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Does U.S. macroeconomic news make emerging financial markets riskier?☆

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Abstract

This study analyzes the impacts of US macroeconomic announcement surprises on the volatility of twelve emerging stock markets by employing asymmetric GJR-GARCH model. The model includes both positive and negative surprises about inflation and unemployment rate announcements in the U.S. We find that volatility shocks are persistent and asymmetric. Asymmetric volatility increases with bad news on US inflation in five out of the twelve countries studied and it increases with a bad news on U.S. unemployment in four out of twelve countries. Asymmetric volatility decreases with good news about US employment situation in eight countries out of twelve countries. Such markets become less risky with an unexpected decrease in unemployment rate in the US. Our findings are important for demonstrating that USA economic growth and employment situation has an impact on many emerging stock markets and that positive US macroeconomic news in fact make many emerging stock markets less volatile.

Jel classification: G1

Keywords: Asymmetric GARCH; Emerging markets; Macroeconomic news; Surprises

1. Introduction

In the past two decades the world has witnessed great financial markets integration due to an overall globalized economic environment. Emerging financial markets have been significantly influenced by changes occurring in developed economies.

On September 13, 2012 The Federal Reserve System (FED) announced that $85 billion worth of treasury bonds and mortgage-backed securities will be purchased monthly to help the economy with the post-crisis recovery. On the next day foreign stock markets responded positively. The indexes of the British, Russian and Turkish stock markets, went up by 1.3%, 4.2%, and1.3% respectively. The question is how much of these increases were due to the FED news.

The purpose of our study is to examine the impact of surprises about U.S. macroeconomic news announcements on emerging financial markets. More specifically, we measure the impacts of news' shocks on the conditional volatility of stock returns in twelve emerging economies, namely Brazil, India, Indonesia, Korea, Mexico, the Philippines, Poland, Russia, Singapore, Taiwan, Thailand and Turkey. To capture the

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asymmetric nature of the market impacts, we employ a joint asymmetric Generalized Autoregressive Conditional Heteroscedasticity (GJR-GARCH) model of daily stock returns and volatility incorporating with positive and negative surprises about US unemployment and inflation rate announcements.

Causes of stock market fluctuations have been a topic of great interest for researchers (Campbell & Shiller, 1988; Chen, Roll, & Ross, 1986; Fama & French, 1988). Economic news, particularly macroeconomic news, has been identified as one of the drivers of stock returns and causes of financial market fluctuations (Chen et al., 1986; Fama, 1981).

There are several studies that investigate the effect of macroeconomic announcements on the volatility of the domestic financial markets. Cutler, Poterba, and Summers (1988), who study the drivers of U.S. stock market, find that macroeconomic news does affect stock returns. Ederington and Lee (1993), on the other hand, find a significant effect of regularly scheduled US macroeconomic announcements on the volatility of the US treasury and foreign exchange futures. Andersen, Bollerslev and Chai (2000) in their study of the Japanese stock market volatility find that the Japanese macroeconomic news announcements explain only 0.1% of variation in the intraday volatility.

Given that most economies are integrated with each other, macroeconomic announcements of major economies such as European Union, Japan and the US do not only affect their domestic financial markets, but also the financial markets of other countries. There are several examples of empirical evidence in support of the above hypothesis. Hanousek, Kocenda, and Kutan (2009), who study the reaction of asset prices to macroeconomic announcements in Hungary, Czech Republic and Poland using intraday data[2] find that Czech stock market is impacted more by the U.S. macroeconomic announcements than by EU macroeconomic announcements. On the contrary, the Hungarian and the Polish stock markets are more affected by the EU macroeconomic news than US macroeconomic news.

Other studies investigate the impact of specific rather than general macroeconomic announcements. Hayo, Kutan, and Neuenkirch (2010) analyze the effects of Federal Open Market Committee (FOMC) communications about both, monetary policy and economic outlook, on European and Pacific equity market returns. Using a pooled GARCH model with country-specific fixed effects they find that both, changes in U.S. target rate and FOMC communications, significantly impact European and Pacific equity markets.

