

# **Inflation Targeting and the Anchoring of Long-Run Inflation Expectations: International Evidence from Daily Bond Yield Data**

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*Abstract:* We gauge the extent to which inflation targeting helps anchor long-run inflation expectations by evaluating the behavior of daily bond yield data for the United States, Sweden, and the United Kingdom. Using the difference between long-term forward rates on nominal and indexed bonds as an indicator of compensation for expected inflation and inflation risk at that horizon, we examine the extent to which forward inflation compensation moves in response to surprises in monetary policy and in macroeconomic data releases. We find that U.S. inflation compensation exhibits highly significant movements in response to economic news. In contrast, our results indicate that long-run inflation expectations are firmly anchored in Sweden and the United Kingdom: in both cases, forward inflation compensation is generally invariant not only to domestic news but also to Euro Area and U.S. economic news. Finally, we find a handful of apparently anomalous results—for example, U.K. inflation compensation responds *negatively* to domestic surprises in retail sales—that appear to be consistent with the influence of financial market factors rather than changing perceptions about long-run inflation.

*Keywords:* forward inflation compensation, high-frequency data, policy surprises.

*JEL Codes:* E31, E52, E58.

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## 1. Introduction

Long-term price stability is a central goal of monetary policy for nearly every modern central bank.<sup>1</sup> To facilitate the achievement of this objective, many economies have adopted explicit inflation targets over the past fifteen years, and a substantial body of literature has emphasized the advantages of this approach as a useful framework for the formulation and communication of monetary policy.<sup>2</sup> Nevertheless, empirical analysis using survey-based measures of inflation expectations has yielded little support for the notion that inflation targeting (IT) significantly influences private-sector expectations. In particular, short-term inflation forecasts appear to behave quite similarly in the IT and non-IT economies, while analysis of longer-term expectations has been hampered by data scarcity due to the relatively low frequency of surveys of professional forecasters.<sup>3</sup>

In this paper, we gauge the influence of IT on long-term inflation expectations by comparing the behavior of daily bond yield data for the United States, Sweden, and the United Kingdom. Forward inflation compensation—defined as the difference between forward rates on nominal and indexed bonds—provides a market-based indicator of the degree of inflation uncertainty as well as the conditional mean of inflation at a given horizon.<sup>4</sup> Thus, if 10-year-ahead forward inflation compensation is relatively insensitive to incoming economic news, then one may infer that financial market participants have fairly stable views regarding the distribution of long-

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<sup>1</sup> In other periods, of course, one can find many instances in which a central bank's primary objective was to provide the fiscal authorities with a combination of cheap credit and seignorage revenue.

<sup>2</sup> See Leiderman and Svensson (1995), Bernanke and Mishkin (1997), Bernanke, Laubach, Mishkin, and Posen (1999), Neumann and Von Hagen (2002), Goodfriend (2003), and Svensson and Woodford (2003).

<sup>3</sup> For analysis of short-term expectations, see Bernanke et al. (1999), Johnson (2002, 2003), Ball and Sheridan (2004), and the comments of Gertler (2004). For analysis of longer-term expectations using semi-annual Consensus Economics surveys, see Castelnuovo, Nicoletti-Altimari and Palenzuela (2003) and Levin, Natalucci, and Piger (2004).

<sup>4</sup> In contrast to raw bond yields, the use of forward rates avoids any direct influence from short-term developments and thereby permits a sharper focus on inflation expectations at a particular horizon.

term inflation outcomes, and hence that the monetary policy framework has been reasonably successful in anchoring long-term inflation expectations.

To evaluate the impact of economic news, we quantify the surprise component of monetary policy decisions and major macroeconomic data releases (such as retail prices and industrial output) for each of these three countries as well as for the Euro Area. Monetary policy surprises are measured using the change in either the near-term futures contract or the 3-month London interbank rate on the day of each policy committee meeting. For each macro data release, the surprise is measured as the difference between the actual release and the consensus of projections of professional forecasters who were surveyed a few days earlier.

The fairly frequent nature of the monetary policy decisions and data releases enables us to obtain relatively precise estimates of the impact of these surprises on long-term forward inflation compensation, even for samples that only span a few years. For the United States, we focus on the sample period since 1999, not only because of the relative high liquidity of the indexed bond market over this period, but also because the year 1999 roughly marks the end of the “opportunistic disinflation” during which some policymakers may have intentionally permitted long-term inflation expectations to decline in response to the benign macroeconomic environment.<sup>5</sup> For Sweden, we use data since 1996--when the Swedish indexed bond market became reasonably liquid—and then conduct some sensitivity analysis using the post-1999 period.<sup>6</sup> Finally, our analysis of U.K. data focuses primarily on the period since 1999, but we also consider the earlier period from 1993-97 when monetary policy was following a formal strategy of inflation targeting but long-term inflation expectations were gradually trending downwards (perhaps in part because the Bank of England was not granted operational independence until mid-1997).

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<sup>5</sup> See Orphanides and Wilcox (2002) and Kohn (2003).

<sup>6</sup> This sensitivity analysis confirms the results reported here; details will be provided in a technical appendix.

Our analysis reveals substantial cross-country differences in the sensitivity of inflation compensation to economic news. As in the analysis of Gurkaynak, Sack, and Swanson (2003)—henceforth referred to as GSS—we find that U.S. long-term forward inflation compensation exhibits highly significant movements in response to surprises in macro data releases. In contrast, inflation expectations appear to be firmly anchored in Sweden and in the United Kingdom for the period since 1999; in both cases, inflation compensation is generally invariant not only to domestic economic news but also to U.S. and Euro Area economic news.

We also find some indication that the operational independence of the Bank of England has had a substantial influence on the behavior of inflation expectations.<sup>7</sup> In particular, U.K. long-term forward inflation compensation increased significantly in response to positive surprises in retail prices, producer prices, and the preliminary release of real GDP over the period 1993-97, whereas surprises in these three series have had no significant effects on U.K. inflation compensation over the period since 1999.

We do find a handful of apparently anomalous results that appear to be consistent with the influence of institutional factors or financial market frictions rather than changing perceptions about long-run inflation. First, U.K. long-term forward inflation compensation exhibits a significantly *negative* response to domestic surprises in retail sales. Second, Swedish long-term forward inflation compensation responds significantly to surprises in the U.S. employment cost index, whereas surprises in this series are *not* significantly linked to U.S. forward inflation compensation. Finally, Swedish and U.K. inflation compensation each exhibit significant responses to surprises in the U.S. manufacturing survey.

