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Abstract

This paper examines the spillover impacts of the U.S. Fed's and the European Central Bank (ECB)'s target interest rate news on the first two moments of the Asia-Pacific exchange rates against the US dollar and the euro over the period 1999-2006. The spillover effects on the mean are generally consistent with the literature where a majority of currencies depreciates against the USD and the EUR in response to unexpected rate rises. Both the Fed and the ECB news elicited tardy or persisting volatility responses. The Fed's news tends to send a leading signal upon the upcoming decision of the ECB, while the ECB's news tends to confirm the Fed's decision. This relationship between the news tends to help reduce volatility in the Asia-Pacific currency markets.

Keywords: Target interest rate surprises; News effects; Spillover effects; U.S. Fed; ECB; Asia Pacific; Exchange rates

JEL classification codes: E44; G14; G15

1. Introduction

The spillover effects of the news content in one central bank's target interest rate announcement on financial markets in other countries have been extensively explored. Considering the leadership role played by the U.S. market, any new information upon the Fed's interest rate policies would have both direct and indirect influences on other markets around the world. The indirect effect is via the influence of the U.S. market movements resulting from the news on the other markets. To the extent that the U.S. market responds significantly to the Fed's news and that the markets in other countries look to the U.S. for market momentum, there is potential for the Fed's news to be significantly priced in other markets. [1]

The direct effect of the Fed's news can be examined by investigating the extent to which markets in other countries respond to the news. While this direct impact has been examined extensively on equity markets,[2] there is only a handful of studies on the exchange rates, for instance, Andersen et al. (2003) and Ehrmann and Fratzscher (2005) show that the U.S.'s and the euro area's (and German's news before 1999) macroeconomic news have a significant impact on the U.S. dollar-euro exchange rate; Faust and Rogers (2003) report a "delayed overshooting" effects of the Fed's news on the British pound and German mark; and Lobo et al. (2006) report that changes in the Fed's interest rate target are positively related to changes in the value of the dollar, and also provide evidence for the asymmetric impact of the Fed's news where unexpected rate rises have a larger effect than unexpected rate cuts for the pound, mark, and Canadian dollar, whereas the opposite is true for the Japanese yen.

However, the current literature does not include the investigation of the Fed's news spillover effects on the volatility on the currency markets. This is a significant oversight because the news does not only affect the direction of market movements but also the trading environment and hence the level of volatility. Another oversight in the literature is the lack of investigation of the spillover effects of the European Central Bank's (ECB) interest rate news to other financial markets.[3] Given the increasing prominence of the euro area countries not only as a trade partner but also as the provider of financial services to other countries[4], there is a strong potential for spillover impacts of the ECB's news on markets in the other regions.

In this paper, we aim to fill these gaps and provide comprehensive evidence on the existence and the nature of the transmission of both the Fed's and the ECB's policy interest rate news on the first two moments of exchange rates of the Asia-Pacific's currencies against the U.S. dollar (USD) and the euro (EUR) for the period from January 1999 (since the introduction of the ECB) to December 2006. The key findings of this paper are summarized as follows. First, in general, we reveal that the spillover effects of the Fed's and the ECB's news on the Asia-Pacific currencies are generally consistent with the interest rate parity condition and arbitrage argument, where a majority of currencies depreciate against the USD and the EUR in response to an unexpected hike in the Fed's and ECB's target rates. Second,

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[1] The literature has provided ample evidence for the information leadership of the U.S. market in the Asia-Pacific (see, *inter alia*, Arshanapalli et al., 1995; Liu et al., 1998; Liu and Pan, 1997; Janakiramanan and Lamba, 1998; Ghosh et al, 1999; Ng, 2000; Miyakoshi, 2003; Kim, 2003, 2005; Phylaktis and Ravazzolo, 2005).

[2] See, for example, Wongswan (2006, 2008), Ehrmann and Fratzscher (2006), Bernanke and Kuttner (2005), Bonfim (2003), Kuttner (2001), Bernanke and Blinder (1992) on the Fed's spillover effects.

[3] Except for Ehrmann and Fratzscher (2005) who examine the ECB's effect on the first moment of the U.S. dollar-euro exchange rate only.

[4] The growing bilateral flows of trade and financial investments between the euro area and the Asia-Pacific region evidenced by the fact that the EU is the largest trading partner for most of Asia-Pacific economies (see http://ec.europa.eu/trade/issues/bilateral/data.htm).

unexpected hikes in the Fed's and the ECB's target rates reduced volatility in most of examined currency pairs. Fourth, even though the ECB's interest rate decisions may have been influenced by those of the Fed, the ECB's news was also important informational provider in the Asia-Pacific region. The Fed's news seems to send a leading signal upon the upcoming decision of the ECB, while the ECB's news tends to confirm the Fed's decision. This relationship between the two news helps to reduce volatility in the Asia-Pacific exchange rates.

The rest of the paper is organized as follows. Section 2 discusses data requirements and the empirical modeling issues are discussed in Section 3. Section 4 reports and analyzes the estimation results, and Section 5 concludes the paper.

2. Data

2.1. Target interest rates

The target interest rates of the two central banks were obtained from their respective websites.[5] Panel A of table 1 reports the breakdown of target rate announcements into rate rises, rate falls and unchanged subcomponents. From January 1999 to December 2006, the Fed and the ECB made 69 and 131 target rate announcements, respectively. Of these, the Fed had 19 announcements with rate changes (13 rate rises and 6 cuts) and 50 with no changes; and the ECB had 21 announcements of the target rate changes (13 rises and 8 cuts) and 110 announcements with no changes. Thus, most of the interest rate announcements contained no change (72% for the Fed and 84% for the ECB).

As the focus of the paper is on the news spillover impact, properly modeling the news component of the announcements is very crucial. Most of earlier studies on the Fed's news employed surveys of market participants on the expectations of the target Fed funds rate as a proxy of expected target rate announcement (e.g. Reinhart and Simin, 1997). However, recent studies have instead relied more on price-based proxies. Following the finding of Krueger and Kuttner (1996) and Gürkaynak et al (2002) that the Fed funds futures rate is the best predictor of the Fed's target rate change, Kuttner (2001) propose a breakthrough method using the Fed funds futures rates to separate the target rate changes into anticipated and unanticipated components.

