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What Moves Sovereign Bond Markets? The Effects of Economic News on U.S. and German Yields

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Economic announcements are an important source of information, containing news that spills over internationally across markets, affecting yields. An analysis of the U.S. and German sovereign bond markets finds that the largest moves in yields are associated with U.S. announcements on labor market conditions, real GDP growth, and consumer sentiment.

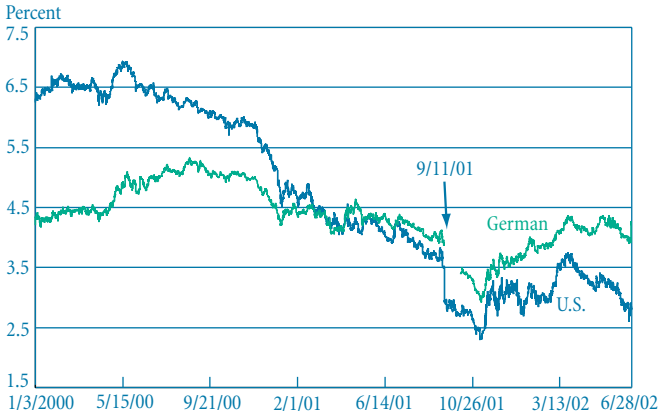
Financial market observers perceive substantial interdependence between the U.S. and European markets. Sovereign debt yields in these markets, for example, display a high degree of correlation. The yields appear to move in tandem in response to economic announcements that are followed closely by participants in both markets.

Accordingly, the financial press has emphasized the relationship between economic announcements and yields on U.S. and European sovereign, or country-issued, debt instruments. Announcements can affect yields by offering market participants insight into economic fundamentals and shaping their expectations of central banks' future monetary policy decisions. In efficient markets, economic releases should influence yields insofar as they provide unanticipated information about economic activity. Nevertheless, because of variations in the timeliness, relevance, and reliability of such information, announcements can affect yields differently across international markets and asset maturities.

In this edition of *Current Issues*, we examine how the news contained in economic announcements—the surprises that could move markets—influences market yields. Specifically, we consider how U.S., German, and euro-area news affects hourly changes in sovereign debt yields for the United States and Germany. Our analysis uses thirty months of hourly yield data, as reported by Reuters, for the on-the-run U.S. and German two- and ten-year notes from January 3, 2000, to June 28, 2002.[1] (Yields on the two-year notes are depicted in Chart 1.) Our emphasis on this recent period and our introduction of the important dimension of news spillover across markets enable us to extend the existing research on the securities markets and on the effects of economic announcements.

We find that economic announcements are indeed an important source of market information. The announcements found to account for the biggest moves in yields in both the U.S. Treasury and German sovereign bond markets are the U.S. news releases on payrolls, the unemployment rate, and initial unemployment claims, as well as U.S.

Chart 1
U.S. and German Two-Year Note Yields
January 2000–June 2002



Source: Reuters.

Notes: The data span 14,787 hourly observations. They exclude weekends and common U.S. and German holidays as well as September 11-14, 2001. There are sporadic missing hourly observations associated with the technologies used to capture the data from Reuters.

news on advance readings of real GDP and on reports of consumer sentiment. However, we also find that the effects of the news are not identical across the yield curve or across international assets. U.S. economic news, for example, has a significant effect on yields in the U.S. Treasury and German bond markets. Both the short and long ends of the yield curve in these markets respond to many U.S. announcements, with stronger effects occurring at the short end. Conversely, although U.S. news has made a strong contribution to German yields, similar news from the euro area has shown little effect on U.S. Treasury yields in recent years.

Methodology

The methodology behind our analysis has its origin in a number of important published studies of bond market activity. Fleming (1997) and Fleming and Remolona (1997) provide an informative review of the research in this area, much of which examines daily data from the U.S. Treasury market. A study by Balduzzi, Elton, and Green (2001) considers the effects of U.S. announcements on U.S. yield outcomes between 1991 and 1995. Additional research, such as Kuttner (2001) and Ehrmann and Fratzscher (2002), focuses on monetary policy considerations, while other studies use higher frequency data—at hourly or five-minute intervals—and concentrate either on bond markets (Fleming and Remolona 1999) or on foreign exchange markets (Andersen et al. 2003).