Finally, it is interesting to consider these findings in light of survey-based measures of long-term inflation expectations. The most readily-available source for cross-country comparisons

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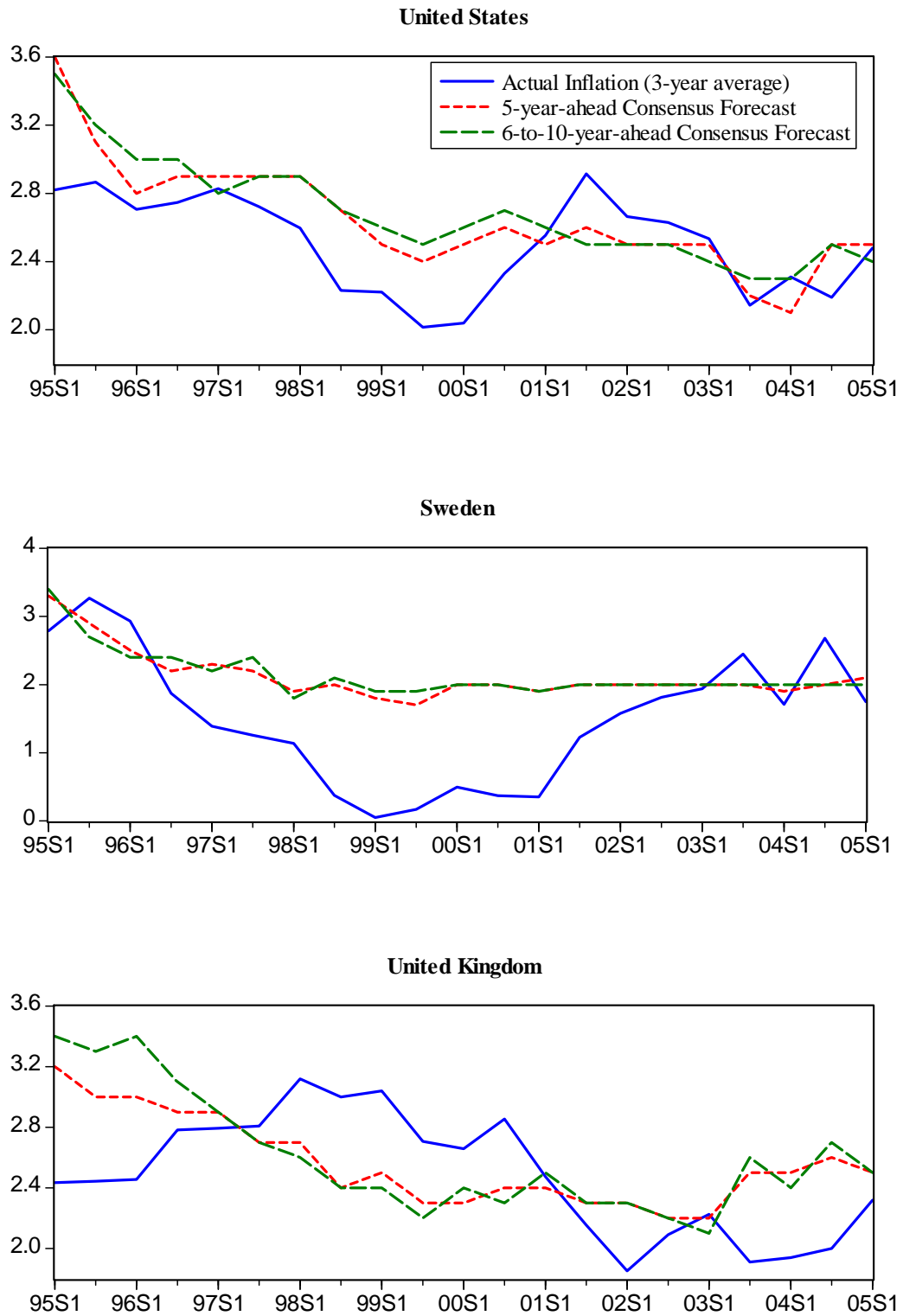
<sup>7</sup> See Lasaoa (2005) for further analysis of the empirical effects of the Bank of England's operational independence.

is Consensus Economics' semi-annual survey of long-run projections by professional forecasters. For each country, the corresponding panel of Figure 1 depicts the 5-year-ahead and 6-to-10-year-ahead Consensus Forecasts of inflation compared with the three-year average of actual inflation.

While Figure 1 confirms that all three countries have experienced reasonably stable long-run inflation expectations since 1999, the cross-country differences are also strikingly consistent with our analysis of the inflation compensation data. For the United States, the recent swing in actual inflation appears to have had a influence on longer-term expectations, which declined by 0.2 to 0.4 percentage points from mid-2002 through mid-2003 and then recovered during 2004. In the case of Sweden, the long-term Consensus Forecasts of inflation have been virtually constant at 2 percent since 1999, consistent with the view that the monetary policy framework has provided a firm anchor for inflation expectations. Finally, the survey-based measures for the U.K. indicate non-trivial variations in long-run inflation expectations, but these variations do not appear to be very closely linked to actual inflation. Thus, as with the results for inflation compensation, these data raise analytical questions about the influence of institutional factors as well as strategic questions about whether U.K. inflation expectations can become anchored as firmly as seems to be the case in Sweden.

The remainder of this paper proceeds as follows. Section 2 describes our methodology in greater detail. Section 3 discusses the specific evidence for each country regarding the response of inflation compensation to domestic surprises in monetary policy and macroeconomic data releases. Section 4 reports on the reaction of Swedish and U.K. inflation compensation to economic news from the United States and the Euro Area. Section 5 confirms that these results are not due to the influence of any specific outliers in the data. Section 6 concludes.

**Figure 1**  
**Survey Evidence on Long-Term Expected Inflation**



## 2. Methodology

This section discusses the construction and interpretation of our measures of long-term forward inflation compensation and the surprise component of macroeconomic data releases and monetary policy decisions. Appendix 1 reports further details regarding the specific data series used in our analysis.

### 2.1 Forward Inflation Compensation

Forward rates provide a useful means of interpreting the term structure of interest rates. For a zero-coupon bond with a maturity of  $m$  years, the yield  $r_t^{(m)}$  represents the return that an investor requires to lend money today in return for a single payment  $m$  years in the future. By comparison, the  $k$ -year-ahead forward rate  $f_t^{(k)}$  represents the rate of return that the same investor would require today to commit to a one-year loan at time  $t+k-1$ , with repayment at time  $t+k$ . The linkage between these concepts is simple: a  $m$ -year zero-coupon security can be viewed as the combination of a sequence of one-year forward agreements over the next  $m$  years. Thus, the continuously-compounded yield  $r_t^{(m)}$  can be expressed as the simple average of the  $m$  one-year forward rates:

$$r_t^{(m)} = \frac{1}{m} \sum_{k=1}^m f_t^{(k)} \quad (1)$$

In practice, of course, longer-term Treasury notes and bonds have coupon payments and somewhat irregular maturity dates. Thus, for the United States and Sweden, we use the method of Svensson (1994) to construct a smoothed zero-coupon yield curve for nominal bonds and a separate yield curve for indexed bonds, and then proceed to calculate the forward rates implied by each smoothed curve. For the U.K., we are able to directly incorporate the yield curve data published on the website of the Bank of England, which uses essentially the same curve-fitting procedures.

