The Day-of-the-Week Effect: The CIVETS Stock Markets Case

Julio César Alonso Cifuentes
Icesi University

Beatriz Eugenia Gallo Córdoba
Icesi University

Finding patterns in the behavior or performance of financial markets has been a subject of interest for both analysts and academics. We use GARCH and IGARCH models with covariates to estimate the day-of-the-week (DOW) effect on both volatility and daily returns of the stock exchange markets for the CIVETS. We found a DOW effect on the daily returns for all of the CIVETS' stock markets. DOW effect was also found for the daily returns' volatility of some of the stock markets. Finally, there is evidence of lags in the DOW effect for the stock markets we analyze.

INTRODUCTION

Finding patterns in the behavior or performance of financial markets has been a subject of interest for both analysts and academics. Since the 1980s, the search for predictable patterns in the fluctuations of prices (and returns) in the stock and exchange markets has been the focus of attention of a plethora of investigators. For instance, a number of regularities have been reported in the literature such as the "January effect"[1], the monthly effect[2], the "firm size effect"[3], the "end-of-the-week effect", and the "day-of-the-week effect".

Cross (1973), French (1980), Gibbons (1981), Lakonishok(1982), Keim (1984) and Rogalski (1984) were the first to provide sufficient evidence to show the existence of the day-of-the-week effect (also known as DOW effect). Victoria (2005) and Jarrett (2006) recently provided new evidence to support the DOW effect. These authors have particularly shown that there are statistical differences in the distribution of returns for each day of the week in the U.S. stock market.

These regular patterns have also been found in the market of bonds issued by the U.S. Federal Government –Flannary & Protopapadakis (1988)– and the foreign exchange market –Corhay, Fatemi, & Rad (1995)–. Other authors including Balvers (1990), Breen (1990), Campbell (1987), Fama (1989), and Pesaran (1995), have applied different approaches that also support the existence of this effect in the United States.

Based on the prices of a considerable number of shares traded in the New York Stock Exchange (NYSE), Jarrett (2006) found evidence of these daily effects which allow forecasting the daily returns on each kind of share with a certain level of accuracy. In general, the most frequently reported finding is that a lower return is expected on a Monday or close to the weekend (i.e. end-of-the-week effect). Studies such as those by Clare (1995), Black (1995), and Pesaran (1995) use similar approaches for England. Jaffe (1985) reported the presence of this effect in Australia, Canada, England, and Japan.

Pettway & Tapley (1984) reported a DOW effect in the Japanese stock market using three different indexes and information about the five largest firms in the period from 1979 to 1982. They also found the lowest returns to occur on Tuesdays and the highest returns on Wednesdays.

Following those studies conducted for the United States, Ikeda (1988) used the Tokyo stock exchange index and found similar daily effects to those reported by Pettway (1984). He also proved this behavior based on the kurtosis and the asymmetric rate for daily returns. For an extended time series, Kato (1990) found the same weekly patterns of behavior in the returns on stock in Japan. However, he included in his research tests to determine returns on each day of the week. He came to the conclusion that in most cases returns have a significant increase during the time when the stock exchange market is closed.

Like any other pattern, the “day-of-the-week effect” (DOW) on the returns of an asset would enable agents to profit from behavior patterns of the markets by designing trading strategies. The existence of a behavior pattern in the returns associated with the days of the week could suggest predictable characteristics of the time series. This could indicate the existence of conditional returns depending on the day of the week, thus providing investors with opportunities for arbitration. The existence of these long-term valid negotiating rules would imply a conflict with the Efficient Market Hypothesis (also known as EMH) as discussed by Granger (1992). In general, if there are foreseeable and openly available patterns that allow generating profit, then there will be evidence against the EMH.