The early literature on the ECB's news employed price-based proxies to gauge the market expectations on the ECB's target rate announcements. However, the choice of market instruments differs across researchers. Gaspar et al (2001) use EONIA[6] to gauge the probability attached to a change in the ECB's key interest rates before the governing council's meeting. Perez-Quiros and Sicilia (2002) propose a principal components approach that utilizes the daily changes of different money market interest rates including the EONIA, the one-week, one-, two- and three-month EONIA swap rates, and the closest three-month EURIBOR futures rates. Their approach is to extract the key common component that shapes the evolution in all the above rates. Würtz (2003) measures the interest rate change expectations from the forward rate implied by the one- and two-month EONIA swap rates. However, due to the high volatility and the impacts of liquidity considerations rather than the monetary policy considerations as identified by Bindseil (2002) in underbidding scenarios, it seems that the EONIA is not the best proxy for the market expectation on the ECB's upcoming interest rate announcements. Recently, Ehrmann and Fratzscher (2005) utilize the

[5] These data are available at http://www.federalreserve.gov/FOMC/#calendars for the Fed, and http://www.ecb.int/press/pr/activities/mopo/html/index.en.html?skey=decisions for the ECB

[6] Euro OverNight Index Average, the effective overnight reference rate for the Euro.

means of the Reuters's survey of 25-30 market participants conducted on the Friday before each meeting of the ECB as a proxy for the market expectations upon the upcoming interest rate decision. More importantly, Bernoth and Von Hagen (2004) find that the three-month EURIBOR futures rate is an unbiased predictor of the euro area policy rate changes. Thus, the literature seems to suggest that a market-based approach using futures rates would provide us with the market's unbiased expectation on the upcoming interest rate announcements.

In this paper, for consistency, we employ Kuttner (2001)'s methodology to generate the unexpected part of the two central banks' target rate announcements. We use the current-month Fed funds futures contracts traded on the Chicago Board of Trade (CBOT) to extract the Fed's news, and the three-month EURIBOR futures contracts traded on the EUREX market for the ECB's surprises.[7]

The news component of the Fed's target rate announcement on day *d* of month *m* can be derived from the implied change in the price of the futures contract. Since the Fed funds futures settlement price is based on the monthly average of the spot Fed funds rate, it is necessary to account for the number of days affected by the announcement in that particular month as in equation (1). On the other hand, the three-month EURIBOR futures settlement price is based on the reference interest rate (EURIBOR) for three-month euro term deposits on the last trading day, and so the news component of the ECB's target interest rate announcement is calculated as in equation (1) without the scaling factor $D/(D-d)$.

$$\Delta i^{u} = \frac{D}{D-d}\left(f^{0}_{m,d} - f^{0}_{m,d-1}\right) \qquad (1)$$

where:

Δi^{u} is the unexpected target rate changes;

$f^{0}_{m,\,d}$ is the current month Fed funds futures rate for the Fed and three-month EURIBOR futures rate for the ECB;

$f^{0}_{m,\,d-1}$ is the futures rate as of the day prior to the announcement;

D is the number of days in the month; and

$D-d$ is the number of days in the month affected by the announcement.

Panel B of table 1 reports the summary statistics for the interest rate news series. While 35% of the Fed's interest rate announcements were correctly anticipated by the U.S. market, the euro zone market correctly expected only 26% of the ECB's interest rate announcements. Whereas more negative surprises then positive surprises were observed for the ECB's interest rate announcements (44% compared with 31%), in general the Fed's interest rate announcements had more positive than negative surprises (36% relative to 29%). On average, the Fed's and the ECB's change announcements are lower than the market's expectation (-0.0639 and -0.0050 percent, respectively). The variance of the ECB's news is much lower than that of the Fed's (0.0009 and 0.1027 respectively). The news series demonstrate strong evidence of negative skewness for the ECB and positive skewness for the Fed. Furthermore, the two series exhibit leptokurtosis.

[7] Although the 1-month EONIA Futures and the 1-month EURIBOR Futures (FEU1) are better proxies, the former was introduced only on January 27, 2003, and the latter was delisted on March 16, 2004, hence they are not practical for our study.

Table 1 - Descriptive statistics

This table reports descriptive statistics for the U.S. Fed's and the ECB's target interest rate announcements (Panel A), the surprise components (Panel B), and the Asia-Pacific exchange rates changes (Panel C) for the period from January 1999 to December 2006.

Panel A. Target interest rate announcements

	Fed fund target rate announcements				ECB target rate announcemtns			
	Total	**Rate rise**	**Rate cut**	**No change**	**Total**	**Rate rise**	**Rate cut**	**No change**
No. of announcements	69	13	6	50	131	13	8	110
Proportions	(100%)	(19%)	(9%)	(72%)	(100%)	(10%)	(6%)	(84%)

Panel B. Target interest rate surprises

	Fed fund rate surprises				ECB policy surprises			
	Total	**Positive suprises**	**Negative surprises**	**No surprise**	**Total**	**Positive suprises**	**Negative surprises**	**No surprise**
No. of observations	69	25	20	24	131	40	57	34
Proportions	(100%)	(36%)	(29%)	(35%)	(100%)	(31%)	(44%)	(26%)
Summary statistics								
Mean	-0.0639	0.0994	-0.3447		-0.0050	0.0223	-0.0270	
Variance	0.1027	0.0075	0.2349		0.0009	0.0006	0.0007	
Skewness	-3.5799	0.8090	-1.8831		-0.2408	3.9062	-2.1255	
Excess Kurtosis	18.6141	2.1375	6.4368		10.3984	20.5803	7.3462	
Min	-1.9140	0.0055	-1.9140		-0.1300	0.0100	-0.1300	
Max	0.2760	0.2760	-0.0050		0.1500	0.1500	-0.0100	

Note: The number of surprises shown in Panel B is different from the actual rate change announcements for both central banks. This is because even when there was no rate change announcement, markets might have expected a rate rise or fall and so the surprise component is non zero.