Continuing this line of research, Hanousek and Kocenda (2011) categorize EU and US macroeconomic announcements in four general classes, reducing the number from fifteen different classes previously analyzed, to study their impact on Czech, Hungarian and Polish stocks for the period from 2004 to 2007. The authors' findings suggest that the Czech, the Hungarian and the Polish stock markets have significant responses to EU macroeconomic news, but not to U.S. macroeconomic news. However, these findings have been questioned by another study on the same stock markets. Using a GARCH model and data for the period 1999–2006, Buttner, Hayo, and Neuenkirch (2012) find that both EU and US macroeconomic news significantly affect financial sectors of the above three countries. The only difference in response of the three stock markets is that the impact of EU news dominates over the impact of US news on the Czech market.

Apart from the above listed country-specific studies, research on the impact of economic shocks of developed economies on stock prices of emerging markets has been limited. Various other studies are concerned with the globalized outreach of other macroeconomic changes. For example, Bekaert and Harvey (1997) study the role of economic integration as a cause for increasing volatility in emerging stock markets. They provide evidence of whether emerging market correlations with the world market increase after liberalization. De Santis and Imrahoroglu (1997) add to the literature by studying emerging stock markets riskiness, quantified as stock market volatility, and find that except for Latin American emerging markets such as Brazil and Argentina risk is poorly reflected in stock market prices. Going beyond economic news, Onder and Mugan (2006) investigate the effect of unexpected political announcements in Turkey and Argentina. They analyze the impact of newspaper publications and find these do tend to increase the stock return volatility and trading volume on the Turkish and Argentinean stock markets. Basdas and Oran (2014) analyzed event studies on Turkey and found increased risk due to clustering of announcements.

Only a handful of studies differentiate between good and bad news. Cakan (2012) finds that there is a significantly positive relation between the long-term bond return and unemployment news during economic expansions in the US financial market. Both unemployment and inflation news surprises have impacts on volatility of the US stock market during economic recessions than during expansion. Meanwhile, Campbell and Hentschel (1992) and Engle and Ng (1993) establish for first time asymmetric effects by good and bad news. Recently Lee and Chang (2011) examine the asymmetric volatility in equity returns in response to monetary policy announcements on the stock market of Taiwan. They find that the significant asymmetric effects and asymmetric volatility movements could be due to an increase in financial leverage associated with declining firm market values. Further, differencing between good and bad news, Hayo and Kutan (2005) are among the first researchers to examine the reaction of emerging countries stock market returns and volatility as a response to IMF stabilization measures during the Asian, Russian and Brazilian crises in the period 1997–1999. Their results suggest that both good and bad news affect stock returns. More specifically, the authors find that positive IMF news tends to increase stock returns and negative IMF news tends to decrease stock returns by roughly one percentage point.

One of closest studies to ours is Chiang and Doong (2001), who examine time-series behavior of stock returns for seven Asian stock markets. They find that higher average returns

[2] The period of the data is June 2, 2003–December 29, 2006.

appear to be associated with higher level of volatility. The authors use Threshold Autoregressive GARCH(1,1)-in-mean specification indicating that the null hypothesis of no asymmetric effect on the conditional volatility is rejected for the daily data.

Our contributions to the existing literature are threefold. First, we use current daily data, that spans several financial crises and captures recent reactions of emerging stock markets and analyze a large in comparison to previous studies group of countries. Our data spans from 1994 to 2014 and covers twelve emerging stock markets. Second, in addition to examining the direct relationship between stock returns and volatility, we quantify the degree of asymmetry in the time-varying volatility process attributable to the foreign good and bad economic news. Third, our choice of countries is not random. We study emerging stock market countries that were recently affected by major financial crises-the Asian crisis of 1997, the Russian crisis of 1998, Turkish crisis of 2000, and Brazilian and Argentinean crises of 2000. By focusing on these economies, we are able to understand the specific sources of stock return volatility in emerging markets and to estimate the impacts of US economic announcements in the volatility model.

