-yr forward infl. comp. ending 7 yrs	1-yr nominal rate	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.52*	1.77***	0.29***	0.00
	(1.89)	(3.18)	(4.27)	(0.00)
CPI	3.17*	3.11	2.32***	0.77
	(1.78)	(0.87)	(2.63)	(0.35)
IP	2.55	3.83	3.68***	0.98
	(1.54)	(1.15)	(4.51)	(0.48)
PMI	-	-	-	-
	-	-	-	-
RETAIL SALES	1.64	3.60	0.69	1.98
	(1.04)	(1.14)	(0.82)	(0.94)
TRADE DEFICIT	3.53	3.20	-1.31	3.17
	(1.35)	(0.61)	(-1.37)	(1.33)
GDP	5.92**	-7.39	5.33***	7.80**
	(1.99)	(-1.24)	(3.52)	(2.06)
UNEMPL. RATE	0.90	5.72*	-2.24***	-2.60
	(0.53)	(1.69)	(-2.80)	(-1.30)
Number of obs.	66	66	362	362
R^2	32%	28%	16%	3%
adj.R^2	22%	18%	14%	0%
$F-$statistic	26.35	17.37	67.22	9.17
(p-value)	(0.00)	(0.02)	(0.00)	(0.24)

Notes: The table shows regression results for Brazil for the pre-crisis sample period July 2006 - June 2007 (the two leftmost columns) and the crisis sample period July 2007 - April 2013 (the two rightmost columns), 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. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 8: CHILE: Baseline Model (Pre-Crisis and Crisis Samples)

variable	Pre-crisis: Oct-2002 - Jun-2007		Crisis: Jul-2007 - Apr-2013	
	1-yr nominal rate	1-yr forward infl. comp. ending 7 yrs	1-yr nominal rate	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.03	0.28**	0.07*	-0.06
	(0.69)	(2.30)	(1.81)	(-1.24)
CPI	0.43	4.85*	4.85***	2.76**
	(0.49)	(1.91)	(5.32)	(2.18)
IP	1.73**	-3.41*	1.81**	-0.69
	(2.43)	(-1.66)	(2.07)	(-0.57)
PMI	-	-	0.00	0.00
	-	-	(0.00)	(0.00)
RETAIL SALES	-	-	0.37	0.65
	-	-	(0.25)	(0.31)
TRADE DEFICIT	1.16*	-1.81	-0.48	-1.23
	(1.88)	(-1.01)	(-0.50)	(-0.94)
GDP	1.69	4.96	1.88	2.21
	(1.47)	(1.49)	(1.21)	(1.03)
UNEMPL. RATE	0.22	4.40***	0.42	-0.56
	(0.40)	(2.78)	(0.47)	(-0.45)
Number of obs.	192	192	293	293
R^2	7%	11%	12%	4%
adj.R^2	3%	8%	9%	1%
Wald-statistic	12.74	21.93	38.05	8.81
(p-value)	(0.05)	(0.00)	(0.00)	(0.27)

Notes: The table shows regression results for Chile for the pre-crisis sample period October 2002 - June 2007 (the two leftmost columns) and the crisis sample period July 2007 - April 2013 (the two rightmost columns), 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. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 9: MEXICO: Baseline Model (Pre-Crisis and Crisis Samples)

variable	Pre-crisis: Jan-2003 - Jun-2007		Crisis: Jul-2007 - Apr-2013	
	1-yr nominal rate	1-yr forward infl. comp. ending 7 yrs	1-yr nominal rate	1-yr forward infl. comp. ending 7 yrs
Macro News Surprises				
POLICY RATE	0.59***	-0.03	0.52***	-0.18**
	(3.28)	(-0.09)	(7.95)	(-1.99)
CPI	1.08	2.95	0.74	0.84
	(0.75)	(1.23)	(1.09)	(0.87)
IP	2.07**	2.54	0.29	0.89
	(2.03)	(1.49)	(0.42)	(0.90)
PMI	-	-	0.84	-1.91
	-	-	(0.94)	(-1.51)
RETAIL SALES	-1.77	-0.01	1.32*	0.14
	(-1.62)	(-0.01)	(1.90)	(0.14)
TRADE DEFICIT	0.89	0.14	-0.34	-0.87
	(0.79)	(0.07)	(-0.50)	(-0.90)
GDP	-4.52**	1.27	0.85	-1.14
	(-2.35)	(0.40)	(0.68)	(-0.65)
UNEMPL. RATE	-0.08	-0.76	0.15	-0.54
	(-0.08)	(-0.42)	(0.22)	(-0.55)
Number of obs.	265	265	417	417
R^2	9%	2%	15%	2%
adj.R^2	6%	-1%	13%	0%
Wald-statistic	24.04	4.00	69.81	9.11
(p-value)	(0.00)	(0.78)	(0.00)	(0.33)

Notes: The table shows regression results for Mexico for the pre-crisis sample period January 2003 - June 2007 (the two leftmost columns) and the crisis sample period July 2007 - April 2013 (the two rightmost columns), 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. Besides the surprise 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, while *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The Wald statistic and accompanying p-value are for testing the null hypothesis that all coefficients (with the exception of the constant and the yearly dummy) are equal to zero.

Table 10: BRAZIL: Alternative Specifications (Full Sample: Jul-2006 - Apr-2013)

variable	basic model	with Q4 2008	with all obs.	without yearly dummy	with TBill rate	with controls
Macro News Surprises						
POLICY RATE	0.06	0.05	0.06	0.05	-	0.06
	(0.37)	(0.27)	(0.42)	(0.31)	-	(0.34)
3-MONTH TBILL	-	-	-	-	-0.21	-
	-	-	-	-	(-1.03)	-
CPI	1.15	2.46	1.09	1.17	1.15	1.13
	(0.59)	(1.12)	(0.58)	(0.60)	(0.59)	(0.58)
IP	1.25	2.84	1.42	1.18	1.23	1.09
	(0.69)	(1.35)	(0.82)	(0.65)	(0.68)	(0.60)
PMI	-	-	-	-	-	-
	-	-	-	-	-	-
RETAIL SALES	2.24	2.55	2.13	2.26	2.25	2.13
	(1.22)	(1.19)	(1.20)	(1.23)	(1.23)	(1.15)
TRADE DEFICIT	3.04	1.87	1.80	1.09	2.84	2.78
	(1.41)	(0.74)	(0.98)	(0.59)	(1.32)	(1.27)
GDP	7.34**	10.09***	7.52**	7.45**	7.50**	7.31**
	(2.20)	(2.63)	(2.34)	(2.23)	(2.25)	(2.18)
UNEMPL. RATE	-1.33	-0.55	-1.16	-1.38	-1.33	-1.32
	(-0.73)	(-0.26)	(-0.66)	(-0.76)	(-0.73)	(-0.72)
Controls						
OIL FUTURES	-	-	-	-	-	-0.21
	-	-	-	-	-	(-0.38)
FOOD FUTURES	-	-	-	-	-	-0.05
	-	-	-	-	-	(-0.07)
VIX	-	-	-	-	-	0.27
	-	-	-	-	-	(0.48)
Number of obs.	428	446	1710	428	428	428
R^2	3%	3%	1%	2%	3%	3%
adj.R^2	1%	1%	0%	0%	1%	0%
Wald-statistic	10.01	9.59	9.59	8.33	10.95	9.01
(pval)	(0.19)	(0.09)	(0.21)	(0.31)	(0.14)	(0.25)