Table 1 - Descriptive statistics (Continued)

Panel C. Exchange rates changes

Panel C1. Asia-Pacific currencies/USD

	AUDUSD			IDRUSD			JPYUSD			KRWUSD		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**
No. of observations	2085	2085	2085	1389	1389	1389	2085	2085	2085	1387	1387	1387
Mean	0.0123	-0.0053	0.0174	-0.0004	-0.0358	0.0345	-0.0021	-0.0051	0.0033	0.0230	-0.0155	0.0383
Std. deviation	0.6689	0.1001	0.6689	0.6189	0.3078	0.6423	0.6234	0.1380	0.6129	0.4352	0.2916	0.4684
Skewness	-0.2541	1.2086	-0.2908	-0.4591	-0.7082	-0.0586	0.0790	-0.9661	0.0283	-0.1637	-0.4850	0.0104
Kurtosis	1.1072	29.2856	1.1536	10.5740	16.2073	11.3461	2.0907	63.2502	2.1054	2.8074	6.6423	2.7025
Jarque-Bera	128.94	75015.51	145.07	6519.80	15318.61	7456.68	381.91	347875.11	385.55	461.68	2604.19	422.41
Ljung-Box Q test												
Return	24.2256	52.3656 ***	22.0267	54.7285 ***	565.6338	89.2077 ***	26.7803	76.7875 ***	15.0313	18.1890	583.3748 ***	123.5925 ***
P-Value	{0.2327}	{0.0001}	{0.3391}	{0.0000}	{0.0000}	{0.0000}	{0.1416}	{0.0000}	{0.7746}	{0.5750}	{0.0000}	{0.0000}
Volatility	171.9142 ***	133.5441 ***	161.8804 ***	348.3105 ***	243.6084	343.5190 ***	108.2925 ***	83.9396 ***	82.9997 ***	32.4102 **	787.8080 ***	191.1708 ***
P-Value	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0391}	{0.0000}	{0.0000}

	NZDUSD			PHPUSD			TWDUSD		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**
No. of observations	2085	2085	2085	1824	1824	1824	1894	1894	1894
Mean	0.0137	-0.0046	0.0184	-0.0112	0.0065	-0.0174	-0.0013	-0.0088	0.0075
Std. deviation	0.7307	0.1170	0.7285	0.4574	0.3886	0.5121	0.2624	0.2075	0.2739
Skewness	-0.2613	0.1256	-0.2874	3.0975	-10.9757	6.5923	0.1598	-1.9780	0.2985
Kurtosis	0.9667	16.0833	0.9798	48.7117	300.0882	122.0836	10.4079	34.7862	7.1881
Jarque-Bera	104.90	22477.62	112.16	183251.43	6880643.28	1146573.95	8556.72	96730.43	4107.86
Ljung-Box Q test									
Return	18.8665	15.4074	19.6633	38.5794 ***	27.1940	50.9597 ***	35.4462 **	1134.0070	547.5142 ***
P-Value	{0.5305}	{0.7526}	{0.4792}	{0.0075}	{0.1299}	{0.0002}	{0.0179}	{0.0000}	{0.0000}
Volatility	152.7418 ***	365.7286 ***	144.3772 ***	207.1359 ***	0.3103	8.3327	167.2696 ***	23.4800	77.2777 ***
P-Value	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{1.0000}	{0.9894}	{0.0000}	{0.2658}	{0.0000}

Note: Data starting dates: IDRUSD (3/9/2001), KRWUSD (5/9/2001), PHPUSD (3/1/2000), and TWDUSD (27/9/1999). All the others are from Jan 1999.
*, **, *** denotes significance at 10%, 5%, and 1%, respectively.

Table 1 - Descriptive statistics (Continued)

Panel C2. Asia-Pacific currencies/EUR

	AUDEUR			IDREUR			JPYEUR			KRWEUR		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**
No. of observations	2085	2085	2085	1158	1158	1158	2085	2085	2085	1044	1044	1044
Mean	0.0065	0.0083	-0.0018	-0.0247	-0.0114	-0.0137	-0.0083	-0.0021	-0.0063	-0.0039	0.0013	-0.0050
Std. deviation	0.6562	0.1663	0.6448	0.7415	0.1967	0.7598	0.7103	0.1676	0.7017	0.6899	0.1257	0.6944
Skewness	-0.2843	3.0794	-0.3781	-0.2498	3.0067	-0.2197	0.0241	2.3067	0.0265	-0.0323	5.8225	-0.0972
Kurtosis	2.3828	51.4306	2.2789	1.9437	42.7844	1.8160	2.8565	77.0702	2.9400	0.4781	112.8419	0.8352
Jarque-Bera	521.33	233089.02	501.08	194.32	90066.75	168.58	709.04	517869.81	751.52	11.09	613417.19	35.08
Ljung-Box Q test												
Return	26.2149	89.7700 ***	26.3863	37.3231 **	132.2189 ***	34.8255 **	20.1226	74.7475 ***	19.3987	75.0859 ***	28.7313 *	75.2980 ***
P-Value	{0.1588}	{0.0000}	{0.1534}	{0.0107}	{0.0000}	{0.0211}	{0.4503}	{0.0000}	{0.4961}	{0.0000}	{0.0932}	{0.0000}
Volatility	148.7215 ***	219.7319 ***	122.4143 ***	83.2778 ***	176.2092 ***	83.9080 ***	413.4854 ***	39.7125 ***	390.5683 ***	67.6846 ***	3.0316	45.4879 ***
P-Value	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{0.0000}	{1.0000}	{0.0009}

	NZDEUR			PHPEUR			TWDEUR			USDEUR		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**
No. of observations	2085	2085	2085	1248	1248	1248	1894	1894	1894	2085	2085	2085
Mean	0.0084	0.0135	-0.0056	-0.0288	0.0156	-0.0440	-0.0136	-0.0107	-0.0030	-0.0058	0.0135	-0.0191
Std. deviation	0.7180	0.1678	0.7062	0.7147	0.4488	0.6593	0.6653	0.2086	0.6648	0.6466	0.1727	0.6412
Skewness	-0.1966	4.0705	-0.3008	0.0214	-0.6624	0.1071	-0.0344	-4.9031	-0.0093	0.0087	2.9856	0.0039
Kurtosis	1.9779	45.3494	1.7585	4.1668	15.8595	3.2035	0.8974	206.6283	1.3437	0.6837	52.0275	0.5180
Jarque-Bera	353.32	184422.15	300.24	902.92	13170.56	536.46	63.93	3376956.73	142.58	40.63	238256.46	23.32
Ljung-Box Q test												
Return	29.7838 *	33.9982 **	23.6223	62.8212 ***	44.2079 ***	32.3721 **	47.5402 **	168.8278 ***	31.8769 **	30.4478 *	68.9403	23.1548
P-Value	{0.0734}	{0.0261}	{0.2593}	{0.0000}	{0.0014}	{0.0395}	{0.0005}	{0.0000}	{0.0446}	{0.0629}	{0.0000}	{0.2813}
Volatility	139.7547 ***	27.0443	114.5481 ***	182.4217 ***	25.4370	17.3729	100.0221 ***	5.1628	46.1953 ***	119.6057 ***	166.4617	89.7571 ***
P-Value	{0.0000}	{0.1340}	{0.0000}	{0.0000}	{0.1852}	{0.6286}	{0.0000}	{0.9996}	{0.0008}	{0.0000}	{0.2658}	{0.0000}

Note: Data starting dates: IDREUR (23/7/2002), KRWEUR (12/8/2002), PHPEUR (19/3/2002), and TWDEUR (10/02/2000). All the others are from Jan 1999.
*, **, *** denotes significance at 10%, 5%, and 1%, respectively.