The paper is organized into following sections. Section 2 describes the data and presents some statistical properties of stock returns. Section 3 investigates the relationship between stock returns and volatility based on an asymmetric GARCH(1,1) model. Section 4 contains a summary and concluding remarks.

2. Data

The data set used in this study includes the daily stock price indexes in domestic currency for twelve emerging economy stock markets for the period of May 1st, 1994 to June 24th, 2014.[3] More specifically we analyze the stock indexes of: Brazil (IBOVESPA); India (SENSEX); Indonesia (SSX); Mexico (BOLSA); South Korea (KOSPI); Philippines (PSE); Poland (WSE); Russia (MOEX); Singapore (SGX); Taiwan (TAIEX); Thailand (SET); and Turkey (BIST). The source of the data on the above listed stock price indexes is Datastream. The daily composite stock returns are defined as logarithmic difference of the daily stock index times 100: $R_t = 100*(log\ P_t - log\ P_{t-1})$.

The macroeconomic announcements related to inflation and unemployment rate are collected respectively from the websites of the Bureau of Economic Analysis (BEA) and the Bureau of Labor Statistics (BLS).[4] Inflation and unemployment rate announcements are released at 8:30 am US Eastern time. We account for time-zone differences in modeling the effect of U.S. news on other stock markets by adjusting the lags and leads in the models. Table 1 summarizes the opening and closing times of the local stock exchanges, their time differences with respect to U.S. EST, as well as the local market day in course when the US news is released. For example, the effects of inflation and unemployment news occur on the same day for Brazil, Mexico, Turkey, Russia and Poland, but with a day lag for India, Indonesia, South Korea, Philippines, Singapore, Taiwan, and Thailand.

Table 1
Opening and closing times of emerging stock exchanges and the schedule of US macroeconomic news announcements.

Exchange	Opening-closing in local time	Time difference from NY	CPI news in local time	UR news in local time
Brazil	10:00 am–5:00 pm	(+2 h)	same day	same day
India	9:00 am–3:30 pm	(+9.5 h)	+1 day	+1 day
Indonesia	9:00 am–6:00 pm	(+11 h)	+1 day	+1 day
Korea	9:00 am–3:00 pm	(+13 h)	+1 day	+1 day
Mexico	8:30 am–3:00 pm	(−1 h)	same day	same day
Philippines	9:00am–12:10 pm	(+12 h)	+1 day	+1 day
Poland	9:00 am–4:20 pm	(+6 h)	same day	same day
Russia	10:30 am–6:00 pm	(+8 h)	same day	same day
Singapore	9:00am–5:00 pm	(+8 h)	+1 day	+1 day
Taiwan	9:00 am–1:30 pm	(+12 h)	+1 day	+1 day
Thailand	10:00 am–12:30 pm	(+11 h)	+1 day	+1 day
Turkey[a]	9:30–12:30pm 2pm–4pm	(+7 h)	same day	same day

Note: These times are as of May 2010.
[a] The Turkish stock market closes at 5:40 pm since 19 October 2010.

We have a total of 5126 observations for all countries. The sample period includes 229 announcements of US macroeconomic news. We obtain market expectations for inflation and unemployment rate from the Money Market Survey from 1994 to 2005 and Bloomberg Terminal Bloomberg Survey from 2005 to 2014. Based on the market expectations, we calculate the surprise element of the US macroeconomic news announcements.