Notes: The table shows regression results for the full sample period July 2006 - April 2013 for Brazil, for our benchmark model (first column) as well as for a number of alternative specifications (the remaining columns); (i) including observations from the fourth quarter of 2008, (ii) including all observations during our sample period (thus including days on which no Brazilian macroeconomic figures are released), (iii) without including the dummy that takes on the value of one on the first business day of the year, (iv) including the daily change in the 3-month local Treasury Bill instead of the standardized surprise component of the policy rate, and (v) including the 12-month oil futures, 3-month food futures and the VIX as control variables in the regression. 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. In the regressions, the surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (Wald-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: CHILE: Alternative Specifications (Full Sample: Oct-2002 - Apr-2013)

variable	basic model	with Q4 2008	with all obs.	without yearly dummy	with TBill rate	with controls
Macro News Surprises						
POLICY RATE	0.00	0.00	0.00	-0.01	-	0.00
	(0.03)	(0.02)	(-0.03)	(-0.12)	-	(-0.08)
3-MONTH TBILL	-	-	-	-	-0.06	-
	-	-	-	-	(-0.51)	-
CPI	3.12***	2.98***	3.22***	3.20***	3.11***	3.22***
	(2.65)	(2.59)	(2.65)	(2.72)	(2.65)	(2.72)
IP	-1.15	-1.02	-1.00	-1.12	-1.15	-1.22
	(-1.08)	(-0.97)	(-0.91)	(-1.05)	(-1.08)	(-1.14)
PMI	-	-	-	-	-	-
	-	-	-	-	-	-
RETAIL SALES	1.50	1.54	1.37	1.47	1.50	1.42
	(0.69)	(0.71)	(0.61)	(0.68)	(0.69)	(0.65)
TRADE DEFICIT	-1.26	-1.41	-0.89	-0.90	-1.27	-1.28
	(-1.16)	(-1.36)	(-0.81)	(-0.85)	(-1.17)	(-1.18)
GDP	3.05*	2.95	2.97	3.03*	3.06*	3.17*
	(1.67)	(1.62)	(1.57)	(1.66)	(1.67)	(1.71)
UNEMPL. RATE	1.48	1.44	1.56	1.49	1.48	1.47
	(1.50)	(1.50)	(1.53)	(1.51)	(1.50)	(1.49)
Controls						
OIL FUTURES	-	-	-	-	-	-0.04
	-	-	-	-	-	(-0.12)
FOOD FUTURES	-	-	-	-	-	0.35
	-	-	-	-	-	(0.81)
VIX	-	-	-	-	-	0.24
	-	-	-	-	-	(0.72)
Number of obs.	485	498	2694	485	485	485
R^2	4%	3%	1%	3%	4%	4%
adj.R^2	2%	2%	0%	2%	2%	2%
Wald-statistic	15.15	14.99	13.72	14.76	15.42	15.65
(pval)	(0.03)	(0.04)	(0.06)	(0.04)	(0.03)	(0.03)

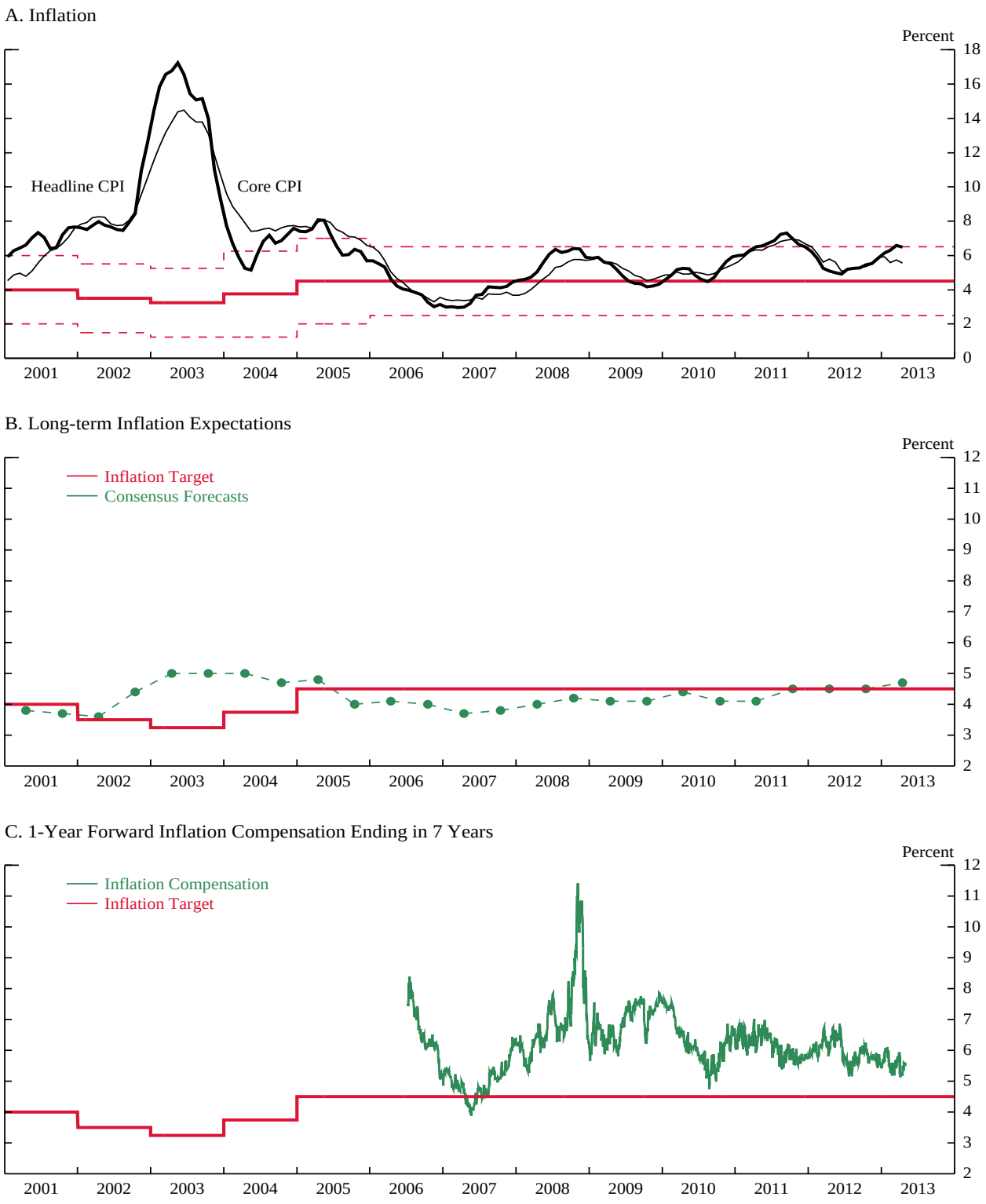
Notes: The table shows regression results for the full sample period October 2002 - April 2013 for Chile, for our benchmark model (first column) as well as for a number of alternative specifications (the remaining columns); (i) including observations from the fourth quarter of 2008, (ii) including all observations during our sample period (thus including days on which no Chilean macroeconomic figures are released), (iii) without including the dummy that takes on the value of one on the first business day of the year, (iv) including the daily change in the 3-month local Treasury Bill instead of the standardized surprise component of the policy rate, and (v) including the 12-month oil futures, 3-month food futures and the VIX as control variables in the regression. 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. In the regressions, the surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (Wald-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: MEXICO: Alternative Specifications (Full Sample: Jan-2003 - Apr-2013)