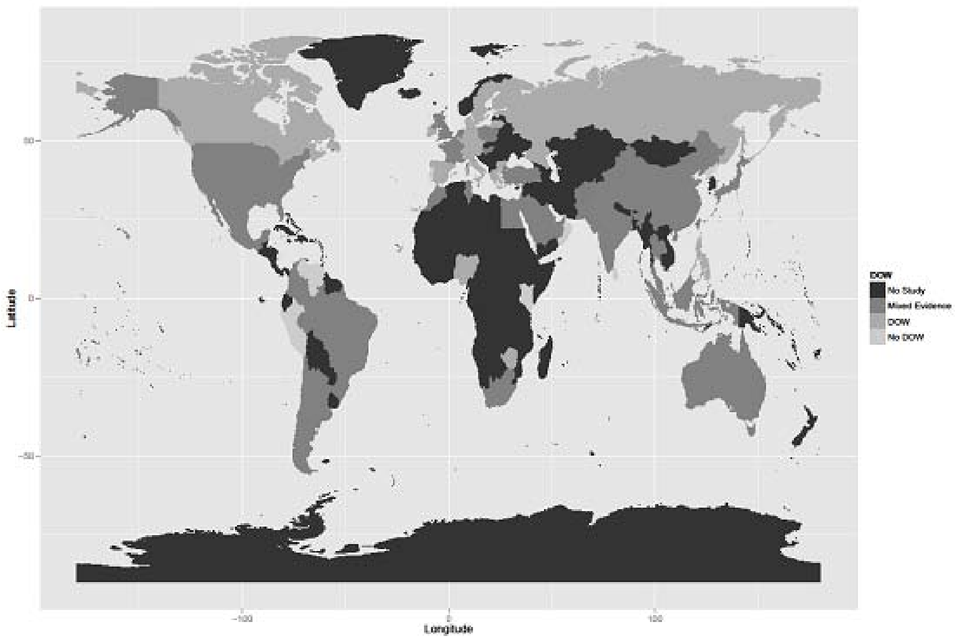
The efficiency of financial markets has been the subject of important research studies since Fama (1955) and Fama (1970) explained that the foundations of his EMH are based on the impossibility to predict the behavior of price series of financial assets.

In recent years, market annalists and market agents have been given major attention to emerging markets’ performance. For example, Goldman Sachs popularized an acronym for a group of emerging markets: BRICS (Brazil, Russia, India and China). The BRICS aggrupation dates from 2001, when Goldman Sachs began to use the term (O’Neill, 2001). More recently, a “second generation” of emerging markets became popular: the CIVETS (Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa) (Greenwood, 2011). The Economist popularized this acronym in 2009.

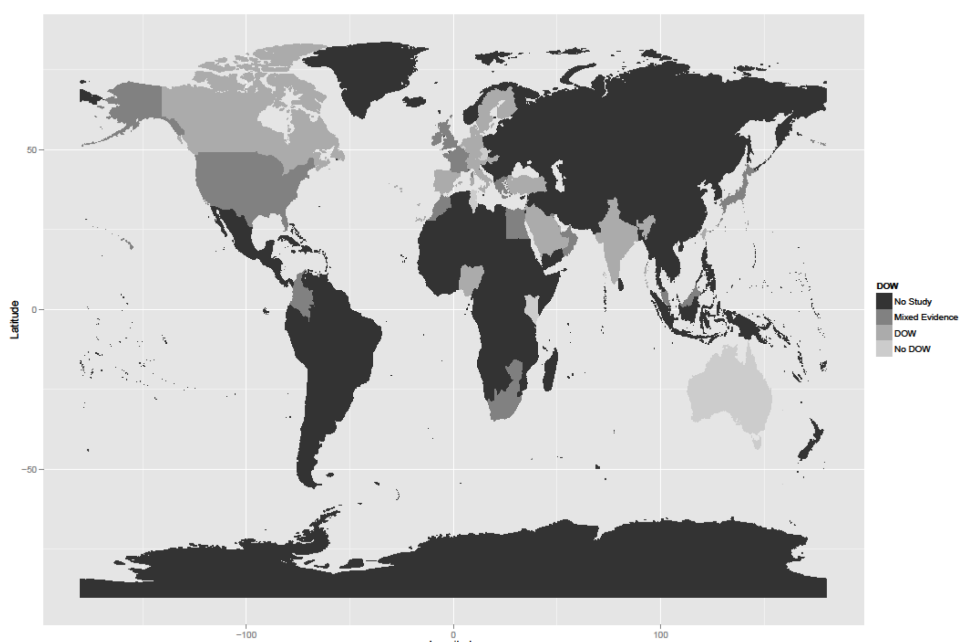
In the case of the CIVETS, not too many studies have investigated the existence of calendar effects in their financial markets. Furthermore, Rivera (2009), for Colombia; Basher & Sadorsky (2006) for Colombia, Indonesia, South Africa and Turkey; Yalcin & Yucel (2006) for Colombia, Indonesia, South Africa and Turkey; Kamaly & Tooma (2009) and Aly, Mehdian & Perry (2004) for Egypt; Alagidede (2008) for Egypt and South Africa; Lean, Smyth & Wong (2007) for Indonesia; Brounen & Ben-Hamo (2009) for South Africa; Aksoy & Dastan (2011), Kamath and Liu (2010), Cinko & Avci (2009) and Berument, Coskun & Sahin (2007) for Turkey; and Hau (2010) for Vietnam provide mixed evidence on the hypothesis of a DOW effect for both the mean and the volatility of the returns for the CIVETS.