Let F_i denote the median of the Bloomberg forecast survey and A_i the released value of announcement i. We measure the surprise in announcements i as:

$$E_{it} = A_{ti} - F_{t-\delta i}(A_t) \quad (1)$$

Further, we standardize the surprises E_t by dividing them by their standard deviation across all observations to facilitate interpretation. The standardized surprise measure therefore is:

$$S_i = \frac{E_i}{\sigma_i} \quad (2)$$

Following Balduzzi, Elton, and Green (2001), we compute the unexpected components of the announcements as the standardized differences between the actual announcement values and their median expected values.

In addition, we classify the surprises about US macroeconomic announcements as positive and negative surprises. We create two dummy variables for positive and negative surprises. The positive surprise of inflation announcement is

[3] The purpose of our study is to capture some historical effects. To that goal we are using daily data spanning 20 years. We are aware that some other studies have focused on more narrow period of time, such as 4–5 years and have used intra-day data. Unlike these studies we are not capturing the "immediate" or intra-day effect of the surprises. We thank an anonymous referee for pointing this important difference of our study from other studies and the limitations of our data.

[4] Corresponding web sites are www.bea.gov; www.bls.org.

Table 2
Descriptive statistics of daily stock index returns in all emerging markets.

Returns	Mean	St. Dev.	Min	Max	Skew-ness	Kurtosis	JB
Brazil	0.04569	2.355	−18.041	16.470	−0.340	10.180	7830.2(0.0)
India	−0.00567	1.698	−11.343	8.1647	−0.173	5.661	1084.2(0.0)
Indonesia	−0.0212	2.138	−17.895	16.046	0.175	10.447	8368.2(0.0)
Korea	0.03891	3.153	−27.485	22.135	−0.191	9.200	5810.0(0.0)
Mexico	0.03992	1.829	−12.245	18.758	−0.183	9.554	6488.7(0.0)
Philippines	−0.00430	2.847	−37.592	22.542	−0.978	23.995	66934.6(0.0)
Poland	0.00940	2.588	−21.496	26.491	0.092	15.635	24039.7(0.0)
Russia	0.04066	1.772	−19.025	14.993	−0.270	12.903	14808.2(0.0)
Singapore	−0.02748	1.756	−13.865	18.830	0.366	12.867	14740.2(0.0)
Taiwan	0.01997	2.048	−13.033	13.868	−0.202	7.004	2437.75(0.0)
Thailand	0.06386	3.067	−27.472	23.729	−0.6089	14.529	20234.5(0.0)
Turkey	0.00662	1.530	−9.2557	12.335	0.0584	8.946	5324.0(0.0)

Notes: All numbers are in percentages. All statistics are for daily series from 31 May 1994 to 24 June 2014, yielding 5126 observations. All stock index prices are expressed in domestic currency. Under the null hypothesis of a normal distribution, the Jargue-Bera (JB) statistics for normality statistic measures the difference between the skewness and kurtosis of the series with those from the normal distribution. *p*-values are provided in parentheses.

denoted as$posCPI_{t-i}^{\text{surprise}} = 1$ if $S_i > 0$, 0 otherwise; and negative surprise is denoted as $negCPI_{t-i}^{\text{surprise}} = 1$ if $S_i < 0$, and 0 otherwise. Likewise, we create two dummy variables for unemployment announcements: $posUR_{t-i}^{\text{surprise}} = 1$ if $S_i < 0$, and 0 otherwise; and $negUR_{t-i}^{surprise} = 1$ if $S_i < 0$, and 0 otherwise.[5] We can interpret these coefficients as "bad economic news" if $S_i > 0$ since higher than expected unemployment is "bad news" for the economy; and we can interpret the coefficients as "good economic news" if $S_i < 0$, since lower than expected unemployment is "good news" for the economy.

In order to provide a general understanding of the emerging markets and compare their distinct properties, we present summary statistics of daily returns for each country in Table 2. The statistics include mean return, standard deviation, skewness, excess kurtosis, and normality. The mean daily return is ranges from of 0%−0.06%, while the standard deviations range from 1.5% to 3.15%. This result clearly indicates that the emerging stock markets are characterized by high volatility. The most volatile market appears to be Thailand's stock market and the most stable one-the Turkish stock market. In most cases, higher returns are associated with higher volatility and vice versa (Table 2). All the markets have excess kurtosis, and most have negative skewness (Table 2). Excess kurtosis indicates that the return distribution is not Gaussian, which is typical of financial data.