variable	basic model	with Q4 2008	with all obs.	without yearly dummy	with TBill rate	with controls
Macro News Surprises						
POLICY RATE	-0.15	-0.16	-0.15	-0.15	-	-0.16
	(-1.46)	(-1.46)	(-1.35)	(-1.45)	-	(-1.47)
3-MONTH TBILL	-	-	-	-	-0.07	-
	-	-	-	-	(-0.55)	-
CPI	1.49	1.40	1.50	1.45	1.49	1.46
	(1.46)	(1.37)	(1.38)	(1.42)	(1.45)	(1.43)
IP	1.60*	1.61*	1.65*	1.60*	1.58*	1.67*
	(1.73)	(1.74)	(1.69)	(1.73)	(1.70)	(1.81)
PMI	-1.89	-1.88	-1.95	-1.93	-1.89	-1.90
	(-1.17)	(-1.16)	(-1.14)	(-1.19)	(-1.17)	(-1.18)
RETAIL SALES	0.08	0.56	0.11	0.08	0.07	0.01
	(0.09)	(0.59)	(0.11)	(0.09)	(0.08)	(0.01)
TRADE DEFICIT	-0.60	-0.28	-0.63	-0.60	-0.59	-0.56
	(-0.63)	(-0.30)	(-0.62)	(-0.64)	(-0.62)	(-0.58)
GDP	-0.03	-0.45	0.02	-0.02	-0.01	-0.10
	(-0.02)	(-0.28)	(0.01)	(-0.01)	(-0.01)	(-0.06)
UNEMPL. RATE	-0.58	-0.37	-0.60	-0.58	-0.55	-0.58
	(-0.62)	(-0.40)	(-0.61)	(-0.62)	(-0.59)	(-0.62)
Controls						
OIL FUTURES	-	-	-	-	-	-0.49*
	-	-	-	-	-	(-1.77)
FOOD FUTURES	-	-	-	-	-	0.29
	-	-	-	-	-	(0.88)
VIX	-	-	-	-	-	0.39
	-	-	-	-	-	(1.47)
Number of obs.	682	699	2622	682	683	682
R^2	1%	1%	0%	1%	1%	2%
adj.R^2	0%	0%	0%	0%	0%	1%
Wald-statistic	9.23	8.84	8.49	9.16	7.31	9.41
(pval)	(0.32)	(0.36)	(0.39)	(0.33)	(0.50)	(0.31)

Notes: The table shows regression results for the full sample period January 2003 - April 2013 for Mexico, for our benchmark model (first column) as well as for a number of alternative specifications (the remaining columns); (i) including observations from the fourth quarter of 2008, (ii) including all observations during our sample period (thus including days on which no Mexican macroeconomic figures are released), (iii) without including the dummy that takes on the value of one on the first business day of the year, (iv) including the daily change in the 3-month local Treasury Bill instead of the standardized surprise component of the policy rate, and (v) including the 12-month oil futures, 3-month food futures and the VIX as control variables in the regression. 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. In the regressions, the surprises in the policy rate are recorded in basis points, while all other macroeconomic surprises are normalized by their standard deviation. Student-t statistics are presented between parentheses, except for the test of joint significance of all included regressors (Wald-statistic) for which the p-value is shown. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

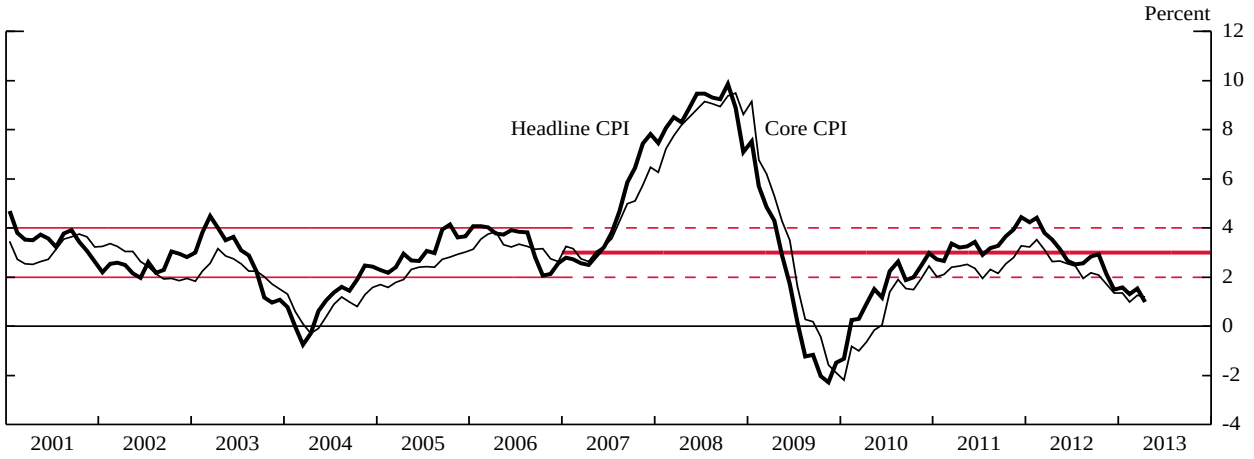
Figure 1: Brazil: Inflation, survey measures, and forward inflation compensation