The Balduzzi, Elton, and Green paper is the closest conceptual predecessor to our analysis. Like those authors, we construct the news component of economic data releases by measuring the difference between the actual numbers announced in the releases and the numbers expected by the markets.[2] The U.S., German, and euro-area economic data releases that we examine appear in Table 1. For data on market expectations, we rely on median responses from weekly surveys of market participants conducted by Money Market Services, a division of Standard & Poor's.

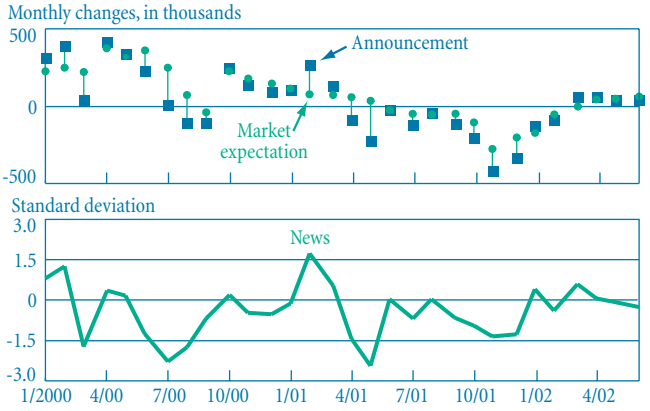
This concept of economic news is illustrated in Chart 2, which plots announcements and market expectations relating to U.S. nonfarm payroll data in the top panel and the news component of the announcements in the bottom panel. The announcements report the change in nonfarm payroll employment on a month-to-month basis as calculated by the U.S. Department of Labor's Bureau of Labor Statistics. As the chart's top panel reveals, for much of 2000 and the early part

Table 1
U.S., German, and Euro-Area Economic Data Releases

U.S. Releases	German Releases
U.S. monthly data	Current account
Business inventories	Employment
Capacity utilization	Final cost of living
Chicago PMI	GDP
Civilian unemployment rate	Import prices
Construction spending	Industrial production
Consumer confidence	Manufacturing orders
CPI	Manufacturing output
CPI excluding food and energy	PPI
Durable goods orders	Retail sales
Factory orders	Trade balance
Housing starts	Wholesale price index
Index of leading indicators	
Industrial production	**Euro-Area Releases**
Michigan sentiment, final	Business confidence
Michigan sentiment, preliminary	Composite index
NAPM	Consumer confidence
New home sales	CPI excluding food, energy, and tobacco
Nonfarm payrolls	CPI flash estimate
Personal consumption expenditures	GDP, preliminary
PPI	Harmonized CPI
Retail sales	Industrial production
U.S. quarterly data	Purchasing managers index
Employment cost index	Retail sales
Real GDP, advance	
Real GDP, final	
Real GDP, preliminary	
Other U.S. data	
Federal funds rate	
Initial claims	

Source: Money Market Services.

Chart 2
U.S. Nonfarm Payrolls: Announcements, Market Expectations, and News
January 2000–June 2002



Source: Money Market Services.

of 2001, these announcements were positive numbers, indicating that nonfarm payroll employment was increasing. These figures turned decidedly negative for most of 2001, indicating month-to-month declines in employment, and flattened out into early 2002. The top panel also presents the results of the Money Market Services survey of market expectations for each of the pending payroll data releases. For much of this period, survey participants expected payroll numbers to be stronger than they actually were. This expectation is reflected in the news series, presented in the chart's bottom panel as the vertical distance between these indicators at the release date divided by the standard deviation of nonfarm payrolls relative to expectations over the thirty months from January 2000 to June 2002.

Our analysis focuses on the extent to which hourly changes in U.S. and German two- and ten-year note yields are driven by economic news and how this news spills over across markets. Accordingly, we make certain assumptions about the timing of news effects. Announcements that occur exactly on the hour, such as at 10 a.m., are matched against yield changes over the course of the next hour, 10 a.m. to 11 a.m. Releases made within the hour, such as at 10:30, are also compared with yield changes over the hour, or from 10 a.m. to 11 a.m. in our example. This assumption implies that intra-hourly announcements have a shorter interval over which to influence contemporaneous yield changes. We do not expect these assumptions to affect our findings significantly because most of the price activity derived from the announcements occurs within fifteen to twenty minutes of the event.[3]

How Economic News Affects U.S. and German Yields

Table 2 presents our main results for U.S. and German two- and ten-year note yields over the January 2000-June 2002 period. Overall, the results suggest that the quantitative effects of news vary considerably along the yield curve and across markets. Generally, however, the findings are consistent with the expectation that yields will rise on signs of stronger economic conditions or faster-than-anticipated inflation. The largest effects on both the U.S. and German sovereign bond yields are associated with labor market news, advance readings of real GDP, and reports of consumer sentiment. Moreover, U.S. economic news was found to affect German yields within one hour of release. Expected inflation also remains a key focal point for fixed-income investors: news associated with price level indicators significantly affected yields in both markets.