In Fig. 1 we plot the stock market return series for each country. The observed volatility clustering explains the presence of excess kurtosis. The family of ARCH models was developed to address exactly such phenomenon. In order to take volatility clustering into account, we employ a model with a GARCH specification based on Bollerslev (1986).

[5] We run our models with the size of positive and negative surprises. The coefficients for this model are still significant (or insignificant) as it is in the dummy variables of surprises. Since the results are consistent in both, we keep surprises as dummy variables to be able to interpret the signs of the coefficients easily.

3. Methodology and empirical results

We employ generalized autoregressive conditional heteroscedasticity (GARCH) model developed by Bollerslev (1986) to analyze the financial time series under study. GARCH(1,1) eliminates the ARCH effect in the data. Due to the fact that the GARCH model fails to take into account the asymmetric effect of positive and negative shocks, Exponential GARCH and The threshold Autoregressive GARCH or TAR-GARCH model (Glosten, Jagannathan, & Runkle, 1993; henceforth, GJR; Engle & Ng, 1993; Tsay, 1998) are employed by researchers. After performing EGARCH and GJR-GARCH testing and checking the standardized residuals, we have selected the GJR-GARCH as the best specification and performed the estimation based on it. When applying these models we empathize the asymmetric effect of positive and negative surprises and hypothesize that a negative shock to returns will generate more volatility than a positive shock of equal magnitude.

We use the following GJR-GARCH(1,1) model incorporated with the four news surprise variables:

$$R_t = \mu + \rho R_{t-1} + \varepsilon_t \tag{3}$$

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \gamma \varepsilon_{t-1}^2 d_{t-1} + \beta h_{t-1} + d_1 posCPI_{t-i}^{\text{surprise}} + d_2 negCPI_{t-i}^{\text{surprise}} + d_3 posUR_{t-i}^{\text{surprise}} + d_4 negUR_{t-i}^{\text{surprise}} \tag{4}$$

R_t represents the return series and ε_t is a normally distributed stochastic error term with zero mean. The conditional variance h_t is a function of the mean volatility level (ω), the error from the previous period (ε_{t-1}^2), and the conditional variance (h_{t-1}) from the previous period. Asymmetric effect is measured by $\varepsilon_{t-1}^2 d_{t-1}$, where $d_t = 1$ if $\varepsilon_t^2 < 0$; and $d_t = 0$ otherwise. The impact of shocks on conditional variance is asymmetric if γ is significantly different from zero. The persistence of volatility for a given shock is $\alpha + 1/2\gamma + \beta$. If this sum is very close to one, it suggests that the shocks may persist over a longer period of time.

