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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 U.S. 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 impact, but that the effects are not symmetric: although several communication variables are statistically significant, target rate changes have an economically more important impact. European markets are influenced by a greater variety of FOMC communications than Pacific markets.

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 (U.S.) 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 U.S. Financial markets in the U.S. 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.

A number of studies report 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 is that they do not consider forms of FOMC communications other than interest rate decisions and hence may underestimate the total 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 congressional hearings, on the basis of its written content. Econometrically, we employ a pooled GARCH model with country-specific fixed effects. We address two questions: (1) Do U.S. monetary policy actions and communications affect European and Pacific equity market returns? (2) 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 Board of Governors (BOG) members, as well as 68 post-meeting statements and 20 monetary policy reports.¹ The communications are coded as being either related to monetary policy or to economic outlook, allowing for possible asymmetric reactions of financial markets.² Coding of the dummy variables for the U.S. economic outlook communications is either “positive” (EO+) or “negative” (EO–), whereas “tightening” (MP+) and “easing” (MP–) are the categories for monetary policy communications.³ There are 16 communication dummies as each type of communication (statement, monetary policy report, testimony, speech) 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 mature European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom) and seven mature 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 implies assuming equal coefficients across countries and a common error structure, which are potentially problematic.

Descriptive statistics (not reported here) show that the pooled equity market series exhibits volatility clustering (Engle, 1982; Bollerslev, 1986). We start the empirical modeling with a general autoregressive-distributed lag GARCH(1,1) specification, which we simplify by applying a consistent testing-down process.

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

¹ Hayo et al. (2008) also provide data for speeches by regional Fed presidents. Their results show that presidents' speeches do not have any systematic influence on U.S. financial market returns. Therefore, we omit these communications from our analysis.

² For example, Ehrmann and Fratzscher (2004) provide evidence for an asymmetric reaction of the U.S. equity market to positive and negative target rate surprises.

³ As in Hayo et al. (2008), neutral speeches are coded as non-events.

where α_0 , α_1 , β_1 , μ , κ_1 , κ_2 , γ , δ , ζ , η , θ , ι , and λ are parameters or vectors of parameters, τ is an indicator function as defined in the last line above, $\varepsilon_t|\Gamma_{t-1} = t(v)$. Γ_{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, and growth rates of the U.S. dollar effective exchange rate, as well as dummies for country-specific effects and 9/11.⁴ 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 mean equation, asymmetric effects of shocks, and asymmetry thresholds.

Federal funds target rate changes (split into expected hikes, expected cuts, surprise hikes, and surprise cuts)⁵ and FOMC communication dummies are included on the day the news actually reaches the respective market. 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)⁶ specification, we exclude all insignificant variables in a general-to-specific testing-down approach at a 1 percent level of significance.⁷ The remaining variables are reported in Table 1.⁸ 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. Significant lagged returns suggest that weak market 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 countries ($\text{Chi}^2(1) = 47.7$).

Among target rate change variables, only rate cut surprises matter: Pacific returns rise by 2.9 percentage points after an unexpected 100 bps cut, whereas European returns increase by slightly less (2.6 percentage points). Statements conveying a bright EO drive both

⁴ Data sources: Thomson Datastream for stock market data; Federal Reserve statistical releases H.10 and H.15 for U.S. FX and bond data.

⁵ Bloomberg surveys are used to identify surprises from scheduled meetings. Inter-meeting moves are naturally classified as surprises.

⁶ The final GARCH(1,1) model is sufficient to remove ARCH effects in the residuals: $F(2,51437) = 0.11$.

⁷ We find evidence for country-specific fixed effects as a statistical test fails to exclude these from Equation (1) ($\text{Chi}^2(22) = 48.3$).

⁸ Preliminary analysis suggests that standard errors are not affected by clustering at the country level.

European and Pacific returns up by 15 bps.⁹ Monetary policy report news affects only European markets, which are depressed by hiking inclinations (−39 bps).