2.2. Exchange rates

Our choice of sample is based on data availability. We obtained from Bloomberg daily open and close spot foreign exchange rates for seven Asia-Pacific currencies (Australian dollar (AUD), New Zealand dollar (NZD), Japanese yen (JPY), Korean won (KRW), the Pilipino peso (PHP), Indonesian rupiahs (IDR), and Taiwanese dollar (TWD)) against the USD and the EUR for the period from January 1999 to December 2006.[8] The sample exchange rates were indirectly quoted as 1 unit of Asia-Pacific currencies equals x units of the USD or the EUR.[9] Therefore, if the USD or the EUR is strengthening (i.e., appreciating) then the exchange rate number decreases.

Daily open and closing prices allow us to conduct intradaily investigations of the interest rate news spillover effects. We construct one overall daily horizon (Horizon 0) which is then decomposed into two sub-horizons, overnight (H1) and intradaily (H2). The daily horizon (H0) is from market close of day *t-1* to day *t* enveloping the Fed's news on calendar day *t*, which is the focus of the previous studies. The overnight horizon (H1) is from the close of day *t-1* to the open on day *t* and this captures the first reaction to the Fed's and the ECB's news. The intraday horizon (H2) is from opening of day t to closing of day t and this captures any delayed reactions during the next trading day in Asia-Pacific local markets.[10]

Panel C of table 1 reports the summary statistics of the exchange rates changes over the three horizons. There are significant differences across the three time horizons in various aspects. The USD exchange rates show negative returns over H1 and positive returns over H2 in all cases except for the PHPUSD. For H0 there is a mix of positive and negative returns (4 and 3). For exchange rates against the EUR, in most cases except for the AUDEUR and NZDEUR pairs, the series have negative means during the daily (H0) and intraday (H2) horizons, while more positive means are observed overnight (H1). Noticeably, in three cases the series have all negative means over all three horizons (IDREUR, JPYEUR, and TWDEUR).

In all cases, the return volatility measured by the standard errors is significantly lower during the overnight than during the other horizons. AUDUSD and NZDUSD show negative skewness over H0 and H2 and positive skewness over H1, while the reverse is true for JPYUSD, PHPUSD and TWDUSD pairs. The return series of exchange rates against the EUR are negatively skewed over the daily and intraday horizons for four pairs of AUDEUR, IDREUR, KRWEUR and NZDEUR, and positively skewed overnight, while the reverse is true for PHPEUR. JPYEUR shows positive skewness in all three time horizons while the reverse is observed in TWDEUR. In general, the series exhibit leptokurtosis.

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[8] Due to data limitation, we were able to collect daily open and close data for the full sample period for AUD, NZD and JPY exchange rates against the USD and the EUR only. The others have different starting dates as noticed in Table 1. As a robustness check, we also investigate the Fed's and the ECB's news effect on the mean and volatility of the USDEUR pair. Consistent with Ehrmann and Fratzscher (2005), we find that an unexpected hike in the Fed's target interest rate causes an appreciation of the USD against the EUR and lower volatility overnight, while the ECB's news did not have any significant impact on the exchange rate.

[9] From Asia-Pacific markets' perspective, under indirect quotation convention the home currency is the base (unit) currency while the USD or the EUR is the term (price) currency.

[10] Since both the U.S. Fed's and ECB's target interest rate announcements are made when the Asia-Pacific markets are closed, the earliest market reaction on the news can be captured at market opening at one calendar day after the announcement.

3. Empirical methodology

The financial econometric literature shows that the GARCH family of models is well-suited to modeling daily financial returns series, which are characterized as skewed, leptokurtic and non-normally distributed with time-varying second moments as shown in Table 1 for the variables used in this investigation. We employ the EGARCH(1,1) methodology to model these returns series, as a parsimonious specification often outperforms more profligate ones and the exponential specification allows negative coefficients in the conditional variance equation that has an important implication in this study. This methodology also enables us to measure the news and the spillover effects on both the conditional mean and variance of daily returns.

We start with the baseline univariate EGARCH(1,1) model and then progress to specific modeling of the interest rate news effects in various forms of the Fed's and the ECB's news on the Asia-Pacific currencies. The baseline EGARCH(1,1) model employed in our study is described by the conditional mean and the conditional variance equations (2a) and (2b) shown below.

$$y_t = \alpha_c + \alpha_{Lag}\, y_{t-1} + \alpha_{Hol} Mon_t + \varepsilon_t \tag{2a}$$

$$\ln h_t = \beta_c + \beta_h \ln h_{t-1} + \beta_{\varepsilon 1} \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \beta_{\varepsilon 2} \frac{|\varepsilon_{t-1}|}{\sqrt{h_{t-1}}} + \beta_{Hol} Mon_t \tag{2b}$$

The conditional mean equation for the returns (y_t) is expressed as a function of past returns as well as Monday effect (*Mon*) in relevant markets. The conditional variance equation for the returns in the financial market series (h_t) is expressed as a function of the one period lag of the variance, Monday effect (*Mon*), and the residuals. The Monday effect variable takes the value of one for Monday and zero otherwise to control for the weekend where more intense information flows might show up after a period of market closure.[11]

To investigate the spillover impacts of the Fed's and the ECB's news on the Asia-Pacific currencies' returns and volatilities, we extend the baseline model with an overall news variable for the Fed and the ECB, $News_t$ ($FedNews_t$ for the Fed and $ECBNews_t$ for the ECB separately). We lag the $News_t$ variable by one period to account for the time difference between the U.S. and European and the Asia-Pacific trading hours.

