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**Working Paper**

## The impact of U.S. central bank communication on European and Pacific equity markets

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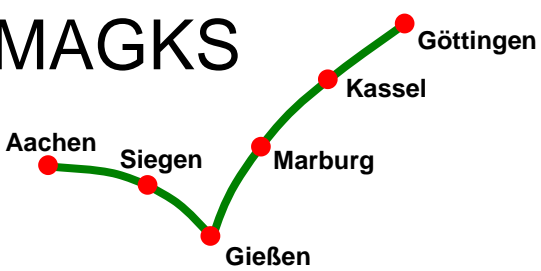
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# **The Impact of U.S. Central Bank Communication on European and Pacific Equity Markets**

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## **The Impact of U.S. Central Bank Communication on European and Pacific Equity Markets**

### **Abstract**

We examine the effects of federal funds target rate changes and all types of FOMC communication on European and Pacific equity market returns using a GARCH model. We show that both types of news have a significant statistical and economic impact, but that the effects are not symmetric: target rate changes exert a larger influence, although several communication variables are statistically significant. Third, Pacific markets react more strongly than do European markets to FOMC news, whereas the latter are influenced by a greater variety of communications.

JEL: E52, G14, G15

Keywords: Central Bank Communication, International Equity Markets, Federal Reserve Bank, U.S. Monetary Policy

## 1. Introduction

The importance of the United States in international capital markets suggests that news about Fed monetary policy will influence stock markets around the world. We concentrate our analysis on major equity markets in Europe and the Pacific region as these have strong trade and financial relations with the United States. U.S. financial markets adjust not only to monetary policy actions but also to informal channels of communication by Federal Open Market Committee (FOMC) members (Ehrmann and Fratzscher, 2007). Consequently, other developed equity markets could be expected to undergo adjustments after U.S. monetary policy communications. For example, Nikkinen et al. (2006) demonstrate that European and Asian countries are closely integrated with respect to U.S. macroeconomic news.

Some influential studies show that U.S. monetary policy actions affect international equity markets, including those in Europe and Asia. For instance, Conover et al. (1999) find that foreign stock returns are higher in expansionary U.S. and local monetary environments. Kim (2003) shows that scheduled U.S. macroeconomic announcements elicit significant first and second moment influences on returns in Australia, Hong Kong, and Singapore. Hausman and Wongswan (2006) document the influence of U.S. monetary policy surprises on foreign equity indices in 49 countries, finding that a 25 bps cut is associated with a 1 percent increase in foreign equity markets. Ehrmann and Fratzscher (2006) analyze 50 equity markets and find that returns fall by around 3.8 percentage points in response to a 100 basis point tightening of U.S. monetary policy. An important shortcoming of these studies, however, is that their analyses do not include all types of FOMC communications and hence may underestimate the true effects of U.S. monetary policy on international equity markets and investor wealth.

Our approach is unique in that we analyze the effect of *all types of FOMC communications* regarding monetary policy and economic outlook on European and Pacific equity markets returns. We examine a rich combination of FOMC news, including post-meeting statements, monetary policy reports, speeches, and testimonies, on the basis of its written content. Econometrically, we employ a pooled GARCH model with country-specific fixed effects. We address three questions: (1) Do U.S. monetary policy actions and communications affect international equity market returns? (2) What types of communication matter most? and (3) Are European markets affected differently than Pacific markets?

## 2. Data and Econometric Methodology

We use the data set introduced by Hayo et al. (2008), which contains 663 speeches and 151 congressional hearings by FOMC members, as well as 68 post-meeting statements and 20

monetary policy reports (MPR). The communications are coded as being either related to monetary policy or economic outlook, allowing for possible asymmetric reactions of financial markets. Coding of the dummy variables for the U.S. economic outlook communications is either “positive” (EO+) or “negative” (EO–), whereas “tightening” (MP+) or “easing” (MP–) are the categories for monetary policy communications. There are 16 communication dummies as each type of communication (statements, MPR, testimonies, speeches) can be coded into four different categories (EO+, EO–, MP+, MP–).