Forward inflation compensation is then computed simply by subtracting the indexed forward rate from the nominal forward rate at a given horizon. Given our interest in characterizing long-term expectations, our analysis focuses on a ten-year horizon, which seems sufficiently long to minimize the influence of business cycle fluctuations. Thus, we henceforth refer to the forward inflation compensation at this horizon as *long-term forward inflation compensation* and to the forward rate on indexed bonds at this horizon as the *long-term forward real rate*. Finally, while not reported here, we have confirmed that the main findings of this paper are not sensitive to the use of an alternative time horizon, namely, the five-year-average forward rate five years ahead.

## 2.2 Macroeconomic and Monetary Policy News

To quantify macroeconomic news, we consider data releases of major macro variables for each of the three countries and for the Euro Area. To measure the surprise component of each macroeconomic data release, we compute the difference between the actual release and the consensus of projections of professional forecasters who were surveyed a few days earlier; surveys obtained from Money Market Services are used for the U.S. variables, while Bloomberg Financial Services surveys are used for Sweden, the United Kingdom, and the Euro Area.

For the United States, we utilize the ten macro variables that GSS identified as having statistically significant effects on the one-year Treasury bill rate: capacity utilization; consumer confidence; core consumer price index; employment cost index; advance release of real GDP; initial jobless claims; NAPM/ISM survey of manufacturing activity; non-farm payrolls; retail sales; and unemployment rate. For each data release, the surprise is constructed using the median market forecast compiled and published by Money Market Services on the previous Friday.

For Sweden and the United Kingdom, we focus on macro variables for which Bloomberg Financial Services compiles and publishes market projections. For Sweden, there are seven such



variables: headline consumer price index (CPI); core CPI; preliminary release of real GDP; industrial production; producer price index (PPI); retail sales; and the unemployment rate.

The seven U.K. macro variables are: average earnings; preliminary release of real GDP; manufacturing production; PPI; headline retail price index (RPI); core RPI; and retail sales.

For many Euro Area variables, the individual country components are published several weeks prior to the release of the Euro Area aggregate, so that the Bloomberg consensus projection consistently matches the actual release. Thus, we are only able to use three Euro Area macro variables that exhibit non-trivial surprises: industrial orders; industrial production; and retail trade. Of course, because the publication of these Euro Area series was only initiated a few years ago, the impact of surprises in these variables cannot be assessed for U.K. data over the 1993-97 period.

We follow Kuttner (2001) and GSS in quantifying U.S. monetary policy surprises based on the change in the current month's fed funds futures contract rate on the day of each FOMC meeting.<sup>8</sup> For Sweden, the United Kingdom, and the Euro Area, we measure monetary policy surprises using the change in the 3-month London Interbank rate on the day of each policy committee meeting.<sup>9</sup> Although not reported here, we have conducted robustness analysis to confirm that the U.S. results are not sensitive to the use of the 3-month LIBOR rate instead of fed funds futures contracts.

In the analysis that follows, we regress daily changes in inflation compensation on an intercept and the vector of surprises in monetary policy and macroeconomic data releases. This approach captures the effects of all data releases in a single regression, and thereby correctly accounts for instances when a data release coincides with a monetary policy decision or when

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<sup>8</sup> See also Krueger and Kuttner (1996), Rudebusch (1998), and Brunner (2000).

<sup>9</sup> For the Euro Area, we only include meeting dates on which a policy decision was considered.

multiple data releases occur on the same day.<sup>10</sup> Finally, it should be noted that for each macro variable, we divide the series of surprises by its sample standard deviation; thus, the regression coefficients are comparable across series and can be interpreted as measuring the typical reaction to a one-standard-deviation surprise in the corresponding macro variable.

### 3. Response to Domestic Economic News

In this section, we consider the specific results regarding the influence of domestic economic news; that is, surprises in monetary policy and in macroeconomic news releases. To determine whether a given surprise contains some relevant information for short-run forecasts, we consider whether the surprise has a significant influence on the one-year Treasury bill rate.<sup>11</sup> We then proceed to analyze the influence of each surprise on long-term forward real rates (as indicated by the forward rate on indexed bonds) and on long-term forward inflation compensation (as indicated by the difference in the forward rates of nominal vs. indexed bonds).

The results for the United States, reported in Table 1, are remarkably similar to those obtained by GSS, especially given the difference in sample periods (1990-2002 for GSS versus 1999-2005 in this paper). Seven of the ten series of U.S. macro data surprises have significant effects on the one-year Treasury bill rate, confirming that these series contain information for projecting the short-term evolution of the economy and the federal funds rate.

As shown in the final column of Table 1, U.S. long-term forward inflation compensation responds significantly to the surprises in three of these macro data series, namely, the advance release of real GDP, initial jobless claims, and the survey of manufacturing activity. The sign

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<sup>10</sup> Note that for any given macroeconomic statistic, the time series of surprises is mostly zeros, since each statistic is typically only released once per month (or in some cases once per quarter).

<sup>11</sup> See Connolly and Kohler (2004) for empirical analysis of the impact of economic news on short-term interest rate expectations in six industrial economies.

**Table 1**  
**United States Response to Domestic Economic News, 1999-2005**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Monetary Policy</b>	<b>0.30</b> (0.12)	-0.00 (0.06)	-0.04 (0.06)
<b>Capacity Utilization</b>	<b>1.52</b> (0.59)	0.45 (0.31)	0.73 (0.65)
<b>Consumer Confidence</b>	<b>1.43</b> (0.60)	0.06 (0.46)	0.61 (0.50)
<b>Core Consumer Price Index</b>	0.95 (0.71)	-0.22 (0.40)	<b>1.54</b> (0.56)
<b>Employment Cost Index</b>	1.38 (1.04)	0.23 (0.51)	0.82 (0.91)
<b>Initial Jobless Claims</b>	<b>-1.22</b> (0.37)	-0.29 (0.18)	<b>-0.58</b> (0.29)
<b>Manufacturing Survey</b>	<b>2.85</b> (0.86)	<b>1.65</b> (0.44)	<b>1.39</b> (0.59)
<b>Nonfarm Payrolls</b>	<b>4.45</b> (0.64)	<b>1.29</b> (0.37)	0.51 (0.64)
<b>Real GDP</b>	<b>3.62</b> (1.06)	-0.41 (0.88)	<b>4.21</b> (1.23)
<b>Retail Sales</b>	<b>1.62</b> (0.73)	0.56 (0.35)	1.26 (0.67)
<b>Unemployment Rate</b>	-0.93 (0.67)	0.78 (0.56)	0.40 (0.68)
<b>Constant</b>	0.01 (0.21)	-0.05 (0.14)	0.31 (0.20)
<b># Obs.</b>	729	730	729
<b>R<sup>2</sup></b>	0.15	0.05	0.05

*Notes:* Bold type indicates significance of the coefficient at the 95% confidence level.  
Heteroskedasticity-consistent standard errors are reported in parentheses.

of each effect appears to be consistent with the notion that long-term inflation expectations are sensitive to economic news; that is, surprises in real GDP and manufacturing activity have positive effects while a surprise in initial jobless claims has a negative impact on forward inflation compensation. Furthermore, the magnitude of these effects is non-trivial; for example, long-term forward inflation compensation is estimated to rise by nearly 5 basis points in response to a one-standard-deviation surprise in the advance release of real GDP.