In addition, in the course of a trading day, apart from monetary policy news, other macroeconomic announcements from the U.S.'s and the euro area's agencies might hit financial markets. Therefore, financial markets would also be influenced by these macro

[11] The baseline model's results are summarized here to save space. In general, the Monday dummy tends to reduce changes in the exchange rates against the USD, while it significantly increases changes in the exchange rates against the EUR mostly overnight. In the conditional variance equations, the lagged variance term (β_h) is close to one in most cases suggesting volatility persistence as found in the literature. There is evidence for an asymmetric influence of the past innovations as shown by a negative $\beta_{\varepsilon 1}$ in most of the cases for the daily and overnight horizons respectively. The volume effect is positive ($\beta_{\varepsilon 2}>0$) in most cases, except for NZDUSD and KRWEUR overnight rates, indicating that regardless of sign, the higher is the previous period's unexpected movements, the higher its impact on the conditional variance in the next period. On Monday, in general, the conditional volatility is lower during the intraday and the daily horizons while the reverse is observed overnight for exchange rates against the USD and the EUR. The serial correlations in the first and the second moments of the standardized residuals are removed in all cases by adding more lags of the dependent variable in the mean equation and by varying the lag structures of the EGARCH model in the variance equations. However, the news coefficients from these estimations are qualitatively the same as the one we report in this paper. Thus, for consistency, we adopt the same model specification across the series and the results are reported accordingly.

announcements in addition to target interest rate news. Furthermore, as all macroeconomic announcements of the U.S. and the euro area are released before the Fed's and the ECB's target rate announcements,[12] we include a dummy variable ($MacroAnn_{i,t}$) for each of the major macroeconomic announcements in the conditional variance equation in order to isolate the influence of the target interest rate news on the days of multiple information releases.[13] We consider the following macroeconomic announcements: Gross Domestic Product growth rate (GDP), Consumer Price Index (CPI), Unemployment rate (UE), Trade deficit (TD), and Retail sales growth rate (RET) for the U.S., and Gross Domestic Product growth rate (GDP), Consumer Price Index (CPI), Unemployment rate (UE), External trade (ET), Current account balance (CAB), and Retail trade growth rate (RTT) for the euro are.[14] These news dummies are also useful in modeling the volatility spillovers from the U.S. and the euro area upon releasing of their macroeconomic variables.

Out of 69 and 131 target rates announcements made by the Fed and the ECB, respectively, there were 13 and 27 macroeconomic announcements released by the U.S.'s and the euro area's agencies on the same dates. This represents 18.84% and 20.61% of the Fed's and the ECB's announcement sample, respectively.

The extended model is then shown in equations (3a) and (3b) below:

$$y_t = [\text{RHS of (2a)}] + \alpha_{News} News_{t-1} \tag{3a}$$

$$\ln h_t = [\text{RHS of (2b)}] + \beta_{News} \left| News_{t-1} \right| + \sum_i \beta_{MacroAnn,i} MacroAnn_{i,t-1} \tag{3b}$$

In general, the sign of the news coefficient in the mean equation, α_{News}, can be either negative or positive. Under interest rate parity condition and arbitrage argument, the USD and the EUR would appreciate against other currencies in response to unexpected hike in interest rates in these two economies, thus a negative sign is observed. However, as Vicker (1999) find that the reactions of exchange rates to policy announcements could transmit important insights about the market's perception regarding the central bank's credibility in fighting inflation. For instance, an unexpected hike in Fed's and the ECB's target rates could be viewed as a signal of future economic contraction and lowering the likelihood of future inflation.[15] As a result, such unexpected tightening may lead to a depreciation of the USD and the EUR. Also, higher interest rates would dampen stock market activities leading to portfolio outflows and this would lead to a depreciation. Therefore, we may observe positive mean coefficients instead. Furthermore, depending on the likely policy response of foreign central banks to the Fed's and the ECB's policy decisions, we may even not be able to observe any

[12] The U.S.'s macroeconomic announcements are normally released at 8:30 AM EST, while the euro area's macroeconomic announcements are made at 11:00 CET.

[13] We do not include the macro news dummies in the conditional mean equations because they represent an average impact of the individual announcements and this is hard to interpret. A more disaggregated data would be required to unravel the surprise components of each announcement (deviations of actual from expected figures) and investigate the differential impacts of various aspects of announcements on the first moment of market returns. However, macroeconomic announcements, irrespective of the types of news contents, could influence market volatility in a similar fashion. For example, unexpectedly higher or lower CPI figures could both increase market volatility due to increased trading volume leading to a higher volatility on the days of CPI announcements on average, which a CPI dummy in the conditional equation would be able to pick up.

[14] Due to data limitation, we were able to obtain data on the euro area's macroeconomic announcements from January 2002 only.

[15] This is particular true in the case of the ECB under inflation targeting framework.

change in the exchange rates. That is, if market participants believe that the counterpart central banks are more likely to respond to the Fed's and the ECB's policy choices, e.g. the counterpart central banks may also unexpectedly increase their own policy interest rates, the Fed's and the ECB's news effect on exchange rates against these correspondent currencies might be muted.

The news effect on the conditional volatilities would depend on whether the news adds to or resolves uncertainties in the markets. If an unexpected change in the rate leads to further speculation in the market regarding the future direction of the target rate, this increased heterogeneity would have been shown in a positive news coefficient in the variance equation, i.e. a rise in the volatility. On the other hand, a market calming effect could be observed if an unexpected rate change announcement resolves uncertainty, and a negative news coefficient is shown. In addition, the response would depend on the informational role that the Fed's and the ECB's target rate news play in the Asia-Pacific markets.

In addition, to the extent that the Fed's rate decisions can influence those of the ECB due to timing advantage, it is possible that the impacts of the ECB's rate decisions on the Asia-Pacific's currencies might be weaker as the market participants might regard the ECB news as less newsworthy. Granger causality tests revealed that there is a strong evidence of the Fed's FOMC Granger causing the ECB's governing council in making interest rate decisions, while the evidence for the reverse is weak.[16] Thus, it is necessary to control for the other central bank's news effect to check for the robustness of the target rate news impacts and to further investigate the relationship between the two news.

Equations (4a) and (4b) include both the Fed's and ECB's target news coefficients and both the U.S.'s and the euro area's macroeconomic announcements dummies.

$$y_t = [\text{RHS of (2a)}] + \alpha_{FedNews} FedNews_{t-1} + \alpha_{ECBNews} ECBNews_{t-1} \tag{4a}$$

$$\ln h_t = [\text{RHS of (2b)}] + \beta_{FedNews} \left| FedNews_{t-1} \right| + \sum_i \beta_{USMacroAnn,i} USMacroAnn_{i,t-1}$$
$$+ \beta_{ECBNews} \left| ECBNews_{t-1} \right| + \sum_i \beta_{EuroareaMacroAnn,i} EuroareaMacroAnn_{i,t-1} \tag{4b}$$

The ECB's news coefficient on the mean would be insignificant if the ECB's news has no impact on the Asia-Pacific's currencies if the ECB's news is stale when it hits the Asia-Pacific. However, if the ECB's news has its own merits, the ECB's news coefficient is expected to be significant. On the variance equation, the impact of the ECB's news would once again depend on its supplemental role for the Fed's news in either raising or lowering the level of market uncertainty on the exchange rates of the Asia-Pacific's currencies against the USD and the EUR.