Congressional hearings exert a significant influence in both regions: MP+ news depresses European markets (−53 bps). Mentioning a rate cut increases (decreases) Pacific (European) returns one day later by 59 bps (−159 bps).¹⁰ A negative EO reduces Pacific returns (50 bps), while European markets go up after bright EO news (20 bps). Speeches by BOG members cause adjustments in European markets only, which decline by 22 bps after indications of a future rate hike. A positive EO moves European equity markets up by 8 bps.

Table 1: Explaining equity market returns

	Europe	Pacific
Asymmetry		0.00129
Threshold		0.01822
Conditional Variance in Mean		-5.84168
Returns $t-1$	-0.07083	-0.02639
Returns $t-2$	-0.02979	-0.03978
Returns $t-3$	-0.02448	
Returns $t-5$	-0.03177	
S&P 500 $t-1$	0.28895	0.34512
S&P 500 $t-2$		0.03768
S&P 500 $t-3$	0.02861	0.06906
S&P 500 $t-4$		0.02740
9/11	-0.08025	-0.10884
Federal Funds Target Rate Cut Surprise	0.02607	0.02879
Statement EO +	0.00151	0.00153
Monetary Policy Report MP +	-0.00386	
Testimony MP +	-0.00526	
Testimony MP −	-0.01589	0.00588
Testimony EO +	0.00196	
Testimony EO −		-0.00500
Speech MP +	-0.00220	
Speech EO +	0.00077	

Notes: Standard errors are heteroscedasticity-consistent. Number of observations: 51,497; 23 countries and 2,239 days. Country fixed effects are included in the model. Only the variables of interest of the reduced model resulting from the testing-down process ($\text{Chi}^2(59) = 84.4$) are listed. Full tables are available on request. EO = Economic Outlook and MP = Monetary Policy.

⁹ In either case, the difference between both regions is statistically insignificant (Federal Funds Target Rate Cut Surprise: $\text{Chi}^2(1) = 0.05$; Statement EO +: $\text{Chi}^2(1) = 0.0004$).

¹⁰ The reaction on European markets is counterintuitive, as we would expect equity returns to rise after an inclination of a target rate cut.

Finally, for European markets, we find significantly stronger reactions to MP news than to EO news ($\text{Chi}^2(1) = 8.4$ for testimonies and $\text{Chi}^2(1) = 12.6$ for speeches, respectively).

4. Conclusions

We examine the effects of FOMC communications and U.S. 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 European and Pacific equity market returns. The effect of the former is larger in absolute terms, but several types of communication are also significant. Moreover, informal communication takes place more frequently than interest rate changes. Post-meeting statements and testimonies affect both Pacific and European markets, whereas speeches and monetary policy reports primarily induce adjustments on European markets. In general, European equity markets are influenced by a greater variety of communication types than Pacific ones. The finding that European markets react significantly stronger to monetary policy news than to economic outlook news suggests that for these markets the expected interest rate spillovers are relatively more important than effects arising out of the U.S. business cycle.

Why these two groups of markets react so differently to U.S. monetary policy news is not yet clear and would be an interesting topic for 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. One potential explanation why the reactions are different has something to do with time zone differences. Trading on European markets overlaps by a few hours with that on U.S. markets; there is virtually no overlap, however, when it comes to U.S. and Pacific markets. Therefore, there is a time lag (mostly overnight) before the Pacific markets are affected. Our results suggest that the impact of news (partly) vanishes overnight as Pacific markets do not react to the same extent as European markets.

Interestingly, U.S. monetary policy affects international equity markets more systematically than the domestic market. In the latter, post-meeting statements, monetary policy reports, congressional hearings, and speeches have no impact on S&P 500 returns, another finding worthy of further research.

The results shown in Table 1 are robust. The homogeneity assumption underlying the pooling approach is supported and the separation into European and Pacific markets is statistically valid. Including national target rate variables in our model to control for changes

in domestic monetary policy 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 the country's monetary regime.

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