It is also interesting to note that positive surprises in U.S. core CPI inflation are associated with a significant rise in long-term forward inflation compensation, even though these surprises do *not* have a systematic effect on the one-year Treasury bill rate. Finally, it should be noted in contrast to GSS, we do not find a significant effect of U.S. monetary policy surprises on forward inflation compensation, perhaps because the frequency and magnitude of such surprises has declined substantially in recent years compared with the early-to-mid-1990s.

As shown in Table 2, the results for Sweden differ markedly from those obtained for the United States. In particular, the Swedish one-year nominal rate responds significantly to five of the seven series of surprises in macro data releases, confirming the information content of these series for forecasting the near-term evolution of the economy and market interest rates. Nevertheless, *none* of the macro data surprises nor the monetary policy surprise have statistically significant effects on long-term forward inflation compensation.

Table 3 gives results for the United Kingdom for the earlier sample period 1993-97. Over this period, long-term forward inflation compensation responds significantly to surprises in the preliminary release of real GDP and in the retail price index and producer price index. As in the United States, the sign of these effects appears to be consistent with shifting long-term inflation

**Table 2**  
**Sweden Response to Domestic Economic News, 1996-2005**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Monetary Policy</b>	<b>1.02</b> (0.07)	-0.00 (0.04)	0.18 (0.14)
<b>Consumer Price Index</b>	<b>2.08</b> (0.46)	0.21 (0.28)	0.72 (0.76)
<b>Core Consumer Price Index</b>	<b>2.27</b> (0.41)	-0.54 (0.42)	-0.14 (0.88)
<b>Industrial Production</b>	-0.30 (0.61)	-0.02 (0.26)	-0.65 (0.62)
<b>Producer Price Index</b>	<b>0.79</b> (0.38)	-0.40 (0.27)	-0.03 (0.42)
<b>Real GDP</b>	<b>1.25</b> (0.51)	0.10 (0.46)	0.58 (0.74)
<b>Retail Sales</b>	0.18 (0.33)	<b>-0.41</b> (0.19)	0.85 (0.44)
<b>Unemployment Rate</b>	<b>-0.54</b> (0.27)	<b>-0.55</b> (0.23)	0.08 (0.47)
<b>Constant</b>	-0.16 (0.15)	-0.09 (0.12)	-0.50 (0.25)
<b># Obs.</b>	464	458	458
<b>R<sup>2</sup></b>	0.40	0.03	0.01

*Notes:* Bold type indicates significance of the coefficient at the 95% confidence level.  
Heteroskedasticity-consistent standard errors are reported in parentheses.

**Table 3**  
**United Kingdom Response to Domestic Economic News, 1993-1997**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Monetary Policy</b>	<b>0.49</b> (0.11)	0.06 (0.04)	<b>-0.43</b> (0.19)
<b>Average Earnings</b>	<b>3.19</b> (0.97)	0.53 (0.33)	-0.07 (0.85)
<b>Manufacturing Production</b>	1.39 (0.86)	-0.41 (0.37)	0.63 (1.04)
<b>Producer Price Index</b>	<b>2.28</b> (0.65)	<b>0.74</b> (0.33)	<b>2.01</b> (0.86)
<b>Real GDP</b>	1.71 (1.09)	0.56 (0.35)	<b>1.88</b> (0.94)
<b>Retail Price Index</b>	<b>2.98</b> (0.65)	0.69 (0.35)	<b>1.92</b> (0.89)
<b>Retail Sales</b>	<b>3.15</b> (0.86)	0.61 (0.45)	-0.46 (0.93)
<b>Constant</b>	0.61 (0.31)	0.12 (0.16)	-0.10 (0.42)
<b># Obs.</b>	261	261	261
<b>R<sup>2</sup></b>	0.29	0.06	0.10

*Notes:* Bold type indicates significance of the coefficient at the 95% confidence level.  
Heteroskedasticity-consistent standard errors are reported in parentheses.

**Table 4**  
**United Kingdom Response to Domestic Economic News, 1999-2005**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Monetary Policy</b>	<b>0.53</b> (0.120)	0.05 (0.04)	-0.12 (0.08)
<b>Average Earnings</b>	<b>1.79</b> (0.47)	-0.10 (0.23)	-0.40 (0.29)
<b>Core Retail Price Index</b>	<b>1.84</b> (0.79)	-0.35 (0.30)	-0.56 (0.50)
<b>Manufacturing Production</b>	<b>1.15</b> (0.37)	<b>0.69</b> (0.22)	-0.39 (0.49)
<b>Producer Price Index</b>	0.06 (0.42)	0.40 (0.26)	-0.19 (0.34)
<b>Real GDP</b>	<b>2.36</b> (0.51)	0.02 (0.43)	-0.26 (1.06)
<b>Retail Price Index</b>	0.68 (0.76)	0.33 (0.34)	-0.04 (0.60)
<b>Retail Sales</b>	<b>1.50</b> (0.46)	0.13 (0.31)	<b>-1.30</b> (0.48)
<b>Constant</b>	0.26 (0.20)	0.15 (0.13)	0.02 (0.20)
<b># Obs.</b>	442	442	442
<b>R<sup>2</sup></b>	0.25	0.03	0.03

*Notes:* Bold type indicates significance of the coefficient at the 95% confidence level. Heteroskedasticity-consistent standard errors are reported in parentheses.

expectations. While the U.K. monetary policy surprise also has a statistically significant effect on inflation compensation, we will see below that this result is primarily due to a single observation.

Finally, Table 4 provides results for the United Kingdom for the sample period since 1999. In this case, five of the seven macro data surprises have significant effects on the one-year nominal interest rate, but only one of these series—retail sales—has a significant impact on long-term forward inflation compensation. Even this effect appears somewhat anomalous: a positive surprise in retail sales is associated with a *decline* in forward inflation compensation. Thus, it seems most reasonable to interpret this particular result as reflecting the influence of institutional factors or financial market frictions rather than changing perceptions about long-run inflation.