4. Empirical results

The estimates of the EGARCH model for the spillover effects of the Fed's and the ECB's target rate surprises as modeled in (3a) and (3b) are reported in table 2.

[16] Interested readers can obtain Granger causality test results from the corresponding author upon request.

Table 2 – The target interest rate news spillover effects

This table reports the estimation results of the EGARCH models described in (3a) and (3b) for daily changes in Asia-Pacific exchange rates against the USD and the EUR against the Fed's and the ECB's news, respectively. H0 is daily horizon over the close on calendar day *t-1* to the close on calendar day *t*; H1 is overnight horizon over the close of day *t-1* to the open on day *t*; and H2 is intraday horizon measured over the open on day *t* to the close on day *t*. P-values are in braces.

$$y_t = [\text{RHS of (2a)}] + \alpha_{News} News_{t-1} \quad (3a)$$

$$\ln h_t = [\text{RHS of (2b)}] + \beta_{News} \left| News_{t-1} \right| + \sum_i \beta_{MacroAnn,i} MacroAnn_{i,t-1} \quad (3b)$$

Exchange rate	The Feds' target interest rate news spillover effects					
	$\alpha_{FedNews}$			$\beta_{FedNews}$		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**
AUDUSD	-0.8224 ***	-0.0008	-0.8000 ***	-0.0675	-1.7335	-0.0899
	{0.0000}	{0.7776}	{0.0000}	{0.6678}	{0.3522}	{0.5814}
IDRUSD	2.3544 **	0.0168 ***	1.2239 ***	3.8371	0.6724	2.7223 ***
	{0.0459}	{0.0000}	{0.0072}	{0.3572}	{0.6180}	{0.0006}
JPYUSD	0.1735	0.0629 ***	-0.2939 ***	0.2986 ***	-2.3214 ***	0.6677 ***
	{0.6197}	{0.0000}	{0.0054}	{0.0039}	{0.0018}	{0.0054}
KRWUSD	-0.0396	0.3831 *	-0.3733	-0.4800	-0.0063	-0.7658 *
	{0.8795}	{0.0820}	{0.1321}	{0.1492}	{0.9905}	{0.0654}
NZDUSD	-1.0199 ***	-0.0021 **	-1.0091 ***	-0.0894	-5.5684 ***	-0.0665
	{0.0000}	{0.0191}	{0.0000}	{0.4937}	{0.0000}	{0.6234}
PHPUSD	-0.0139	0.0166	-0.2322	0.3401	0.5052	0.4727
	{0.9264}	{0.9217}	{0.2365}	{0.3175}	{0.2025}	{0.4528}
TWDUSD	-0.0720 ***	0.2841	-0.1349 ***	-0.2991 *	-1.4356 **	-0.5827 **
	{0.0000}	{0.2631}	{0.0058}	{0.0526}	{0.0263}	{0.0491}

Exchange rate	The ECB' target interest rate news spillover effects					
	$\alpha_{ECBNews}$			$\beta_{ECBNews}$		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**
AUDEUR	1.6680 ***	0.0782	2.0502	-0.8884	-7.4612 ***	-1.0091
	{0.0000}	{0.7161}	{0.3692}	{0.5638}	{0.0069}	{0.5985}
IDREUR	-7.5702 ***	-0.8861	-7.8851 *	2.2473	10.5430	3.3550
	{0.0000}	{0.2218}	{0.0667}	{0.5948}	{0.4577}	{0.1258}
JPYEUR	1.3821	0.0238	1.1181	0.4231	-4.2560	1.1037
	{0.4337}	{0.8925}	{0.4755}	{0.8592}	{0.5489}	{0.6335}
KRWEUR	-10.3437 **	0.1816	-9.9304 ***	6.9093	2.0978 ***	2.7455
	{0.0457}	{0.4368}	{0.0025}	{0.2882}	{0.0007}	{0.8297}
NZDEUR	1.7187	-0.0367	2.4347	-0.5149	-2.7469	0.0568
	{0.3520}	{0.9433}	{0.9804}	{0.8542}	{0.5157}	{0.9804}
PHPEUR	-4.6127	1.0884	-7.9111 ***	7.6355	-3.4551	-3.1838
	{0.2848}	{0.3973}	{0.0027}	{0.2499}	{0.3148}	{0.1844}
TWDEUR	-3.2432 **	0.0166	-3.5016 **	-1.4193 ***	-4.8834 ***	-2.1472 ***
	{0.0203}	{0.9076}	{0.0213}	{0.0000}	{0.0002}	{0.0003}

Note: *, **, *** denotes significance at 10%, 5%, and 1%, respectively

4.1. The U.S. Fed's target interest rate news spillover effects

Three currencies (AUD, NZD and TWD) depreciated significantly against the USD over H0 which was mostly coming from significant response in H2. On the other hand, three currencies (IDR, JPY, and KRW) appreciated against the USD mostly during H1. We conjecture that an unexpected hike in Fed's target rate could be viewed as a strong commitment to combat against inflation. As a result, such unexpected tightening may lead to a depreciation of the USD. However, such effect is not persistent evidenced by the depreciation of the yen in the following day. There is some evidence of slow absorption of Fed news as the news effect is either significant in H2 only or significant exchange rate response in H1 is persisting into H2.

There is also evidence for the Fed's spillover impacts on the conditional variance of the exchange rates changes. In general, we find a volatility reducing influence of the Fed's news in four currencies in at least one time horizon. We conjecture that, Asia-Pacific markets' participants might be at an information disadvantage regarding forming expectations on the U.S. Fed's interest rate decisions compared to the U.S. market participants. When these markets open for trading, clearer U.S. market movements would have been established and the potential implications of the Fed surprises on the other markets would have also been well understood. Therefore, a lower level of diversity of opinions upon the spillover effect of the U.S. announcements on the other markets would have been shown.[17]

We also find some evidence for delayed volatility response where volatility effect is significant only in intradaily horizon for two cases (IDR, KRW), and in all three horizons for the other two (JPY and TWD).

4.2. The ECB's target interest rate news spillover effects

In general, similar to the Fed's news, the ECB's news also shows delayed impact on the Asia-Pacific currencies with three currencies (IDR, KRW and TWD) depreciate against the EUR in the intraday and daily horizons while the PHP depreciates during the intraday horizon only.