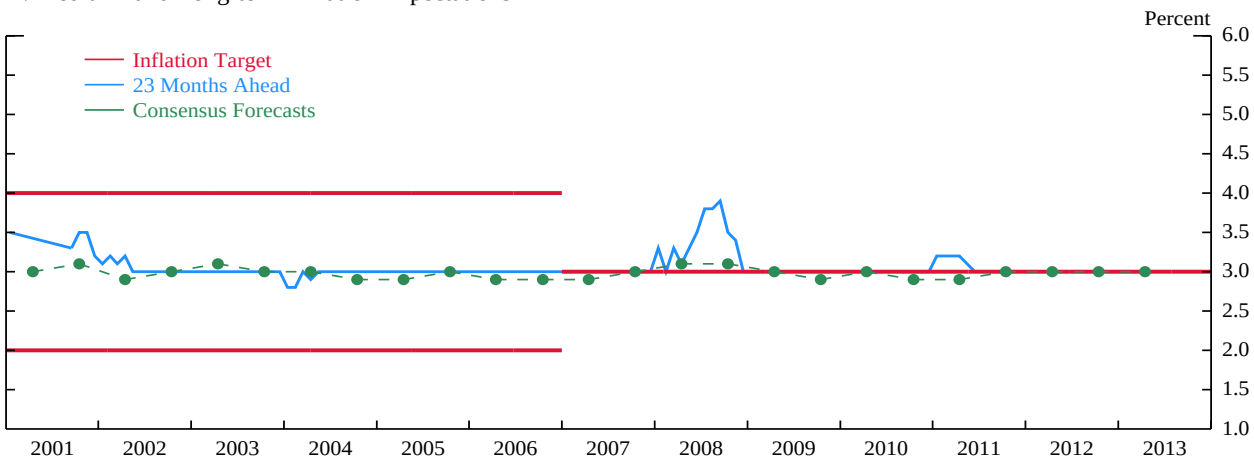
Notes: The figure presents realized inflation, Consensus Forecasts' long-term survey measure of inflation, and our estimated far-forward inflation compensation measure for Brazil. Panel A displays year-over-year realized headline and core CPI for Brazil (the thick and thin black lines, respectively),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