U.S. Treasury Yields

Several observations can be made about the U.S. Treasury market's reaction to economic news. A sizable number of U.S. announcements spurred changes in two- and ten-year note yields over the period, generally with quantitatively larger effects on the short end of the yield curve. When announcements signaled stronger-than-expected U.S. economic conditions, yields on two- and ten-year notes tended to rise, and they fell with weaker-than-expected news.

Announcements on labor market conditions, output, and consumer confidence had the strongest effects on yield changes. News of consumer and producer prices, although significant, had smaller effects. Specifically, yields rose following announcements of larger-than-expected real GDP advance numbers, payrolls, and employment cost indexes. They also responded very positively to news of consumer sentiment surveys, producer surveys such as NAPM (the National Association of Purchasing Management's national index) and Chicago PMI (the Chicago Purchasing Managers' Index), and retail sales figures. Conversely, announcements of larger-than-expected unemployment rates and weekly unemployment claims caused yields to decline. Yields displayed a mixed response to price indicators, rising with reports of larger-than-expected PPI (producer price index) figures but falling with news of larger-than-expected CPI (consumer price index) numbers.

We obtained our strongest results in the U.S. Treasury market from the payroll and real GDP advance releases, which reflected moves of more than 3 basis points in two-year yields for every one-standard-deviation surprise in the announcement. Surprises of this magnitude in the Michigan and Conference Board consumer confidence surveys, the

Table 2
Statistically Significant News Variables for U.S. and German Yields
January 2000–June 2002

	Effects on Hourly Changes in U.S. Yields		Effects on Hourly Changes in German Yields	
News Variable	Two-Year Note	Ten-Year Note	Two-Year Note	Ten-Year Note
United States				
Chicago PMI	+0.026***	+0.014***	—	+0.006***
Consumer confidence	+0.026***	+0.020***	+0.016***	+0.009***
CPI	-0.008*	—	+0.007***	—
CPI excluding food and energy	—	+0.007**	—	+0.003*
Durable goods orders	—	—	—	+0.003*
Employment cost index	+0.027***	+0.012**	—	-0.006**
Federal funds rate	—	-0.021***	—	—
Housing starts	+0.007*	—	+0.006**	+0.003**
Industrial production	—	—	—	+0.009***
Initial claims	-0.013***	-0.005***	-0.004***	-0.004***
Michigan sentiment, final	+0.014***	+0.010***	+0.006**	+0.005***
Michigan sentiment, preliminary	+0.029***	+0.021***	+0.012***	+0.008***
NAPM	+0.028***	+0.027***	+0.014***	+0.015***
New home sales	+0.014***	+0.011***	—	+0.006***
Nonfarm payrolls	+0.034***	+0.025***	+0.017***	+0.011***
Producer price index	+0.011***	+0.013***	+0.005*	+0.007***
Real GDP, advance	+0.031***	+0.025***	+0.014***	+0.014***
Real GDP, final	—	—	+0.007*	—
Retail sales	+0.027***	+0.014***	+0.014***	+0.008***
Unemployment	-0.026***	-0.026***	-0.015***	-0.008***
Germany				
Current account	—	—	-0.007*	—
Manufacturers orders	—	-0.004*	—	—
Manufacturers output	—	—	—	-0.006*
Producer price index	—	—	—	+0.004**
Retail sales	+0.009*	—	—	—
Trade balance	—	—	—	-0.004*
Euro area				
Business confidence	—	—	-0.007**	—
CPI flash estimate	—	-0.010**	+0.012**	—
GDP, preliminary	—	—	+0.011***	—
Degrees of freedom	14,264	14,264	14,263	14,263

Source: Authors' calculations.

Notes: Regressions using German data are missing observations for the two weeks following September 11, 2001. Although we include all news variables of each grouping in the regressions, we report only the coefficients and significance levels for those variables that were statistically significant in the regressions.