On the conditional volatility, we find some evidence for a volatility reducing effect of the ECB's news in two exchange rates (AUD and TWD). However, we also observe that the ECB's news has volatility increasing effect on the conditional volatility of the KRW rate during overnight only. We conjecture that even though the ECB's news has injected some insights about the euro area's economies that might help to resolve uncertainties and heterogeneities in beliefs among market participants, such temporary homogeneity may eventually evaporate as the market participants may be still uncertain about the future course of the ECB's target rate. There is mixed evidence on the speed of the ECB's news absorption. Some currency pairs responded quickly as evidenced by significant news coefficient in overnight horizon only (AUDEUR and KRWEUR), while in the other (TWDEUR) the news

[17] For brevity, we omit reporting the macroeconomic announcement dummies. Instead, the main results are summarized here. Interested readers might obtain full estimation results upon request. The macroeconomic announcement dummies have significant effects on the conditional volatility of currencies pairs. While the GDP and Trade deficit (TD) announcements tend to reduce market volatility, the reverse is observed in cases of the CPI and Unemployment (UE) announcements. Retail sales growth rate (RET) has unclear impact on the volatility with four cases each with higher and lower volatility.

effect shows up in all three horizons.[18] The results tend to suggest that Asia-Pacific market's participants are unclear about the impact of the ECB's news.

4.3. Joint spillover effects of the target interest rate news

The estimates for the joint spillover effects of the Fed's and the ECB's target rate news as modeled in (4a) and (4b) are reported in Table 3. Overall, the results suggest that the separate effects of the Fed's and the ECB's news as reported in the previous sections are robust.

For the exchange rates against the USD, while the Fed's effect is robust, we find that the ECB's news also has significant impacts on the exchange rates against the USD. However, the ECB's effect on exchange rates against the USD is mixed with two cases where the KRW and the PHP depreciates against the USD (mostly overnight), and three other cases where the IDR, PHP and the TWD appreciates against the USD (mostly during the intraday horizon). We conjecture that the late arrival of the ECB's news might help to confirm the prevailing belief that the Fed is going to take further steps in fighting against inflation. On the volatility, in response to unexpected hikes in the ECB's target rate, four currencies show lower volatility in at least one time horizon, while the other two (JPY and TWD) show higher volatility overnight only. This finding reaffirms our hypothesis for the supplementary role that the ECB's news has played to the Fed's news in Asia-Pacific currencies against the USD.

For the exchange rates against the EUR, while the ECB's effect is marginally stronger, the Fed's news tends to lead to an appreciation of the Asia-Pacific currencies against the EUR mostly during the overnight horizon. On the other hand, the Fed's news seems to show a volatility reducing effect across three horizons. Theses findings suggest that the earlier arrival of the Fed's news might send a leading signal to the market that the ECB might also increase its target rate to combat against the inflation. Thus, this signaling effect might result in a depreciation of the EUR and a lower volatility.

[18] The euro area's macroeconomic announcement dummies have significant effects on the conditional volatility where the CPI tends to increase market volatility; the other announcements tend to reduce volatility in most of currency pairs at least in one time horizon.

Table 3 – Joint spillover effects of the U.S. Fed's and the ECB's target interest rate news

This table reports the estimation results of the EGARCH models described in (4a) and (4b) for daily changes in Asia-Pacific exchange rates against the USD and the ECB against the overall surprises of the Fed and the ECB. H0 is daily horizon over the close on calendar day *t-1* to the close on calendar day *t*; H1 is overnight horizon over the close of day *t-1* to the open on day *t*; and H2 is intraday horizon measured over the open on day *t* to the close on day *t*. P-values are in braces.

$$y_t = [\text{RHS of (2a)}] + \alpha_{FedNews} FedNews_{t-1} + \alpha_{ECBNews} ECBNews_{t-1} \quad (4a)$$

$$\ln h_t = [\text{RHS of (2b)}] + \beta_{FedNews} \left|FedNews_{t-1}\right| + \sum_i \beta_{USMacroAnn,i} USMacroAnn_{i,t-1} + \beta_{ECBNews} \left|ECBNews_{t-1}\right| + \sum_i \beta_{EuroareaMacroAnn,i} EuroareaMacroAnn_{i,t-1} \quad (4b)$$

Panel A. Asia-Pacific currencies/USD

Exchange rate	Conditional mean equation						Conditional variance equation					
	$\alpha_{FedNews}$			$\alpha_{ECBNews}$			$\beta_{FedNews}$			$\beta_{ECBNews}$		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**
AUDUSD	-0.8601 ***	-0.0008	-0.8401 ***	1.1685	-0.0008	1.3215	-0.1740	-3.7846	-0.2406 **	0.9493	-11.3158	1.6823
	{0.0000}	{0.6097}	{0.0000}	{0.5301}	{0.8130}	{0.5213}	{0.1853}	{0.2228}	{0.0492}	{0.4835}	{0.1172}	{0.2166}
IDRUSD	2.3321 ***	0.6056 ***	1.2610 **	1.0519	0.6056	2.1164 ***	3.7294 ***	1.8352	2.8938 ***	-9.5531 *	6.6225	-2.7467
	{0.0055}	{0.0002}	{0.0124}	{0.2139}	{0.2060}	{0.0027}	{0.0001}	{0.2320}	{0.0022}	{0.0532}	{0.7269}	{0.6206}
JPYUSD	0.1710	0.0467	0.1349	-0.8228	0.0646	-0.3150	0.1958	-2.6698 ***	0.2071	0.4754	25.3592 **	-0.1971
	{0.5043}	{0.2834}	{0.6928}	{0.5935}	{0.9300}	{0.8416}	{0.1055}	{0.0001}	{0.9712}	{0.6692}	{0.0413}	{0.7674}
KRWUSD	-0.1309	0.4427 *	-0.4294	-1.8519 *	-0.9056 **	1.0643	-0.2943	-0.1336	-0.5477 *	3.1051	-2.6289 **	2.8674 *
	{0.6560}	{0.0595}	{0.1477}	{0.0784}	{0.0236}	{0.3692}	{0.5539}	{0.7700}	{0.0758}	{0.3875}	{0.0450}	{0.0772}
NZDUSD	-1.0305 ***	-0.0023	-1.0319 ***	0.6900	0.0052	0.9536	-0.1622	-4.9186 ***	-0.1437	0.3770	-13.1376 ***	0.6982
	{0.0000}	{0.3718}	{0.0000}	{0.6894}	{0.8943}	{0.6335}	{0.3384}	{0.0000}	{0.3514}	{0.7925}	{0.0000}	{0.6712}
PHPUSD	-0.0088	0.0800	-0.1802	-0.6677	-0.6508 ***	0.9527 ***	-0.4292	-0.6245 ***	0.1036	-12.2305 ***	-14.0620 ***	-9.5110 ***
	{0.9518}	{0.2630}	{0.2682}	{0.3729}	{0.0001}	{0.0003}	{0.2136}	{0.0000}	{0.8245}	{0.0056}	{0.0014}	{0.0016}
TWDUSD	-0.0706 ***	0.1441	-0.1381 **	0.0063 ***	2.0736 **	0.0785	-0.3798	0.9066	-0.5865	-4.4152	9.9415 *	-9.1153
	{0.0000}	{0.2323}	{0.0312}	{0.0000}	{0.0499}	{0.2649}	{0.3953}	{0.1698}	{0.1132}	{0.4281}	{0.0683}	{0.5105}