Our equity market indicator comprises daily closing returns on stock exchanges in 23 countries for the period January, 2 1998 to December, 29 2006. The sample consists of 16 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom) and seven Pacific countries (Australia, Hong Kong, Japan, Korea, New Zealand, Singapore, and Taiwan). Returns are computed by taking first differences of daily stock price indices in logarithms. Using a panel framework increases the number of observations for each type of news and improves estimation efficiency; however, such a framework also means assuming equal coefficients across countries and a common error structure, which are potentially problematic.

Descriptive statistics show that the equity market series exhibit volatility clustering (Engle, 1982). As per Equation (1), we start with a general autoregressive-distributed lag GARCH(1,1) specification (Bollerslev, 1986) simplified by a consistent testing-down process.

$$\begin{aligned}
 \text{returns}_t &= \gamma + \sum_{r=1}^6 \delta_r \text{ control variables}_{t-r} + \zeta \text{ Country Dummies} + \eta \text{ ID9/11} \\
 &+ \sum_{r=-1}^1 \theta_r \text{ FFTR Changes}_{t-r} + \sum_{r=-1}^1 \iota_r \text{ Communication Dummies}_{t-r} + \lambda h_t + \mu_t, \\
 (1) \quad \mu_t &= \varepsilon_t h_t^{1/2}, \\
 h_t &= \alpha_0 + \alpha_1 (\mu_{t-1} - \kappa_1)^2 + \kappa_2 \tau (\mu_{t-1} - \kappa_1)^2 + \beta_1 h_{t-1}, \\
 \tau &= 1 \text{ if } \mu_{t-1} < \kappa_1 \text{ and zero otherwise.}
 \end{aligned}$$

where  $\alpha_0, \alpha_1, \beta_1, \mu, \kappa_1, \kappa_2, \gamma, \delta, \zeta, \eta, \theta, \iota$ , and  $\lambda$  are parameters or vectors of parameters,  $\tau$  is an indicator function as defined in the last line above, and  $\varepsilon_t | \Gamma_{t-1} = t(v)$ .  $\Gamma_{t-1}$  captures all information up to  $t-1$ , and  $t(v)$  is a  $t$ -distribution with  $v$  degrees of freedom.

The vector of controls contains lagged returns, S&P 500 returns, changes in the 10-year U.S. government bond, growth rates of the U.S. dollar effective exchange rate, and

dummies for country-specific effects and September, 11 2001.<sup>1</sup> Contemporaneous U.S. market returns are excluded to avoid simultaneity problems. The GARCH model allows for several special features: student-t distributed errors, variance in the main equation, asymmetric effects of shocks, and asymmetry thresholds.

Federal funds target rate changes (split into hikes, cuts, and inter-meeting cuts) and FOMC communication dummies are included as three-day windows to control for persistence, time zone, and expectation effects. The variables enter the equation on the day the news actually reaches the respective market (and with one lead/one lag). Asymmetric adjustments across European and Pacific equity markets are captured by separate coefficients for each region on lagged returns, financial market control variables, and FOMC communication indicators.

### 3. Empirical Analyses

Starting from this comprehensive GARCH(1,1) specification, we exclude all insignificant variables in a general-to-specific testing-down approach at a 1 percent level of significance. The remaining variables are reported in Table 1. Regarding the controls, last period's negative forecast errors have a larger impact on current volatility of the equity market indicator than do positive ones. In times of high volatility, investors move out of the stock markets. Weak efficiency is violated and U.S. stock returns exert strong positive spill-over effects on the markets in both regions, this being a significantly larger influence on the Pacific ones.

Among target rate change variables, only rate cuts matter, particularly those announced at unscheduled meetings. Pacific returns rise by 2.4 percentage points on one day after an unscheduled 100 bps cut, whereas, and unexpectedly, European returns decrease after cuts announced at scheduled meetings. Statements conveying a bright EO drive Pacific returns up by 11 bps. MPR news affects only European markets, which are depressed by hiking inclinations (−54 bps); positive news about the real economy raises returns over two days by 48 bps.