*** Statistically significant at the 1 percent level.

** Statistically significant at the 5 percent level.

* Statistically significant at the 10 percent level.

employment cost index, the purchasing managers' surveys, retail sales, and the unemployment rate explained moves of more than 2 basis points in two-year yields and moves of at least 1 basis point in ten-year yields. Surprises in the producer price index had a larger impact on yields than did surprises in the consumer price index.

Most German economic news did not have a large direct influence on U.S. yields. At the short end of the yield curve,

only German retail sales had a statistically important effect. For ten-year U.S. notes, the only euro-area news that mattered was the flash estimate of euro-area CPI—an early estimate of CPI based on partial information on price developments—and the reports of German manufacturing orders.[4]

German Yields

The effects of economic news on German note yields are also striking over the January 2000-June 2002 period. Most notably, German two- and ten-year yields were more responsive to U.S. economic news than they were to euro-area or German news. The U.S. announcements moving German yields were mostly the same ones driving U.S. yields. However, the basis-point responses of German note yields typically were smaller.

German yields declined when unexpectedly low values emerged for U.S. consumer prices, durable goods orders, housing starts, industrial production, Michigan sentiment indexes, payroll reports, real GDP advance numbers, and sales figures. Surprisingly large values for the U.S. unemployment report, the employment cost index, and initial unemployment claims were associated with significant German rate declines. Unanticipated changes in the U.S. federal funds rate did not statistically influence German note yields over this period.

Interestingly, some of the German data releases closely followed by market participants, such as German GDP, industrial production, and employment statistics, did not significantly influence German bond yields. Announcements of smaller-than-expected surpluses or larger-than-expected deficits in the German current account and trade balance were associated with rising yields at the short and long ends of the yield curve. Higher-than-expected German output and lower-than-expected producer price inflation were associated with lower long-term yields. The euro-area announcements significantly influencing German short yields were the measures of business confidence, GDP advance numbers, and the flash estimate of euro-area CPI.[5]

A Federal Funds Rate Paradox?

A particularly noteworthy finding in the U.S. Treasury market is that surprise changes in the federal funds rate were associated with statistically significant movements *in the opposite direction* in ten-year Treasury yields.

This directional disconnect in the expected sign of federal funds rate announcements on longer term yields supports a relationship documented in earlier studies: higher-than-expected federal funds rates have been linked to declines in U.S. yields. One interpretation of this relationship is that the negative sign may reflect the degree to which expectations for monetary policy are incrementally incorporated into financial asset prices. Thornton (1998) argues that a short-run tightening in the federal funds rate may be associated with current declines in long-term yields if markets consequently view long-run inflation-reduction efforts as more credible. Another interpretation is that the yield curve's response to a change in policy rates can be complex and inconsistent, depending on how the market weights the action's implications for future inflation or longer term growth.

Regardless of the interpretation adopted, the overall effects of federal funds rate changes are likely to be stronger than the effects of the pure news components of these announcements as we have measured them. Over the January 2000-June 2002 period, there were relatively few discrepancies between consensus survey expectations and policy announcements,[6] likely resulting from the fact that Federal Reserve policy decisions are at least partially formulated using some of the same economic news that market participants follow. Expectations for monetary policy decisions are thus incrementally incorporated into financial asset prices as news is received. As documented by Kohn and Sack (2003), statements by the Federal Open Market Committee (FOMC) and congressional testimony by Federal Reserve Chairman Greenspan also affect market interest rates significantly, indicating that central bank "talk" conveys important information to the markets.

These considerations highlight a limitation of the news variable that we construct for the federal funds rate. For our analysis period, the measured news component was frequently zero, suggesting that markets often correctly anticipated FOMC rate decisions. The quantitative surprise aspect of rate changes measured by news may be less important to the markets than either the resolution of uncertainty over the outcome of the FOMC meeting or the commentary in the committee's accompanying statement and the speeches of Federal Reserve Bank governors. Furthermore, market observers may also be paying attention to more qualitative aspects communicated along with the policy itself, such as the tone of the statement surrounding the policy decision and the perceived balance of risks in the economy, previously presented in FOMC statements as a policy bias or tilt. Our measure of news in the federal funds rate unavoidably misses these dimensions.

Understanding the Influence of U.S. Data on European Bond Yields

It is striking that the U.S. economic data releases had a greater effect on German two- and ten-year yields than

many German releases did. Few German economic series proved to be statistically significant for German yield changes, while a much larger number of the U.S. series were significant and many had more statistically robust effects on yields. These results broadly hold true for the euro-area releases.