Note: *, **, *** denotes significance at 10%, 5%, and 1%, respectively

Table 3 – Joint spillover effects of the U.S. Fed's and the ECB's target interest rate news (Continued)

Panel B. Asia-Pacific currencies/EUR

Exchange rate	Conditional mean equation						Conditional variance equation					
	$\alpha_{FedNews}$			$\alpha_{ECBNews}$			$\beta_{FedNews}$			$\beta_{ECBNews}$		
	H0	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**	**H0**	**H1**	**H2**
AUDEUR	0.0663	0.0554 **	0.0051	1.3049	-0.0129	1.7147	-0.7429 ***	-0.1000	-0.7510 ***	1.4678	-8.5265 ***	1.2015
	{0.7315}	{0.0299}	{0.9782}	{0.5732}	{0.9436}	{0.3922}	{0.0000}	{0.8699}	{0.0000}	{0.4432}	{0.0059}	{0.4828}
IDREUR	-0.9813 **	0.2414 **	-1.1582 ***	-7.3882 *	-0.8805	-7.4357 **	-0.8221	-0.9284 **	-0.8423	3.0124	8.9643 **	3.3971
	{0.0202}	{0.0111}	{0.0037}	{0.0813}	{0.1495}	{0.0402}	{0.1975}	{0.0119}	{0.1577}	{0.6173}	{0.0141}	{0.5895}
JPYEUR	0.6287 **	0.0605 **	0.6375 **	0.2513	-0.0745	-0.2389	0.2344 *	-0.0582	0.1539	-1.1978	2.7098	0.0423
	{0.0115}	{0.0239}	{0.0263}	{0.8971}	{0.6295}	{0.9003}	{0.0730}	{0.9536}	{0.2573}	{0.6243}	{0.7249}	{0.9831}
KRWEUR	0.5451	0.0385	0.1220	-10.7703 ***	0.1087 **	-10.2564 ***	-0.1675	4.6687	1.9419 *	0.1433	-41.8308 ***	3.6371
	{0.4841}	{0.8446}	{0.8856}	{0.0001}	{0.0284}	{0.0000}	{0.5451}	{0.1096}	{0.0627}	{0.9493}	{0.0001}	{0.7821}
NZDEUR	0.1016	0.0112	0.0721	1.3380	-0.2095	1.8911	-0.4346 ***	-2.8266 ***	-0.3939 **	0.6636	11.8021 ***	1.1695
	{0.5703}	{0.7496}	{0.7496}	{0.1349}	{0.3754}	{0.3754}	{0.0044}	{0.0000}	{0.0207}	{0.5646}	{0.0000}	{0.5638}
PHPEUR	-0.1313	-0.1456	-0.0077	-5.3305	1.1289	-6.8656 **	0.5315	0.1755	-0.7888	6.5865	-3.2561	4.4074
	{0.7609}	{0.2317}	{0.9417}	{0.2342}	{0.2828}	{0.0379}	{0.4355}	{0.5805}	{0.1118}	{0.3281}	{0.4966}	{0.5621}
TWDEUR	0.8338 ***	0.0480 ***	0.8382 ***	-2.7775 ***	0.0097	-3.9196 **	-0.2741 ***	-0.4612	-0.2471 ***	-0.3059 ***	-9.3456 **	-0.0237 ***
	{0.0003}	{0.0000}	{0.0006}	{0.0003}	{0.9470}	{0.0281}	{0.0000}	{0.2938}	{0.0000}	{0.0000}	{0.0180}	{0.0000}

Note: *, **, *** denotes significance at 10%, 5%, and 1%, respectively

5. Conclusion

In this paper, we documented and discussed the existence and the nature of the transmission of the policy interest rate news from the U.S. Fed and the ECB on the first two moments of the market returns of the Asia-Pacific exchange rates against the USD and the EUR for the period from January 1999 to December 2006. Considering that these are the two most important economic blocs in the world and their monetary policy shocks have been reported to elicit significant market movements not only in their respective markets but also in others, the comprehensive investigation of the spillover effects of these interest rate news in the Asia-Pacific region adds to the literature.

In general, we reveal that the spillover effects of the Fed's and the ECB's news on the Asia-Pacific currencies are generally consistent with the interest rate parity condition and arbitrage argument, where a majority of currencies depreciates against the USD and the EUR in response to an unexpected hike in the Fed's and ECB's target rates in line with the literature. More importantly, we report significant volatility response to the interest rate news. Unexpected hikes in the Fed's and the ECB's target rates reduced volatility in most of the Asia-Pacific currencies against the USD and the EUR. Furthermore, we find some evidence that the news is absorbed slowly. In addition, even though the ECB's interest rate decisions may have been influenced by those of the Fed, the ECB news was also important informational provider for the Asia-Pacific's currencies. The Fed's news seems to send a leading signal upon the upcoming decision of the ECB, while the ECB's news tends to confirm the Fed's decision. This relationship between the two news helps to reduce volatility in the Asia-Pacific exchange rates against the USD and the EUR.

These findings have important implications for policy makers and market participants alike. A worthwhile extension of this research would be to examine the spillover effects of the Fed's and the ECB's target rate news on various segments of the Asia-Pacific financial markets including money and debt markets and foreign exchange rates. Furthermore, the controlling of other macroeconomic announcements seems to reveal that these releases also have their own significant impact on the volatility of the Asia-Pacific currencies, thus, an in-depth analysis of the role of the U.S.'s and the euro area's macroeconomic news on the Asia-Pacific markets would make further contributions to the literature. We reserve these avenues for future studies.

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