#### 4. Response to Foreign Economic News

In this section, we consider the extent to which Euro Area and U.S. economic news has significant effects on long-term forward inflation compensation in either Sweden or the United Kingdom. This analysis is important in interpreting the results reported above, namely, that forward inflation compensation in these two countries is not sensitive to domestic economic news. In particular, one plausible hypothesis is that expectations of long-term domestic inflation for a small open economy might be largely determined by the projections of long-term inflation of its larger trading partners. This hypothesis could be interpreted as predicting that Swedish forward inflation compensation would be primarily influenced by economic news from the Euro Area, while U.K. forward inflation compensation might be sensitive to economics news from both the Euro Area and the United States.

As shown in Table 5, Swedish long-term forward inflation compensation does *not* respond significantly to any of the Euro Area macroeconomic data or monetary policy surprises. Furthermore, Swedish inflation compensation does not respond significantly to three of the four U.S. surprises (core CPI inflation, initial jobless claims, and the advance release of real GDP) that were found to have statistically significant effects on U.S. forward inflation compensation (cf. Table 1). Thus, these results are not consistent with the hypothesis that Swedish long-term inflation expectations are largely determined by projections of external inflation.

Interestingly, Swedish inflation compensation does exhibit significant responses to surprises in the U.S. manufacturing survey and the U.S. employment cost index. Since surprises in the latter series are *not* significantly linked to U.S. forward inflation compensation, this evidence is also relatively unresponsive of the external inflation hypothesis. Instead, it seems reasonable to interpret these two findings as reflecting the influence of spillovers in global financial markets.

**Table 5**  
**Sweden Response to Foreign Economic News, 1996-2005**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>US Monetary Policy</b>	0.12 (0.07)	0.02 (0.04)	-0.06 (0.09)
<b>US Capacity Utilization</b>	0.04 (0.39)	-0.27 (0.24)	0.35 (0.51)
<b>US Consumer Confidence</b>	0.79 (0.58)	0.18 (0.16)	-0.27 (0.43)
<b>US Core CPI</b>	-0.08 (0.32)	0.07 (0.24)	0.73 (0.47)
<b>US Employment Cost Index</b>	-0.10 (0.38)	-0.28 (0.39)	<b>1.58</b> (0.80)
<b>US Initial Jobless Claims</b>	-0.23 (0.19)	-0.08 (0.11)	-0.08 (0.22)
<b>US Manufacturing Survey</b>	<b>1.59</b> (0.68)	<b>0.70</b> (0.22)	<b>1.91</b> (0.56)
<b>US Nonfarm Payrolls</b>	<b>0.92</b> (0.35)	<b>0.88</b> (0.38)	0.79 (0.67)
<b>US Real GDP</b>	0.36 (0.66)	0.19 (0.25)	-0.24 (0.87)
<b>US Retail Sales</b>	0.71 (0.37)	0.31 (0.31)	0.36 (0.49)
<b>US Unemployment Rate</b>	0.01 (0.33)	0.26 (0.25)	-0.64 (0.53)
<b>Euro Area Monetary Policy</b>	0.17 (0.10)	0.03 (0.06)	-0.22 (0.15)
<b>Euro Area Industrial Orders</b>	<b>-0.72</b> (0.28)	<b>-0.72</b> (0.21)	-0.49 (1.09)
<b>Euro Area Industrial Prodn.</b>	0.46 (0.54)	0.09 (0.55)	0.10 (0.54)
<b>Euro Area Retail Trade</b>	-0.21 (0.80)	0.66 (0.57)	0.29 (0.87)

*Notes:* Bold type indicates significance at 95% confidence level; robust std. errors in parentheses.

Finally, Tables 6 and 7 report corresponding results for the United Kingdom for the 1993-97 and 1999-2005 sample periods. For the earlier period, no Euro Area surprises are available, but we do find that several of the U.S. surprises have significant effects on U.K. long-term forward inflation compensation. In contrast, for the later period, U.K. inflation compensation does not respond significantly to any of the Euro Area surprises and to only one of the U.S. surprises, namely, the NAPM/ISM survey of manufacturing activity. As indicated above, this series also has a significant effect on Swedish inflation compensation; presumably this is not a coincidence, but instead seems to provide further evidence of cross-country spillovers in financial markets.

## **5. Sensitivity Analysis**

[See Figures 2, 3, and 4. Detailed discussion to be added.]

## **6. Conclusions**

[To be added]

**Table 6**  
**United Kingdom Response to Foreign Economic News, 1993-1997**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>US Monetary Policy</b>	0.13 (0.08)	.....	-0.02 (0.11)
<b>US Capacity Utilization</b>	<b>1.40</b> (0.45)	.....	<b>2.22</b> (0.77)
<b>US Consumer Confidence</b>	-0.35 (0.66)	.....	0.10 (1.01)
<b>US Core CPI</b>	<b>1.40</b> (0.71)	.....	<b>2.78</b> (0.87)
<b>US Employment Cost Index</b>	0.81 (1.47)	.....	1.73 (1.66)
<b>US Initial Jobless Claims</b>	<b>-0.57</b> (0.29)	.....	-0.16 (0.46)
<b>US Manufacturing Survey</b>	<b>2.09</b> (0.54)	.....	<b>2.01</b> (0.88)
<b>US Nonfarm Payrolls</b>	<b>1.40</b> (0.71)	.....	0.63 (0.65)
<b>US Real GDP</b>	-0.99 (0.78)	.....	-2.31 (2.00)
<b>US Retail Sales</b>	<b>1.15</b> (0.52)	.....	0.95 (1.14)
<b>US Unemployment Rate</b>	0.85 (0.75)	.....	<b>3.04</b> (0.75)

*Notes:* Bold type indicates significance of the coefficient at the 95% confidence level.  
Heteroskedasticity-consistent standard errors are reported in parentheses.  
Ellipsis (.....) indicates results to be inserted later.