What accounts for the observed relationship between U.S. news and German yields? One might argue that the perception of the United States as the engine of global economic growth has increased in recent years, with the result that U.S. economic fundamentals have taken on a high degree of importance for business and investment activity around the world and for multinational balance sheets. Moreover, the influence of U.S. economic news may be even stronger in a globalized world economy in which business cycles across major industrialized countries have become increasingly synchronized,[7] leading to greater integration and news spillovers across financial markets.

The business-cycle linkages between the United States and Europe suggest that U.S. and European yields may be responding to similar macroeconomic conditions and to similar—although not identical—policy responses in both regions. Our January 2000-June 2002 study period covers the end of the 2000 monetary tightening cycles in the United States and Europe as well as the initiation of easing cycles in 2001. In addition to the concurrent easing cycles in response to waning economic growth, there were parallel fiscal developments in the United States and Europe, such as an increase in government debt issuance.

Another factor that may help account for the influence of U.S. news releases on German yields is the fact that U.S. data releases have typically come out earlier than the releases from individual euro-area countries.[8] Moreover, because of the additional time required to compile information from all twelve euro-area nations, the U.S. releases have also come out ahead of the "harmonized" euro-area data. The European Monetary Union and Eurostat are addressing the challenges of measuring economic performance and achieving timely compilation and reporting of these data. For now, however, market participants interpret the harmonized statistics in the context of the euro-area data's short history, extract the news that has not been included in the country-specific releases, and also look to the signals contained in U.S. data.

With time, the relative importance attached to euro-area data releases, U.S. releases, and the releases of individual euro-area nations may change, both in European debt markets and in European Central Bank (ECB) policymaking. In the 2000-2002 period examined here, market participants were learning to interpret euro-specific economic data and policy signals from the ECB. As experience with the ECB policy framework accumulates, the significance of euro-area data releases relative to national data releases may increase (Ehrmann and Fratzscher 2002). Future analysis will determine if the euro-area data do indeed assume greater importance as determinants of European yields. It may also reveal whether further experience with the ECB framework will heighten the influence of euro-area data releases relative to the influence of U.S. economic announcements.

Conclusion

Economic announcements are a vital source of information for market participants, containing important news that spills over internationally across markets. Many U.S. announcements, for example, significantly affect yields in the German note markets. In fact, U.S. economic news is found to have a direct and large effect on German yields within an hour of its release. This strong effect on interest rates confirms a very high degree of interdependence between the U.S. and European financial markets. German and euro-area economic announcements, however, are far less influential for yields in the U.S. Treasury market.

The direction of the effects of economic announcements supports the market expectation that yields will rise on signs of stronger economic conditions or faster-than-anticipated inflation. The largest effects found in both the U.S. and German markets are associated with labor market news on payrolls, the unemployment rate, and initial unemployment claims, as well as with advance readings of real GDP and reports of consumer sentiment.

Finally, although we emphasize the importance of economic announcements, we recognize that many yield changes are unrelated to economic news and past movements in market yields. Indeed, as Fleming and Lopez (1999) document, large movements in two- and ten-year Treasury yields often appear to occur during the Treasury market's inactive hours and do not seem to be associated with the release dates of key economic data. In addition, although German yields demonstrate their largest movements during the morning hours of the European trading session, these moves are not definitively associated with certain days of the week or dominated by specific release dates. Economic announcements are thus only one source of information for these markets.

Notes

1. Indications are captured hourly between 0:00 and 23:00 eastern standard time for these markets.

2. We then normalize this difference by its standard deviation over our thirty-month horizon in order to study releases in comparable units.

3. This phenomenon is described by Balduzzi, Elton, and Green (2001) for the bond markets and by Andersen et al. (2003) for the foreign exchange markets.

4. Indeed, although the U.S. economic announcements were jointly statistically significant for U.S. yields, tests rejected joint statistical significance of the German or euro-area announcements.

5. A one-standard-deviation surprise in this series accounted for moves of just a fraction of 1 basis point for German two-year yields.

6. Research on the U.S. markets by Kuttner (2001) concludes that only the surprise component of the federal funds rate influences market interest rates. This research uses an alternative definition of surprises, and such definitions could be associated with different regression results.

7. For a discussion of this theme, see Kose, Otrok, and Whiteman (forthcoming). For an interesting analysis of European business cycles and Germany's position in these cycles, see Artis (2003).

8. A time line of announcement histories appears in Andersen et al. (2003).

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