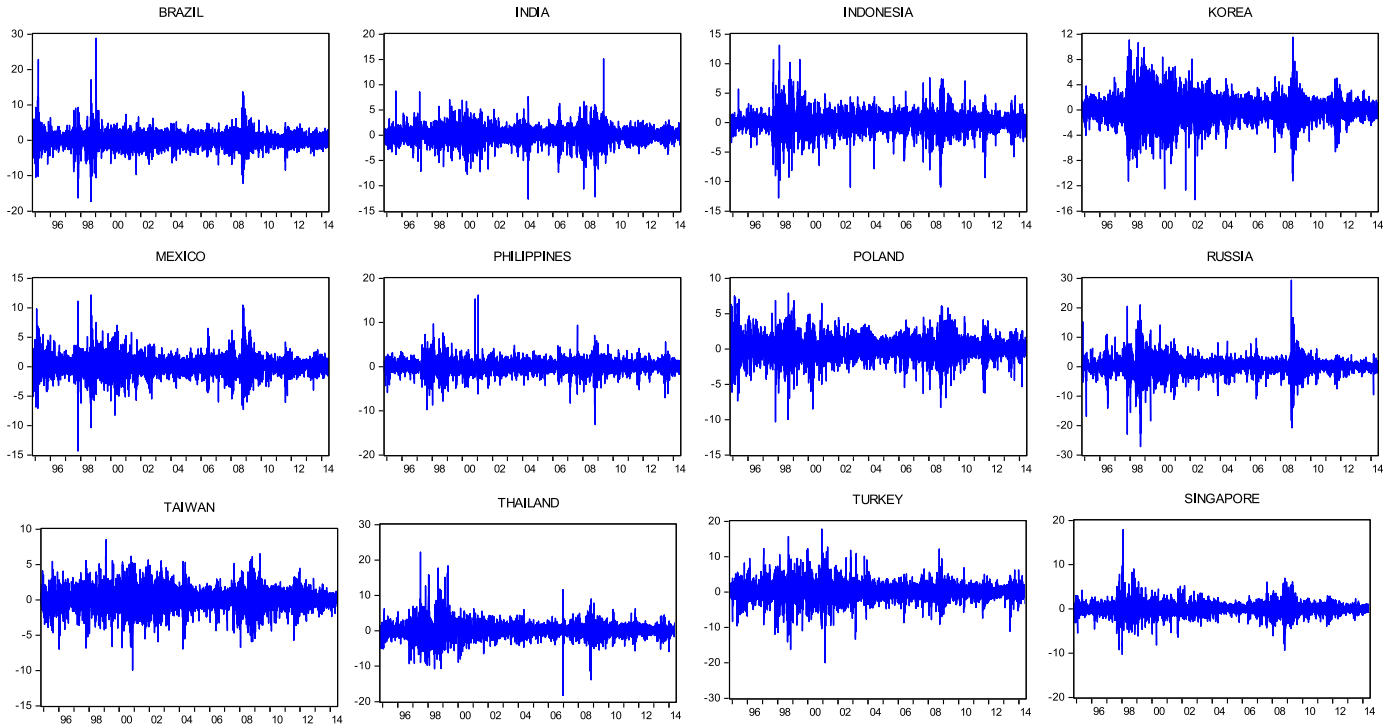

Fig. 1. Daily stock index returns in twelve emerging financial markets.

The dummy variables used for positive and negative news announcement surprises are: $posCPI_t^{surprise}$, $negCPI_t^{surprise}$, $posUR_t^{surprise}$ and $negUR_t^{surprise}$. The parameters d_1, d_2, d_3 and d_4 represents the effects of surprises on the conditional variance. We can name these variables as "bad economic news" for $posCPI_t^{surprise}$ and $posUR_t^{surprise}$; and "good economic news" for $negCPI_t^{surprise}$ and $negUR_t^{surprise}$. A positive coefficient of "bad economic news" indicates that conditional volatility increases, while a negative coefficient of "good economic news" indicates that conditional volatility decreases. For each country, the time zone difference can introduce lag in the effect of U.S. news on the local market. The index i denotes this lag or lead; it is set to -2, -1, 0, 1 or 2 depending on a country's time difference with respect to US EST.

Estimated parameters for Equations (3) and (4) are reported in Table 3. The evidence from the daily series indicates that all of the GARCH parameters, ω,α and β are statistically significant at 1% significance level. Furthermore, a sufficient condition for the conditional variance h_t to be non-negative is thatω, α and β are non-negative. The estimated values of these parameters are non-negative in all countries (Table 3). The sum of α and β is less than one, which rules out the possibility that the model is an integrated GARCH model. Since the estimated β coefficients in the conditional variance equation are considerably larger than the coefficient α (Table 3), the conditional volatility prediction is dominated by the autoregressive component.