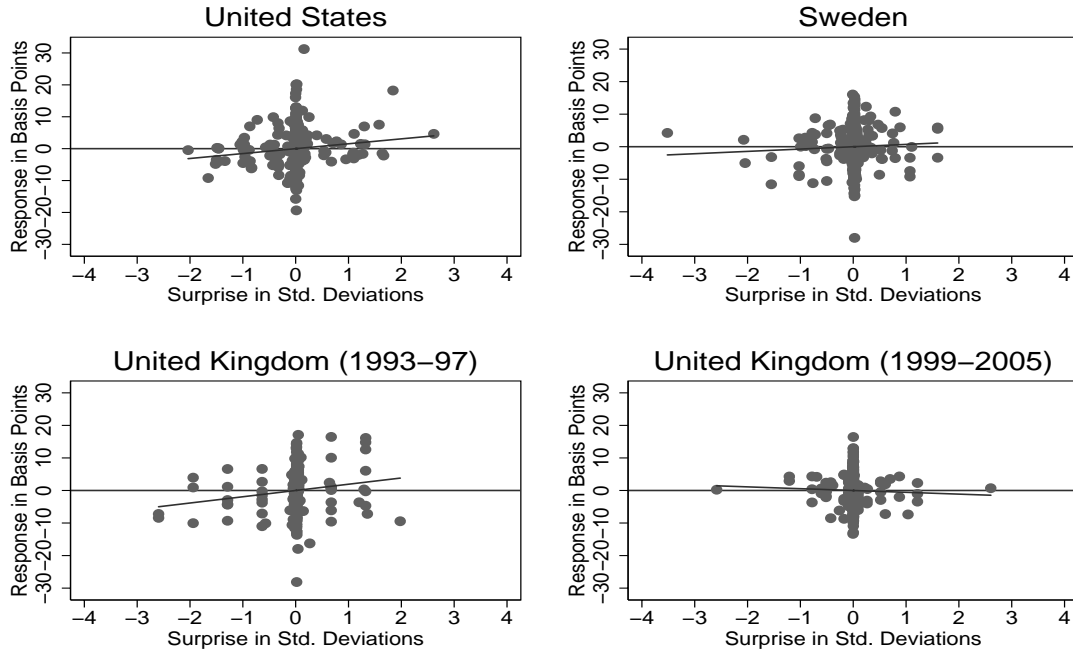
**Table 7**  
**United Kingdom Response to Foreign Economic News, 1999-2005**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>US Monetary Policy</b>	<b>0.10</b> (0.04)	-0.01 (0.06)	-0.03 (0.08)
<b>US Capacity Utilization</b>	<b>0.97</b> (0.50)	0.10 (0.29)	0.75 (0.61)
<b>US Consumer Confidence</b>	0.68 (0.35)	0.47 (0.30)	0.12 (0.34)
<b>US Core CPI</b>	0.82 (0.57)	0.51 (0.30)	-0.36 (0.54)
<b>US Employment Cost Index</b>	0.94 (0.69)	0.22 (0.41)	0.52 (0.55)
<b>US Initial Jobless Claims</b>	<b>-0.57</b> (0.24)	<b>-0.38</b> (0.16)	-0.25 (0.22)
<b>US Manufacturing Survey</b>	<b>1.62</b> (0.45)	<b>1.00</b> (0.26)	<b>1.69</b> (0.53)
<b>US Nonfarm Payrolls</b>	<b>1.92</b> (0.44)	<b>1.46</b> (0.33)	0.56 (0.47)
<b>US Real GDP</b>	0.53 (0.79)	0.71 (0.37)	0.09 (0.56)
<b>US Retail Sales</b>	2.48 (2.35)	0.51 (0.46)	0.43 (0.46)
<b>US Unemployment Rate</b>	0.24 (0.56)	0.58 (0.38)	0.06 (0.42)
<b>Euro Area Monetary Policy</b>	-0.05 (0.13)	<b>0.14</b> (0.04)	0.05 (0.08)
<b>Euro Area Industrial Orders</b>	0.00 (0.77)	-0.28 (0.49)	-0.55 (0.78)
<b>Euro Area Industrial Prodn.</b>	0.80 (0.62)	0.16 (0.38)	0.29 (0.49)
<b>Euro Area Retail Trade</b>	0.38 (0.50)	0.07 (0.09)	-0.29 (0.45)

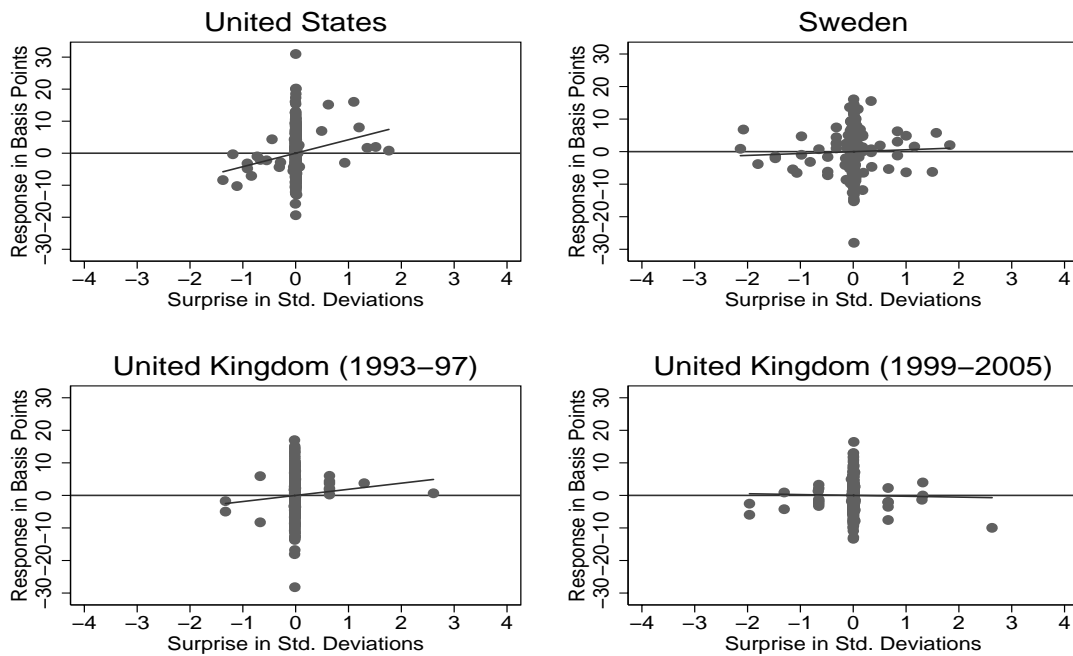
*Notes:* Bold type indicates significance at 95% confidence level; robust std errors in parentheses.