Maps 1 and 2 show the results of different studies about the DOW effect around the globe since 2004. Countries for which no day-of-the-week effect evidence is found are shaded in dark color. The lightest color corresponds to those countries for which no previous study was found. GRAPH 1 focuses on DOW effect in returns, while GRAPH 2 corresponds to evidence regarding this anomaly in volatility.

GRAPH 1
DAY-OF-THE-WEEK-EFFECT ON RETURNS EVIDENCE AROUND THE GLOBE



GRAPH 2
DAY-OF-THE-WEEK-EFFECT ON VOLATILITY: EVIDENCE AROUND THE GLOBE



This paper looks into the weekly behavior patterns of returns on the CIVETS's stock to determine whether there is a DOW effect that would refute the validity of the EMH. This examination is not limited to the regular behavior patterns of the first moment of returns. Following Berument (2003), Harvinder (2004), and Galai (2005), this paper also includes a review of possible patterns at the second moment of returns.

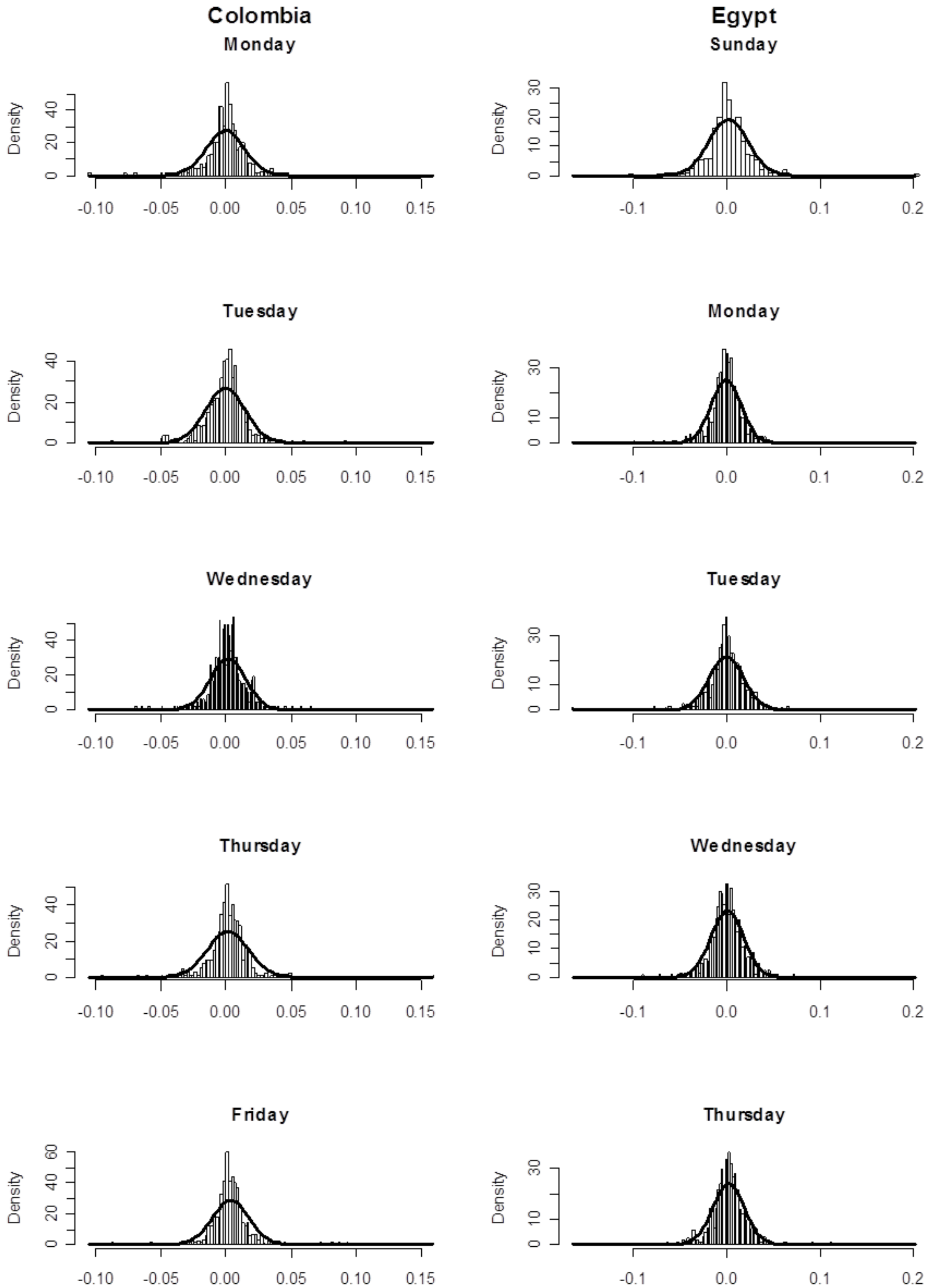
The paper is organized as follows: i) the first section is a brief introduction; ii) the second section discusses the models and data used for demonstrating the existence of the DOW effect; iii) the third section discuses the estimation of the GARCH family models; and iv) the last section deals with the final remarks.