Two particularly striking results emerge from the variance equation. The first is that the hypothesis of no asymmetry in the news effect ($\gamma = 0$) is strongly rejected. Second, the sum of the estimated coefficients in the variance equation is close to unity, meaning that the evolution of volatility occurs in a persistent fashion and that volatility shocks may persist over long periods of time. The coefficient of asymmetric volatility, γ, is statistically significant and positive for all countries. Positive γ means that bad news ($\varepsilon_t^2 < 0$) increases volatility more than good news. Bad news ($\alpha + \gamma$) increases volatility more than good news (α) in all markets.[6] These results are consistent with the literature (Bekaert & Wu, 2000; Engle & Ng, 1993; Wu & Xiao, 2002).

The different impacts of news in the GARCH models have important implications for portfolio selection and asset pricing (Amin & Ng, 1993; Duan, 1995). For instance, after a major positive news event, the two models imply different market risk and thus different risk premiums for individual stocks, under a pricing model that includes conditional volatility. Moreover, since the two models imply different volatility shocks following major good news, the dynamic hedging strategies would be very different.

U.S. news announcement surprises affect the volatility of the stock markets differently. d_1 is positive and statistically significant for India, Indonesia, Korea, Mexico and Taiwan (Table 3). In other words, "bad economic news" on inflation increases the volatility in these countries. To the contrary, d_2, is significant for India, Korea, Mexico, Thailand, Taiwan and Singapore indicating that "good economic news" on inflation increases the volatility (Table 3). However, the magnitude of that effect is much smaller than the magnitude of "bad economic news".

[6] We perform another asymmetric volatility model, EGARCH. The results did not change. We only report the GJR-GARCH model results to save space.

Table 3
GJR-GARCH(1,1) model estimation results.

Return : $R_t = \mu + \rho R_{t-1} + \varepsilon_t$
$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \gamma \varepsilon_{t-1}^2 d_{t-1} + \beta h_{t-1} + d_1 posCPI_{t-i}^{surprise} + d_2 negCPI_{t-i}^{surprise} + d_3 posUR_{t-i}^{surprise} + d_4 negUR_{t-i}^{surprise}$

	Brazil	India	Indonesia	Korea	Mexico	Philippines	Poland	Russia	Thailand	Taiwan	Turkey	Singapore
Mean:												
μ	0.044**	0.045**	0.056***	0.014	0.050***	0.015	0.049**	0.111***	0.027	0.026	0.122***	0.014
	(0.023)	(0.019)	(0.019)	(0.018)	(0.017)	(0.019)	(0.018)	(0.028)	(0.022)	(0.016)	(0.027)	(0.014)
ρ	0.028**	0.125***	0.152***	0.050***	0.104***	0.161***	0.101***	0.084***	0.100***	0.041***	0.035**	0.059***
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Volatility												
ω	0.106***	0.055***	0.047***	0.006**	0.023***	0.084***	0.028***	0.120***	0.029***	0.015***	0.066***	0.009***
	(0.011)	(0.005)	(0.004)	(0.002)	(0.003)	(0.008)	(0.004)	(0.006)	(0.004)	(0.002)	(0.009)	(0.001)
α	0.014**	0.071***	0.057***	0.029***	0.022***	0.083***	0.054***	0.098***	0.047***	0.023***	0.074***	0.046***
	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)	(0.008)	(0.004)	(0.003)	(0.004)	(0.005)
γ	0.123***	0.085***	0.092***	0.055***	0.110***	0.121***	0.039***	0.046***	0.064***	0.059***	0.028***	0.073***
	(0.008)	(0.008)	(0.007)	(0.006)	(0.006)	(0.011)	(0.006)	(0.008)	(0.006)	(0.005)	(0.006)	(0.007)
β	0.895***	0.861***	0.879***	0.939***	0.912***	0.804***	0.913***	0.855***	0.910***	0.936***	0.905***	0.911***
	(0.006)	(0.006)	(0.004)	(0.003)	(0.004)	(0.008)	(0.004)	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)
Volatility persistence	0.9705	0.9745	0.982	0.9955	0.989	0.9475	0.9865	0.98	0.989	0.9885	0.993	0.9935
d_1	0.094	0.415***	0.277***	0.260**	0.352***	0.067	0.012	0.129	0.103	0.352***	−0.131	0.074
	(0.153)	(0.125)	(0.106)	(0.104)	(0.087)	(0.103)	(0.079)	(0.179)	(0.126)	(0.076)	(0.193)	(0.061)
d_2	0.213	0.205**	−0.065	0.246***	0.164**	−0.031	−0.042	−0.182	1.781***	0.224***	0.154	0.153***
	(0.172)	(0.089)	(0.072)	(0.078)	(0.070)	(0.089)	(0.070)	(0.149)	(0.064)	(0.065)	(0.216)	(0.056)
d_3	−0.045	0.090	0.174***	0.105	−0.055	0.212**	0.053	1.558***	−0.227**	−0.114**	−0.066	0.116***
	(0.200)	(0.067)	(0.058)	(0.083)	(0.074)	(0.106)	(0.102)	(0.145)	(0.111)	(0.061)	(0.198)	(0.044)
d_4	−0.522***	−0.078	−0.110**	0.019	−0.186***	1.077***	−0.152**	0.101*	−0.173**	−0.113***	−0.293**	−0.052
	(0.124)	(0.063)	(0.052)	(0.063)	(0.049)	(0.034)	(0.061)	(0.061)	(0.073)	(0.034)	(0.137)	(0.034)