**Figure 2**  
**Response of Inflation Compensation to Domestic Macroeconomic News**

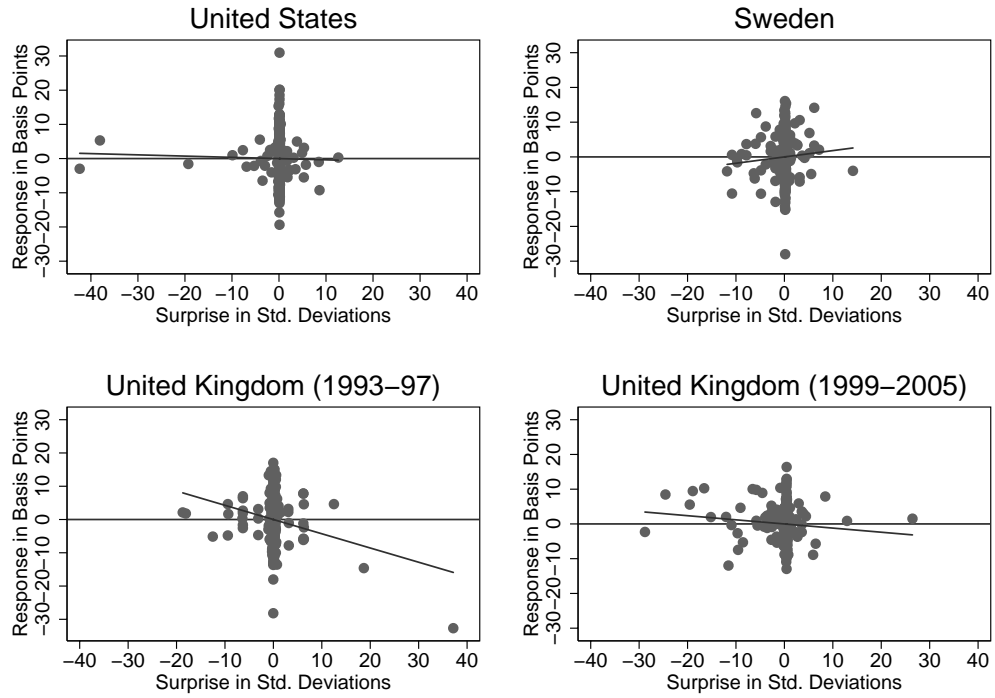
**Retail Price Surprises**



**GDP Surprises**

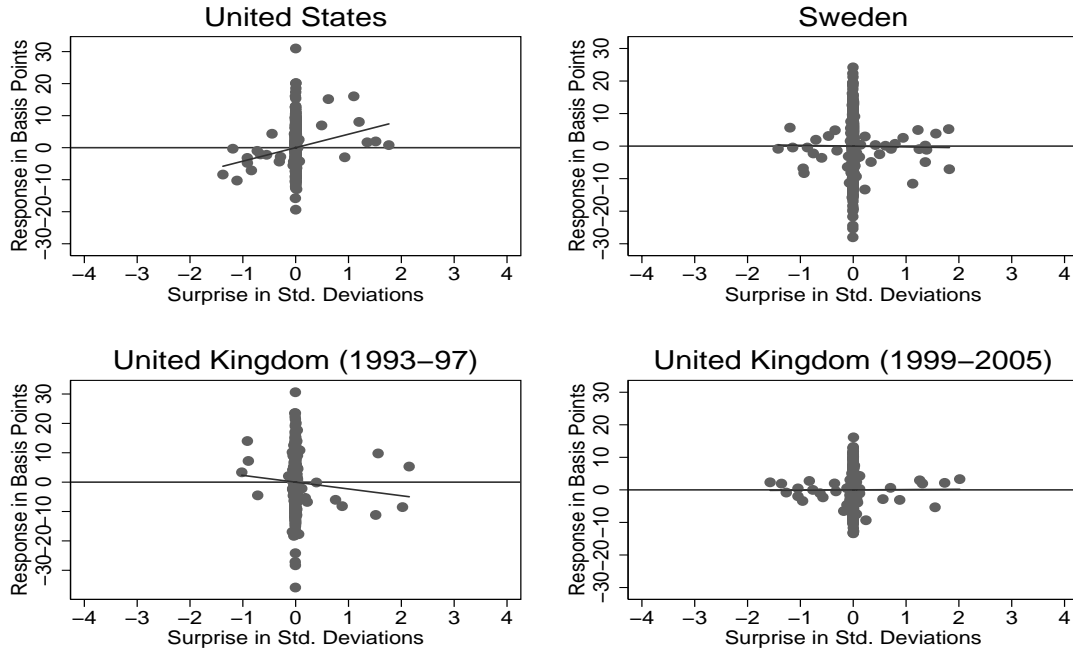


**Figure 3**  
**Response of Inflation Compensation to Domestic Monetary Policy Surprises**

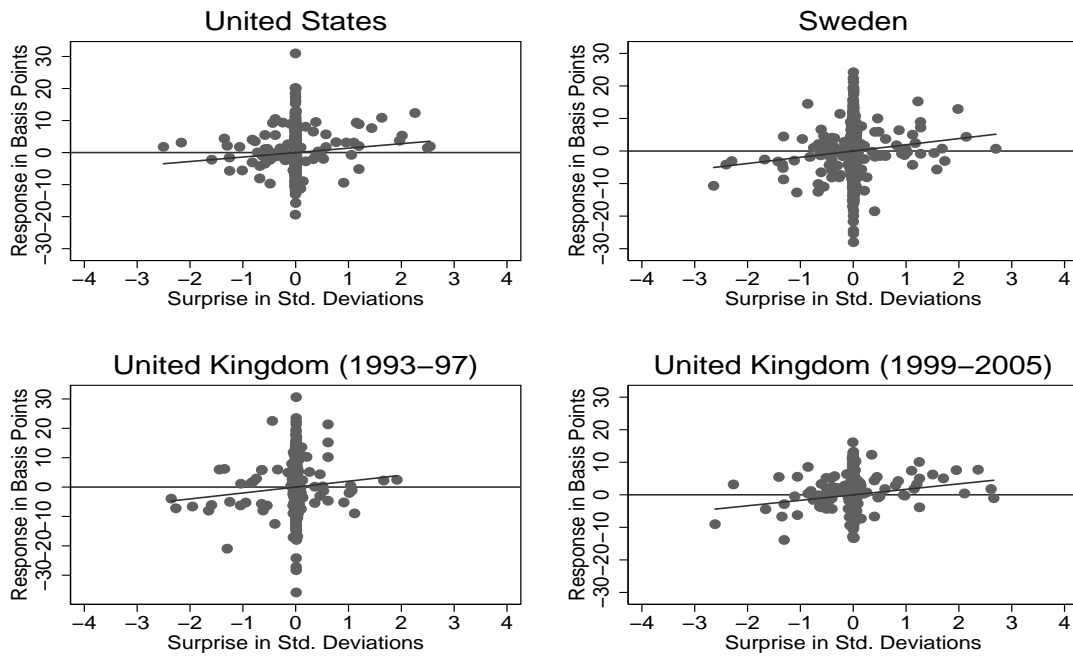


**Figure 4**  
**Response of Inflation Compensation to Foreign Macroeconomic News**

**Surprise in U.S. GDP**



**Surprise in U.S. Manufacturing Survey**





## Appendix 1. Data Sources

### United States

See Gurkaynak, Sack, and Swanson (2003).