Testimonies exert significant influence in both regions: MP+ news depresses European markets (−31 bps). Mentioning a rate cut increases (decreases) Pacific (European) returns one day later by 55 bps (−139 bps). A lagged negative EO reduces Pacific returns (63 bps), while both markets go up after bright EO news. Statistically, there is no difference in impact between the European and Pacific markets (20 vs. 33 bps).

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<sup>1</sup> Germany is used as a base category for the country dummies. Data sources: Thomson Datastream for stock market data; Federal Reserve statistical releases H.10 and H.15 for U.S. FX and bond data.

Speeches by BOG members cause adjustments in both markets. European markets decline by 44 bps over two days after indications of future rate hikes, significantly more than Pacific markets (18 bps). Speeches communicating a positive EO move European markets up by 13 bps one day later.

Table 1: Explaining equity market returns

	Europe	Pacific
Constant Term	0.00085	
Conditional Variance in Mean	-1.59774	
Asymmetry	0.00173	
Threshold	0.02698	
Returns $t-1$	-0.06928	-0.02239
Returns $t-2$	-0.02434	-0.02615
Returns $t-5$	-0.02456	
S&P 500 $t-1$	0.28561	0.32484
S&P 500 $t-2$	0.02858	0.03079
S&P 500 $t-3$	0.02805	0.04952
S&P 500 $t-4$		0.02027
Broad Effective U.S. Exchange Rate $t-1$		-0.07921
Portugal	-0.00043	
United Kingdom	-0.00051	
Australia		-0.00064
New Zealand		-0.00051
9/11	-0.07297	-0.09971
Federal Funds Target Rate Cut $t-1$	-0.00781	
Federal Funds Target Rate Inter-Meeting Cut		0.02404
Statement EO $+t$		0.00111
MPR MP $+t$	-0.0054	
MPR EO $+t+1$	0.00224	
MPR EO $+t$	0.00251	
Testimony MP $+t$	-0.00307	
Testimony MP $-t$	-0.0139	
Testimony MP $-t-1$		0.00549
Testimony EO $+t+1$	0.00202	0.00325
Testimony EO $-t-1$		-0.00634
Speech MP $+t$	-0.00138	-0.00178
Speech MP $+t-1$	-0.00304	
Speech EO $+t-1$	0.00128	

Notes: All coefficients are significant at a 1% level. Standard errors are heteroscedasticity-consistent. Number of observations: 51,497; 23 countries and 2,239 days. Full tables available on request.

All types of MP news have statistically the same impact on European markets, but news about the future of the economy is more important when communicated in a MPR than



when it is given in testimonies and speeches. In Pacific markets, this relationship is reversed as the less formal congressional hearings exert a larger impact than post-meeting statements. A final set of tests compares the influence of MP and EO news: for European markets and speeches, we find significantly stronger reactions to MP news.

#### **4. Conclusions**

We examine the effects of FOMC communications and federal funds target rate changes on European and Pacific equity market returns using a rich GARCH panel specification with country-specific fixed effects. Target rate changes and central bank communication have a significant statistical and economic impact on international equity market returns. The effect of the former is larger, but several types of communication are also significant. Testimonies affect both Pacific and European markets, whereas speeches and monetary policy reports primarily impact European markets. In general, European markets are influenced by a greater variety of communications, whereas the economic reaction is larger in Pacific countries. *Why* these markets react so differently to U.S. monetary policy news is not yet clear and would be an interesting subject of further research. Such research should take into consideration our finding that including all types of FOMC communication is crucial to capturing the entire effect of U.S. monetary policy actions on international equity markets.

These results are robust. The homogeneity assumption underlying the pooling approach is supported and the separation into European and Pacific markets is valid. Including national target rate variables in our model to control for changes in domestic monetary policies does not change our main results. Accounting for the impact of a country's real (financial) integration with the United States yields no additional insight, nor does controlling for its monetary regime.

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