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

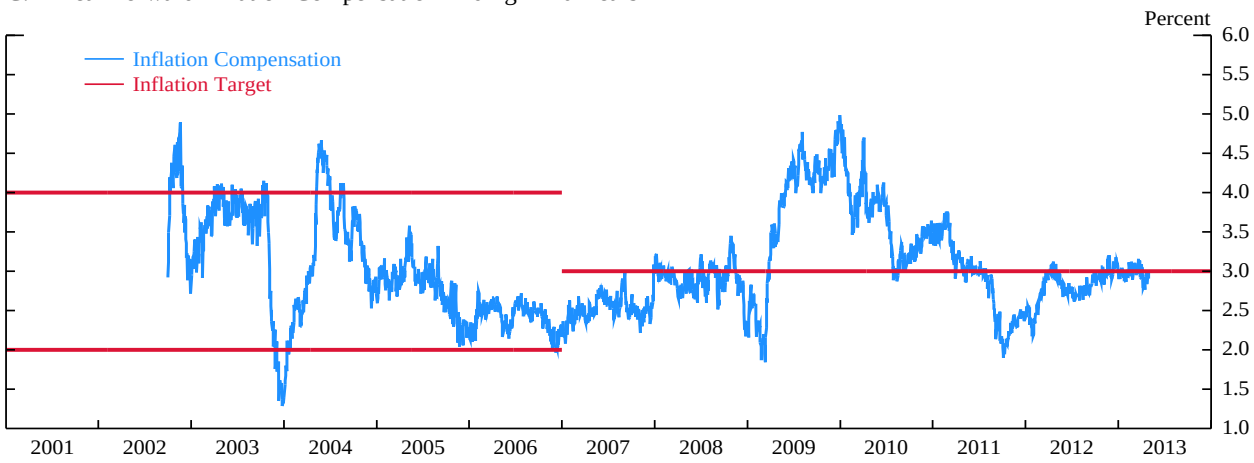
A. Inflation



B. Medium- and Long-term Inflation Expectations

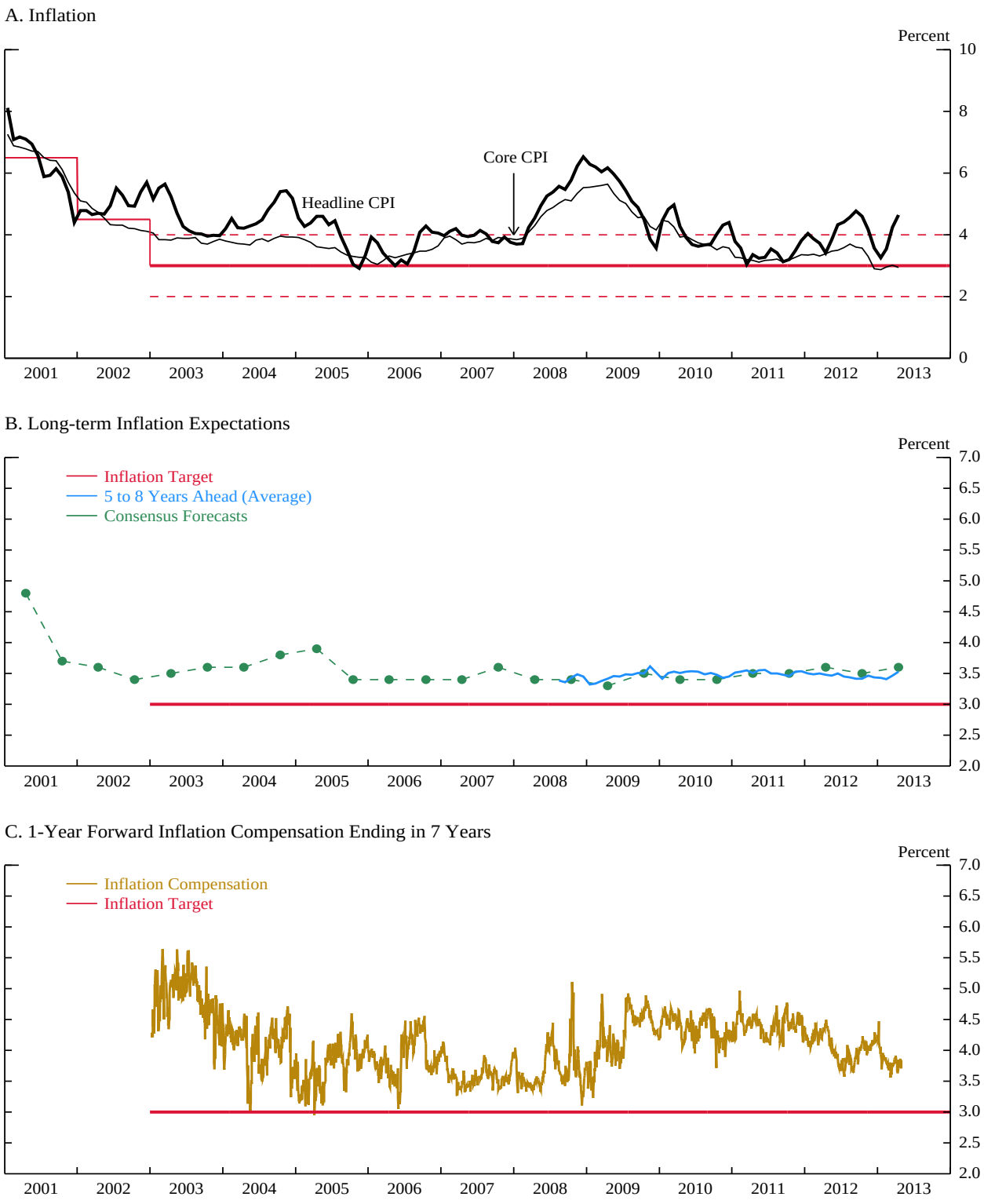


C. 1-Year Forward Inflation Compensation Ending in 10 Years



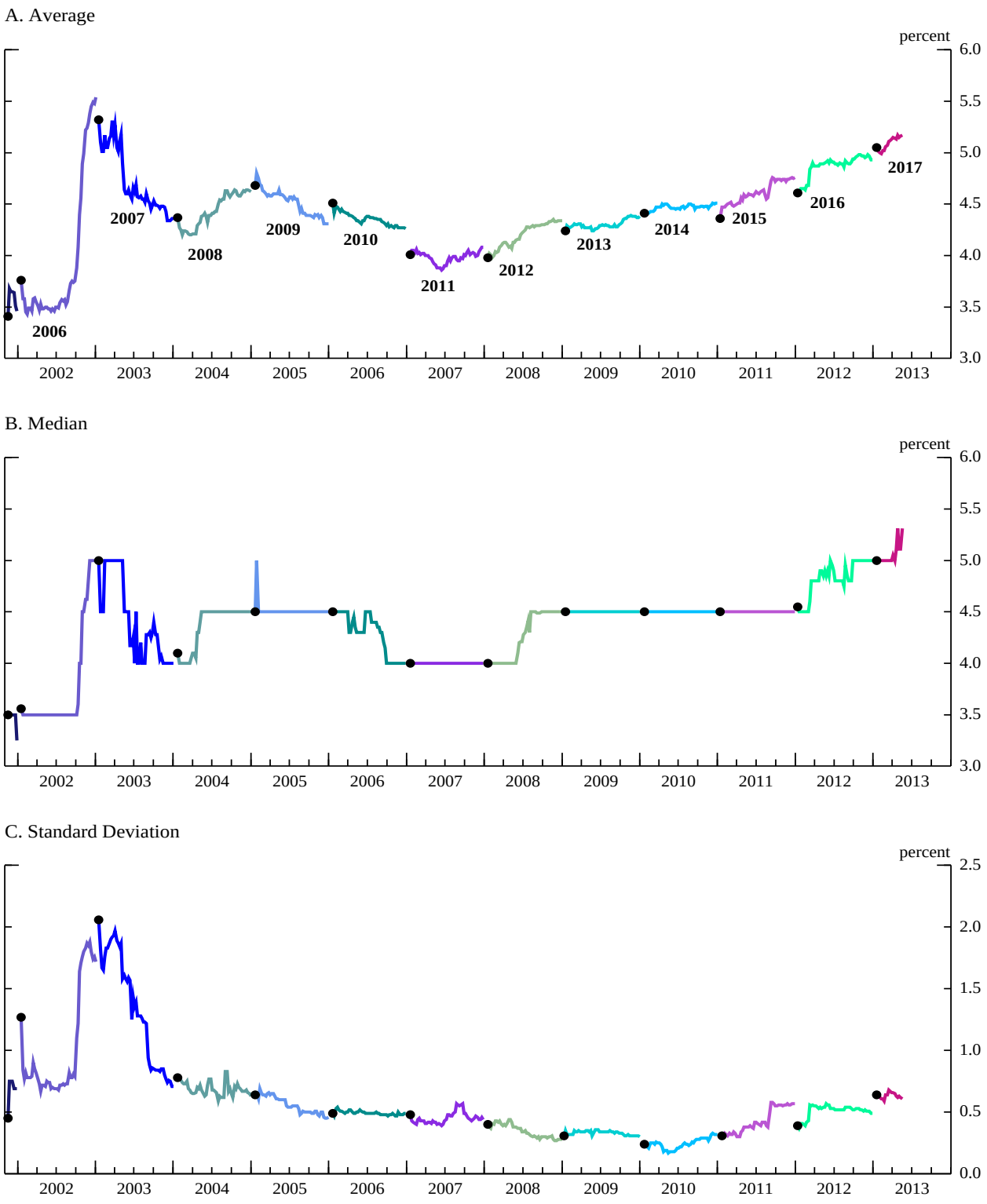
Notes: The figure presents realized inflation, Consensus Forecasts' long-term survey measure of inflation, and our estimated far-forward inflation compensation measure for Chile. Panel A displays year-over-year realized headline and core CPI for Chile (the thick and thin black lines, respectively), the Central Bank of Chile's 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 the Central Bank of Chile's target inflation rate (the red line), Consensus Forecasts' twice-yearly survey of long-run Brazilian inflation between 5 and 10 years out (the green dotted line), and the median expectation of 1-year inflation ending 23 months in the future from the Central Bank of Chile's monthly survey of forecasters (the blue line). Panel C displays our 1-year forward inflation compensation estimate, ending in 10 years (the blue line), together with the inflation target.

