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Information arrivals and intraday exchange rate volatility

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Abstract

This paper investigates the link between information arrivals and intraday DEM/$ volatility. Information arrivals are measured by the numbers of news items that appeared in the Reuters News Service. We separate news stories into different categories and find that total headline news counts, US and German macroeconomic news and German Bundesbank monetary policy news all have a significant impact on intraday DEM/$ volatility. The larger quantitative effects of the German Bundesbank monetary policy news and US macroeconomic news at 15-min intervals are consistent with the findings of a two-stage adjustment process of public information arrivals [Fleming and Remolona, J. Finance (1999) 1901]. Our results suggest that the persistent of intraday exchange rate volatility set off by public information is extended by traders' private information about 15 min later. The conclusions are obtained from ARCH models that incorporate intraday seasonal volatility terms.
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1. Introduction

The link between information arrivals and the variation of asset prices is an important issue in finance. Mitchell and Mulherin (1994) use daily news numbers, reported by Dow Jones on the Broadtape, to examine the link between news arrivals and stock prices. Their results show that there is a significant relationship between information arrivals and trading volumes, but only a weak link with stock returns. Berry and Howe (1994) count the numbers of news items released by Reuters News Service as their information proxies, which include not only political but also economic announcements circulated by major news vendors. They find a positive relationship between information arrival and trading volume, but an insignificant relationship with stock price volatility.

This paper contributes to the accumulating empirical literature addressing similar issues using exchange rate data. There is already an extensive literature that focuses on currency volatility using ARCH related models (Hsieh, 1988; Gallant et al., 1991; Bollerslev et al., 1992). These studies show that ARCH models can capture the clustering of volatility seen in time series of exchange rates. One explanation for time-varying conditional variance is that returns are generated by a mixture of distributions, in which information arrivals are the mixing variables (Diebold, 1986; Taylor, 1986; Lamoureux and Lastrapes, 1990; Gallant et al., 1991; Goodhart et al., 1993; Bollerslev and Domowitz, 1993). These studies have suggested that autocorrelation in information arrivals leads to the serial dependency in conditional volatility that is captured by the ARCH model.

Since mixing variables are generally unobservable, proxies of information arrivals have been used in the literature. Lamoureux and Lastrapes (1990) choose transaction volume as their information proxy. Locke and Sayers (1993) test a series of information proxies such as volume, floor transactions, number of price changes and executed order imbalance on S&P-500 futures contracts. They find some evidence of remaining variance persistence regardless of the definition of the rate of information proxy. Goodhart et al. (1993) use dummy variables to test the effect of US trade figure and UK base rate changes on tick by tick Dollar–Sterling exchange rates. They find these news variables have a significant effect on volatility changes and including them in the conditional variance equation reduces the variance persistence. Bollerslev and Domowitz (1993) test other intraday information proxies such as quote frequency and changes in the bid-ask spread. Their results show that conditional volatility is increasing in the size of the spread, but quote frequency has a negligible effect on conditional volatility. Moreover, including an information proxy did not change many of the other parameters of the GARCH (1, 1) specification.

Our interpretation of information arrivals parallels that used in independent work by Low and Muthuswamy (1995), Melvin and Yin (2000). Low and Muthuswamy use the number of news items reported in Reuters News pages as information proxies and discuss the relationship between these variables and DEM/$ and JPY/$ intraday volatility. However, they do not adjust for intraday volatility seasonality which could influence their results. Melvin and Yin (2000) study the relationship between

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