Note: The standard errors are given in parenthesis. *, **, *** indicate that the coefficient is significant at 10%, 5%, 1%, respectively.

The coefficient d_3 shows the impact of "bad economic news" about US unemployment rate. It is positive and statistically significant for Indonesia, Philippines, Russia, Thailand, Taiwan and Singapore (Table 3). In other words, an unexpected increase in unemployment rate in US may make these markets more risky.

The coefficient d_4 shows the effect of "good economic news" about US unemployment on the conditional volatility. We find that d_4 is negative and significant for Brazil, Indonesia, Mexico, Poland, Thailand, Taiwan and Turkey. This finding is very important. It means that an unexpected decrease in unemployment in the US impacts these stock markets' volatility negatively and their market risk goes down. Unemployment news carries information regarding the growth of the US economy, which affects most of the emerging market countries. We can conclude that a better than expected US employment news will make most stock markets less volatile and safe. Although d_4 is positive and significant in Philippines and Russia, the coefficient is smaller than the bad economic news effect coefficient, d_3. This shows that the effect of news is asymmetric, and good economic news effects volatility less than bad economic news.

4. Summary and conclusion

In this study, we examine the empirical relationship between the stock market returns and volatility based on twelve emerging stock market indexes, for Brazil, India, Indonesia, Korea, Mexico, the Philippines, Poland, Russia, Singapore, Taiwan, Thailand and Turkey over the period from 31 May 1994 to 24 June 2014. Analyzing the results about the relationship between stock returns and time-varying volatility from a GJR-GARCH(1,1) model, incorporating macroeconomic news surprises, indicates that the GARCH parameters are highly significant for all of the examined emerging stock markets. Moreover, we are able to reject the hypothesis of no asymmetric effect, a result that emerges with high level of significance.

Studying the details of asymmetric volatility, we find that asymmetric volatility increases with a bad news about US inflation in five out of the twelve countries studied and that asymmetric volatility it increases with bad news about US unemployment in four out of twelve countries. The asymmetric volatility decreases as a response to good news about US unemployment in eight of the examined economies. These markets become less risky with an unexpected decrease in unemployment rate in the US. These findings are very important to demonstrate that positive developments in the US economic growth and employment situation contribute to more stability and less volatility on many emerging stock markets. This is a very important finding for the purposes of asset pricing.

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