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



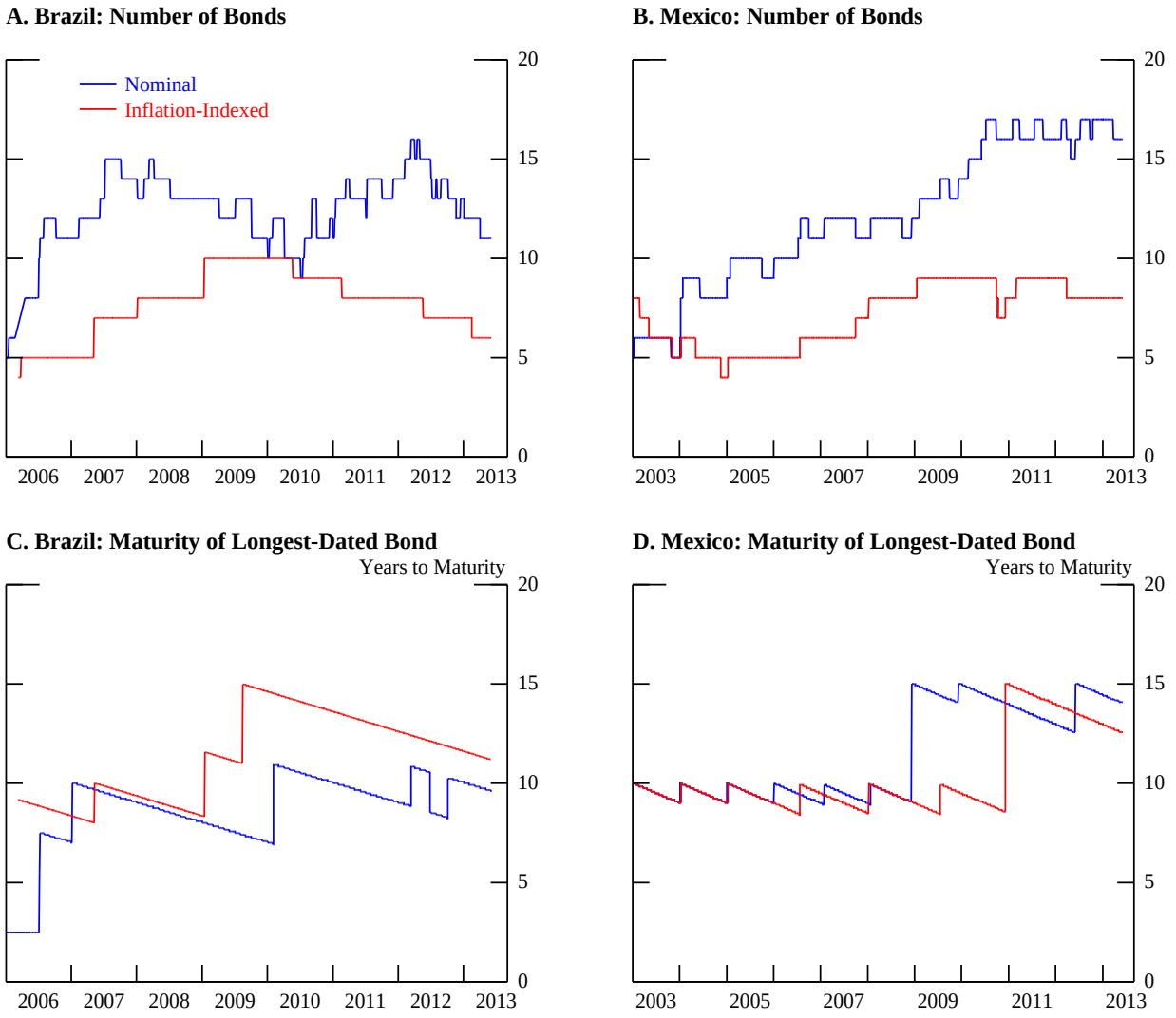
Notes: The figure presents realized inflation, Consensus Forecasts' long-term survey measure of inflation, and our estimated far-forward inflation compensation measure for Mexico. Panel A displays year-over-year realized headline and core CPI for Mexico (the thick and thin black lines, respectively), the Central 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 the Central Bank of Mexico's target inflation rate (the red line), Consensus Forecasts' twice-yearly survey of long-run Brazilian inflation between 5 and 10 years out (the green dotted line), and the average expectation of average inflation between 5 and 8 years in the future from the Central Bank of Mexico's monthly survey of analysts' expectations (the blue line). Panel C displays our 1-year forward inflation compensation estimate, ending in 7 years (the green line), together with the inflation target.

Figure 4: Brazil: Central Bank of Brazil Survey of Inflation Expectations



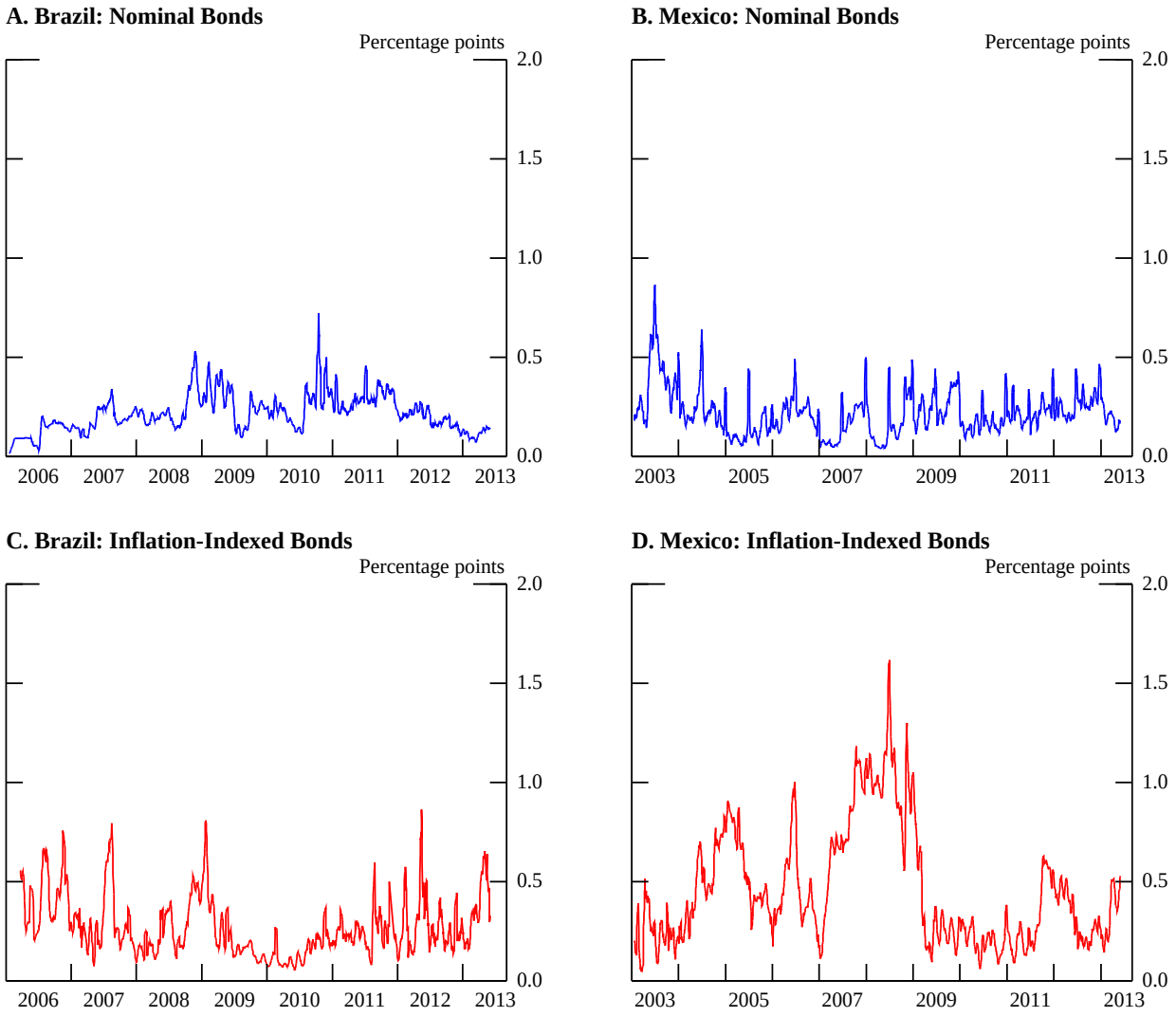
Notes: The figure displays the evolution of medium- to long-term inflation expectations from the Central Bank of Brazils weekly survey of professional forecasters between November 2001 and April 2013. Panels A and B depict the mean and median of respondents forecasts of headline inflation (the 12-month percentage change in the ICPA). Participants are asked to forecast inflation for the next few calendar years. The chart plots the forecast that is furthest in the future at the time of the survey. The circle corresponds to the week in which the inflation forecasts are rolled ahead by one year, and at that time, the forecasts are for 12-month inflation ending 5 years in the future. The forecast period gradually shrinks as the year progresses so that by December, the forecasts are for 12-month inflation ending 4 years in the future. Panel C displays the standard deviation of respondents forecasts and is constructed in an analogous manner. There are gaps in the panels because the forecast period is rolled ahead by one year at different times (although always in January) and because we discard the first week of each years results.

