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# Journal of International Financial Markets, Institutions & Money

journal homepage: [www.elsevier.com/locate/intfin](http://www.elsevier.com/locate/intfin)

## The sign switch effect of macroeconomic news in foreign exchange markets

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### ARTICLE INFO

#### Article history:

Received 22 October 2015

Accepted 5 July 2016

Available online xxxx

#### JEL classification:

F31

F4

G1

#### Keywords:

Financial crisis

Exchange rates

US dollar

Macroeconomic news

High-frequency data

### ABSTRACT

We examine an unusual episode in the behavior of the euro, pound and yen exchange rate markets when the dollar appreciated (depreciated) against the three major currencies, in response to unfavorable (favorable) US growth news during the global financial crisis. Contrary to the previous findings, we show that, for each currency pair, only a small subset (about a third) of the most significant macro news effects reversed sign, primarily announcements regarding consumption, credit, labor and housing markets. Our results reveal that announcement chronology within a month matters, in that specifically the earliest releases within an indicator category exhibit sign asymmetry.

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## 1. Introduction

Standard models of exchange rate determination predict that positive (negative) growth news tend to appreciate (depreciate) the value of a country's currency. However, the opposite can also occur, appreciating (depreciating) the exchange rate in response to unfavorable (favorable) growth news, if for example, investors' risk aversion is sufficiently large. Such an unusual behavior of exchange rates has recently occurred during the global financial crisis (Fratzscher, 2009). Using a high frequency dataset of the three major currency pairs (euro-dollar, pound-dollar, yen-dollar), we provide the first *intraday* analysis of the composition and sources of the sign switch in the exchange-rate response to news coefficients during this period. Contrary to the previous findings which rely on daily returns, we show that, for each currency pair, only a subset (about a third) of the macro indicators' effects reversed sign beginning in 2008, in particular announcements relating to housing, credit and labor markets, which were at the epicenter of the financial crisis. The sign switch effect we document is prevalent in all three markets, yet weaker in the yen-dollar currency pair.

We estimate the conditional mean response of 5-min returns between 2005 and 2012 following Andersen et al. (2003, 2007) and show that the news coefficient sign reversal is strongest for the consumer confidence, consumer price index (CPI), new home sales, housing starts, initial claims, non-farm payroll employment and Fed funds rate announcements,

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which are the earliest releases within a month containing information about consumption, real-estate, labor and credit markets. These results indicate a context-specific change in investors' reaction to news and reveal that announcement chronology within an indicator category matters for the sign switch effect to take place. Typically those announcements in a given month that are the earliest releases within an indicator category, which contain *incremental* information about consumption, real-estate and labor markets reveal sign asymmetry. Our results suggest that, given the sources and evolution of risk during the 2008–2009 financial crisis, investors rationally paid more attention to the signals in the earliest, most informative releases related to consumption, housing, credit and employment to collect new information about the potential changes in the relevant market risks. We also explore various sources of macronews parameter instability suggested by the foreign exchange literature and find that fluctuations in aggregate risk levels, carry trade returns and the Federal Reserve Bank's (Fed) interest rate policy explain most of the variation in news response coefficients.

Many papers have investigated the impact of macroeconomic news on exchange rate markets. However, the literature has not reached a clear consensus on whether the exchange rate return reaction to news varies over time. For example, Andersen et al. (2007), Faust et al. (2007) and Goldberg and Grisse (2013) suggest that time-variation is not a first order issue in foreign exchange rate markets (unlike bond or stock markets) whereas Fratzscher (2009) and Fatum et al. (2010) show that exchange rate reaction to news depends on economic conditions. Bauwens et al. (2005) examine the intraday volatility impact of macroeconomic news, but their dataset is limited in scope including a 26 week period in 2001, which makes it difficult to study time-variance in news effects. Given these mixed results and the limited sample periods used in previous empirical analyses, we contribute to the literature by testing the time-variance in news effects during a more recent and extensive period, which includes the global financial crisis when the risk conditions were significantly elevated.