### Sweden

<b>Name</b>	<b>Ticker</b>	<b>Description</b>
Consumer Price Index, Headline, MoM	swcpmom	
Consumer Price Index, Headline, YoY	swcpyoy	
Consumer Price Index, Underlying, MoM	swcpundm	
Consumer Price Index, Underlying, YoY	swcpundy	
Industrial Production, MoM	swipimom	Index 1995=100, SA.
Industrial Production, YoY	swipnsyy	Index 1995=100, NSA.
Producer Price Index MoM	swppimom	Includes domestic sales & exports.
Producer Price Index YoY	swppiyoy	Includes domestic sales & exports.
Real GDP, QoQ	swgdpqq	Base year 2000, SA.
Real GDP, YoY	swgdpwyy	Base year 2000.
Retail Sales, MoM	swrsamm	Index, 1995=100, constant prices. Monthly percent change, SA. Excludes motor vehicles, beverages, pharmacies and repair shops for personal and household goods.
Retail Sales, YoY	swrsiyoy	Index, 1995=100, constant prices. Excludes motor vehicles, beverages, pharmacies and repair shops for personal and household goods.
Unemployment Rate, Monthly	swue	NSA

*Notes:* MoM = Month-on-Month Change, QoQ = Quarter-on-Quarter, YoY = Year-on-Year, NSA = not seasonally adjusted, SA = seasonally adjusted.

**United Kingdom**

<b>Name</b>	<b>Ticker</b>	<b>Description</b>
Industrial Production YoY	Ukipiyoy	Incorporates annually weighted and chained estimates of volume measures, base year T-3.
Industrial Production MoM	Ukipimom	SA
Manufacturing Production YoY	ukmpiyoy	
Manufacturing Production MoM	Ukmpimom	SA
PPI YoY	Ukppiiy	Base Year 2000 = 100.
PPI MoM	Ukppiiic	Base Year 2000 = 100, SA
PPI Manufactured Products YoY	Ukppioy	Base Year 2000 = 100
PPI Manufactured Products MoM	Ukppioc	Base Year 2000 = 100, NSA
CPI EU Harmonized YoY	Ukrpcjyr	Base year 1996 = 100
CPI EU Harmonized MoM	ukrpcjmr	Base year 1996 = 100, NSA
RPI YoY	Ukrpyoy	Base date 13 January 1987 = 100
RPI MoM	Ukrpmom	Base date 13 January 1987 = 100, NSA
RPI Less Mortgage Interest Payments YoY	Ukrpxyoy	Base date 13 January 1987 = 100
RPI Less Mortgage Interest Payments MoM	Ukrpxmom	Base date 13 January 1987 = 100, NSA
Retail Sales Volume YoY	Ukrvayoy	Base Year 2000 = 100
Retail Sales Volume MoM	Ukrvamom	Base Year 2000 = 100, SA
Real GDP YoY	Ukgrabiy	Market prices, annual chain linking.
Chained GDP QoQ	Ukgrabiq	Market prices, annual chain linking.
Average Earnings	ukaenewy	3 Month Average Index, base year 2000, SA
Unemployment Rate	Ukuer	SA

*Notes:* MoM = Month-on-Month Change, QoQ = Quarter-on-Quarter, YoY = Year-on-Year, NSA = not seasonally adjusted, SA = seasonally adjusted.

*Note:* U.K. domestic monetary policy surprises cannot be constructed for the period 1993-1997.

## Appendix 2. Additional Regression Details

**Table A1: Sweden, 1996-2005**  
**Response to Domestic Surprises, Conditional on Inclusion of Foreign Surprises**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Monetary Policy</b>	<b>1.02</b> (0.07)	-0.02 (0.04)	0.20 (0.14)
<b>CPI</b>	<b>1.96</b> (0.45)	0.21 (0.27)	0.72 (0.76)
<b>Core CPI</b>	<b>2.09</b> (0.47)	-0.49 (0.42)	-0.21 (0.89)
<b>Real GDP</b>	<b>1.25</b> (0.48)	0.11 (0.44)	0.62 (0.72)
<b>Industrial Production</b>	-0.29 (0.65)	-0.00 (0.27)	-0.68 (0.64)
<b>PPI</b>	0.53 (0.46)	-0.40 (0.27)	-0.01 (0.42)
<b>Retail Sales</b>	0.12 (0.29)	-0.40 (0.19)	0.74 (0.45)
<b>Unemp. Rate</b>	<b>-0.55</b> (0.27)	<b>-0.62</b> (0.22)	0.05 (0.48)
<b>Constant</b>	<b>-0.23</b> (0.11)	-0.13 (0.07)	-0.26 (0.15)
<b># Obs.</b>	1627	1530	1529
<b>R<sup>2</sup></b>	0.11	0.02	0.02

**Table A2: United Kingdom, 1993-1997**  
**Response to Domestic Surprises, Conditional on Inclusion of Foreign Surprises**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Average</b>	<b>3.00</b>	-0.09
<b>Earnings</b>	(1.08)	(0.84)
<b>Real</b>	1.94	<b>1.79</b>
<b>GDP</b>	(1.12)	(0.91)
<b>Manufacturing</b>	0.98	0.50
<b>Production</b>	(0.71)	(0.82)
<b>Producer</b>	<b>2.48</b>	1.79
<b>Price Index</b>	(0.75)	(0.94)
<b>Retail</b>	<b>3.10</b>	<b>2.56</b>
<b>Price Index</b>	(0.86)	(0.85)
<b>Core Retail</b>	-0.44	-3.37
<b>Price Index</b>	(1.90)	(2.40)
<b>Retail</b>	<b>2.87</b>	-0.44
<b>Sales</b>	(0.91)	(0.90)
<b>Constant</b>	-0.26	0.03
	(0.17)	(0.18)
<b># Obs.</b>	1853	1866
<b>R<sup>2</sup></b>	0.03	0.01

**Table A3: United Kingdom, 1999-2005**  
**Response to Domestic Surprises, Conditional on Inclusion of Foreign Surprises**

	<b>One-Year Nominal Rate</b>	<b>Long-Term Forward Real Rate</b>	<b>Long-Term Forward Inflation Compensation</b>
<b>Monetary Policy</b>	<b>0.59</b> (0.13)	0.02 (0.05)	-0.11 (0.08)
<b>Average Earnings</b>	<b>1.58</b> (0.44)	-0.13 (0.24)	-0.24 (0.30)
<b>GDP (Prelim.)</b>	<b>2.41</b> (0.53)	0.08 (0.44)	-0.25 (1.08)
<b>Manufacturing Production</b>	<b>1.33</b> (0.44)	0.55 (0.35)	-0.87 (0.52)
<b>PPI (Input)</b>	0.04 (0.42)	0.41 (0.26)	-0.21 (0.34)
<b>Retail Price Index</b>	-0.657 (1.01)	1.12 (0.85)	0.24 (0.71)
<b>Core Retail Price Index</b>	<b>2.65</b> (0.58)	-0.63 (0.45)	<b>-1.06</b> (0.51)
<b>Retail Sales</b>	<b>1.46</b> (0.46)	0.17 (0.32)	<b>-1.24</b> (0.48)
<b>Constant</b>	<b>0.31</b> (0.14)	0.08 (0.09)	0.04 (0.14)
<b># Obs.</b>	964	964	964
<b>R<sup>2</sup></b>	0.19	0.05	0.04

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