Figure 5: 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 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 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.

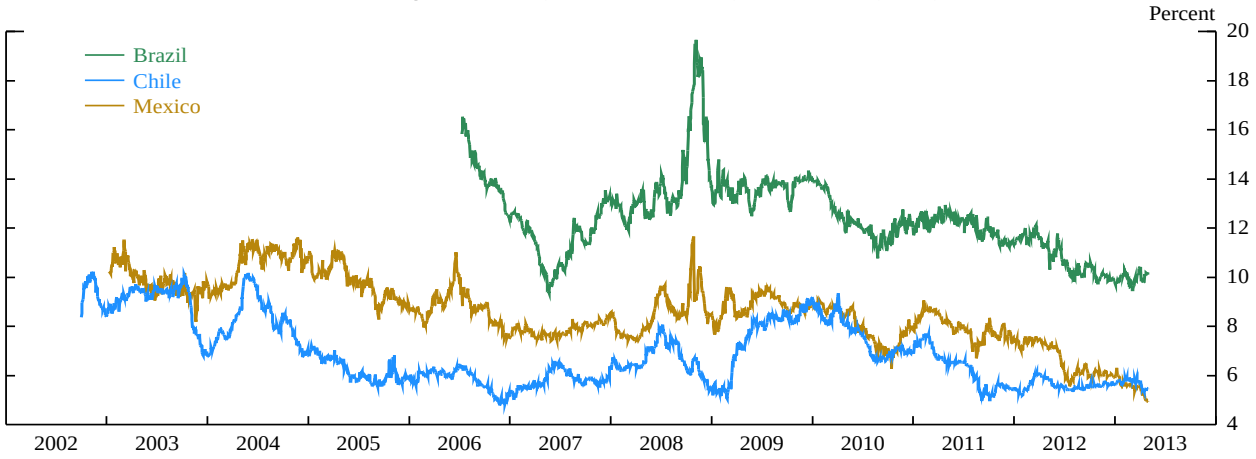
Figure 6: Bond price fitting errors



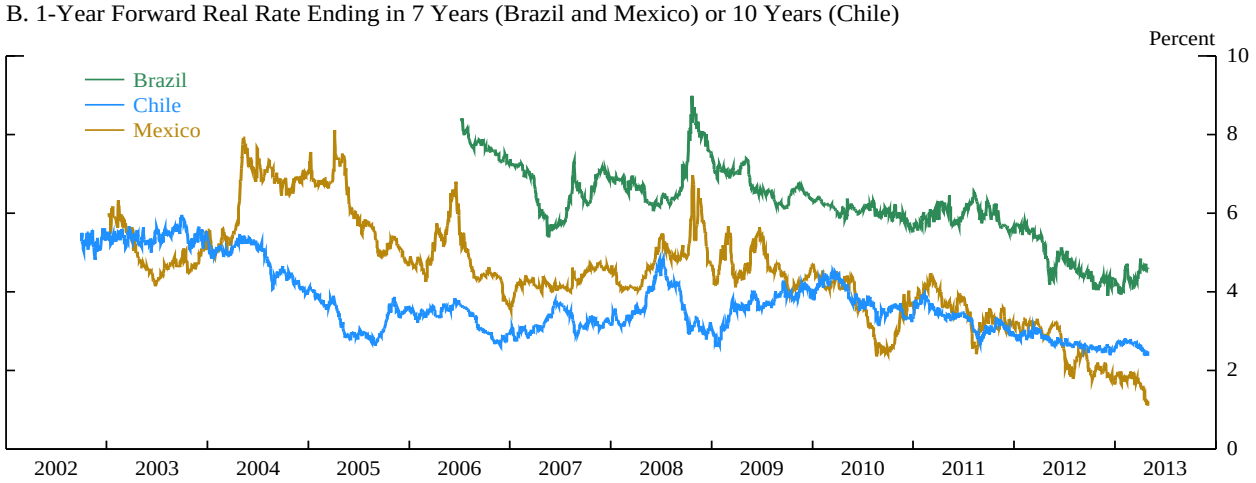
Notes: The figure presents indicators of the bond price fitting error when constructing zero-coupon curves from prices on nominal and inflation-linked sovereign bonds for Brazil (the left hand side panels) and Mexico (the right hand side panels) using the Nelson and Siegel (1987) model. Panels A and 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 7: Zero-coupon yield and inflation compensation estimates