Perhaps most relevant to our study is the analysis by Fratzscher (2009). Similar to our paper, Fratzscher (2009) explores the behavior of the US dollar during the global financial crisis. However, the focus of Fratzscher (2009) is not the reaction of exchange rates to macroeconomic announcements per se. Rather, it provides an explanation to the general depreciation trend in the global currencies vis-à-vis the US dollar during the crisis by concentrating on the cross-sectional determinants such as countries' foreign exchange (FX) reserves, current account positions and financial exposure vis-à-vis the United States. As a side result, the study also reports that there has been an across the board reversal in the direction of the daily exchange rate reaction to macroeconomic news between July 2008 and January 2009.

In our paper, we take this result a step further and analyze the announcement effects during the entire crisis period using high-frequency exchange rate returns. Contrary to the findings in Fratzscher (2009), however, we show that only a selective group of announcements' coefficients reversed sign during the crisis, primarily news related to housing, credit and labor markets indicating the context-specific nature of the sign switch effect. The difference in our findings largely stems from the window over which we calculate the exchange rate returns.

We use intraday returns because intraday data are more appropriate for investigating announcement effects in currency markets. The advantage of using high frequency exchange rate dataset is that it helps capture the *pure* announcement effects. Earlier analyses that rely on daily FX returns may miss the variation in news response coefficients given the rapid response of exchange rate returns to news. Previous literature shows that the conditional mean adjustments of exchange rates to macroeconomic news occur quickly, within a few minutes following the news announcement, effectively amounting to jumps (Andersen et al., 2003, 2007). Therefore, in markets where return reaction to announcements is rapid (as in FX markets), the use of wider (daily) return windows may contaminate the announcement effects since longer intervals may include other events as well. This would reduce the public signal to noise ratio and introduce bias in the daily news response coefficients. To mitigate this bias, many studies in the FX literature use high-frequency data to examine the announcement effects (e.g. Andersen et al., 2003; Andersen et al., 2007; Bauwens et al., 2005; Faust et al., 2007; Goldberg and Grisse, 2013; Fatum et al., 2010).

In addition, the analysis in Fratzscher (2009) spans the period between 1994 and January 2009, hence does not cover the entire crisis period. According to the NBER, the economic contraction that began with the US financial crisis lasted until the end of June 2009. Therefore, although the sample period in Fratzscher (2009) is longer than ours, it is not enough to investigate the crisis episode fully as it lacks 6 months of the crisis period. Since our paper's focus and contribution is the investigation of the unusual sign reversal in news effects that took place in major currency markets during the US financial crisis, including the entire crisis episode in the investigation is critical for our analysis.

To explore the possible sources of the change in news coefficient signs over our sample period, we consider various explanations for time-variant news effects suggested by the literature. Specifically, we examine the importance of the changes in (1) economic conditions, (2) central bank interest rate policies and (3) aggregate risk levels. As noted previously in the literature, the 2008 global financial crisis is directly related to the US monetary conditions and the fluctuations in risk aversion and uncertainty (Bekaert et al., 2012; Bruno and Shin, 2013; Miranda-Agrippino and Rey, 2012). There are different channels through which risk can affect the behavior of news response coefficients. The first channel involves the fluctuations in the risk premium associated with holding non-US dollar currency assets (Faust et al., 2007) and investors turning to safe, low-return US dollar denominated assets in response to the sharp increase in economic uncertainty (McCauley and McGuire, 2009; Gourinchas et al., 2010). Considering the US role as the global insurer in the international monetary system, investors' flight to quality due to an increase in risk aversion is likely to result in a reversal of the relationship between the macronews and exchange rates during crisis times, in that bad (good) US growth news signal even worse (better) global growth prospects, which impact other countries' currencies more negatively (positively) than the US dollar, and hence appreciate (depreciate) the dollar.

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