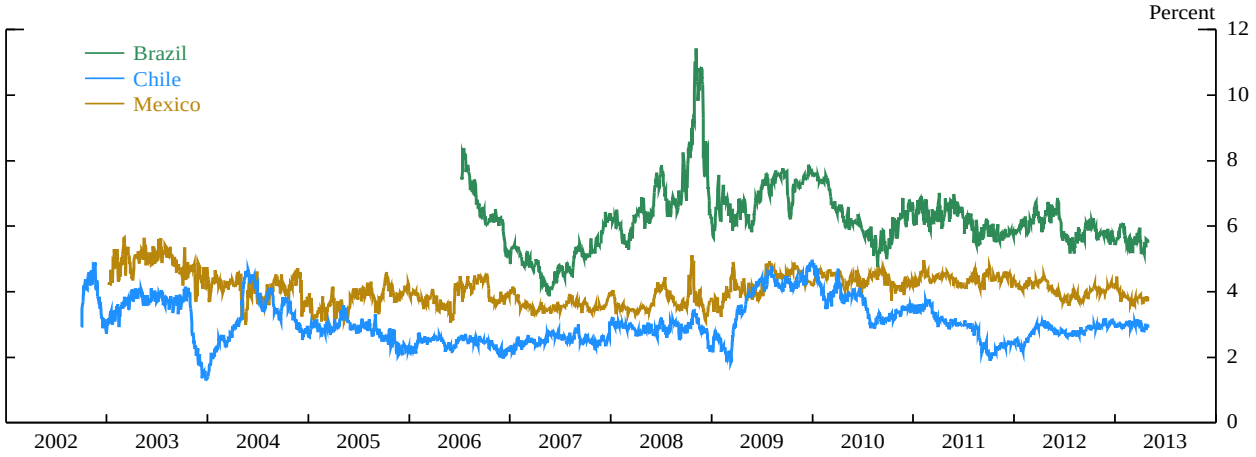
A. 1-Year Forward Nominal Rate Ending in 7 Years (Brazil and Mexico) or 10 Years (Chile)



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

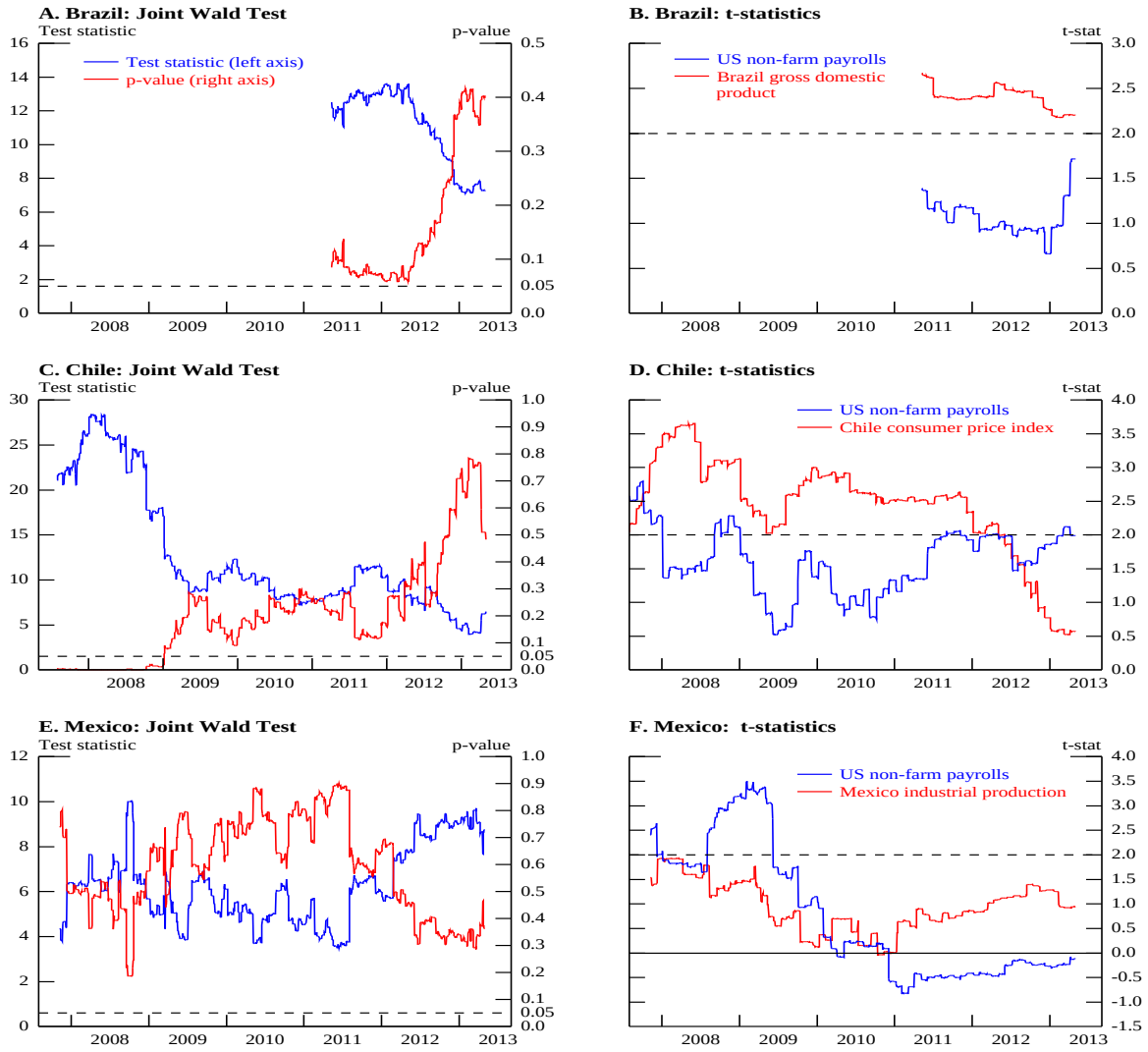


C. 1-Year Forward Inflation Compensation Ending in 7 Years (Brazil and Mexico) or 10 Years (Chile)



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 April 30, 2013.

Figure 8: Baseline Model: Rolling Regression Results For Far-Forward Inflation Compensation



Notes: The figure presents results from our baseline model estimated using rolling regression windows with a length of five calendar years. Reported in the left-hand side panels are the Wald test statistic and corresponding p-value of testing the null hypothesis that all regression coefficients (with the exception of the constant and the yearly dummy) are equal to zero. Reported in the right-hand side panels are the t-statistic of one domestic news surprise where we chose the variable that came in "most significant" in the full sample baseline regression for each country as reported in Tables 1, 2, and 3 and for U.S. nonfarm payroll surprises (from the baseline model with U.S. surprises). The dotted lines in the left-hand and right-hand panels indicate the 5% significance threshold for p-values and t-statistics, respectively.