METHODOLOGY AND DATA

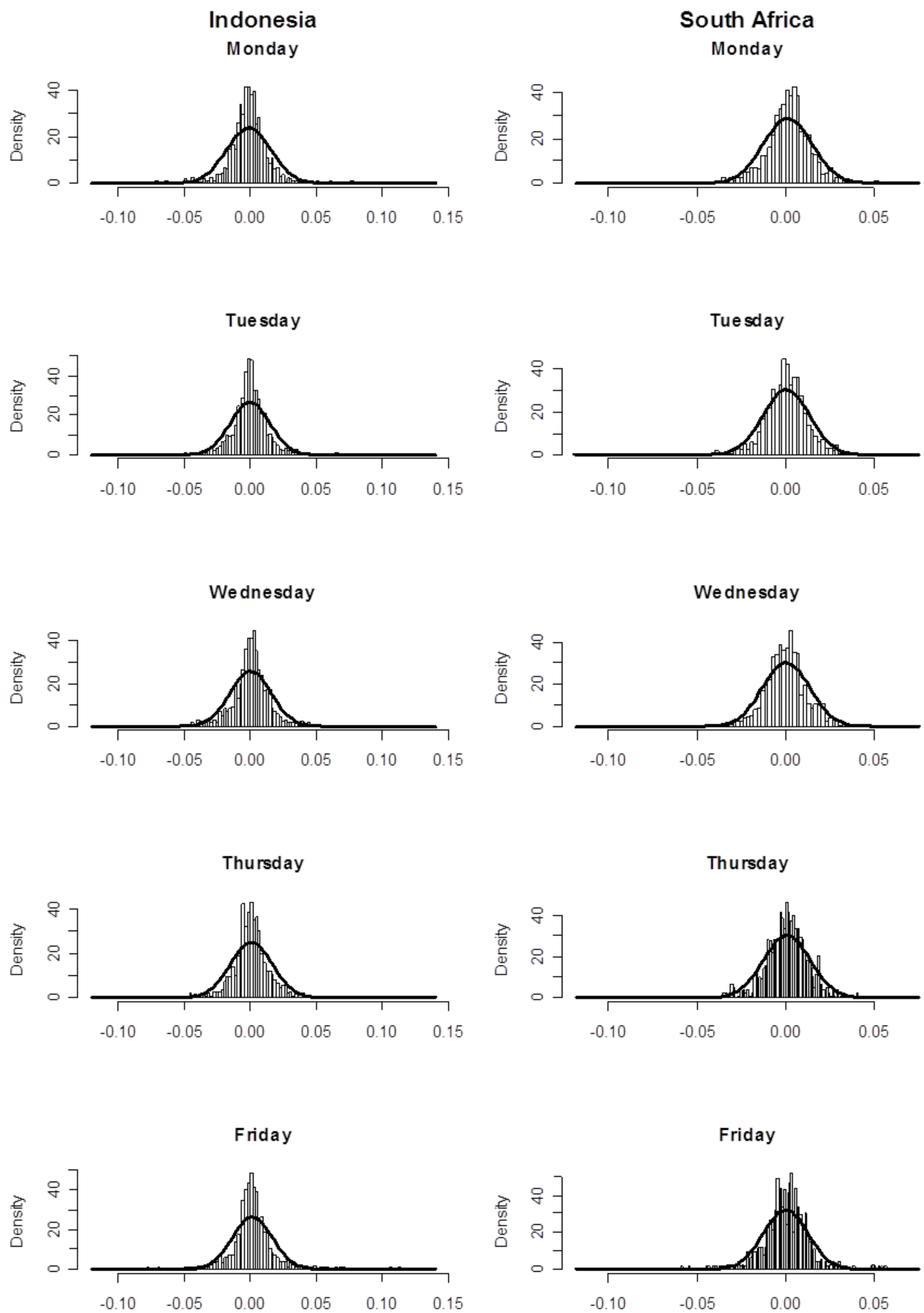
In order to assess the existence or not of the DOW effect in the CIVETS we will use daily returns of the Colombian, Indonesian, Vietnamese, Egyptian Turkish and South African stock markets. All samples end in the last trading-day of July 2012 for the six countries. The source of our data was Reuters.

Finding patterns in the behavior of the daily returns implies to determine the distribution of daily returns on stock indexes on each day of the week. The histogram and the associated normal distribution (based on the unconditional mean and variance of the sample) are shown in GRAPH 3, GRAPH 4 and GRAPH 5.

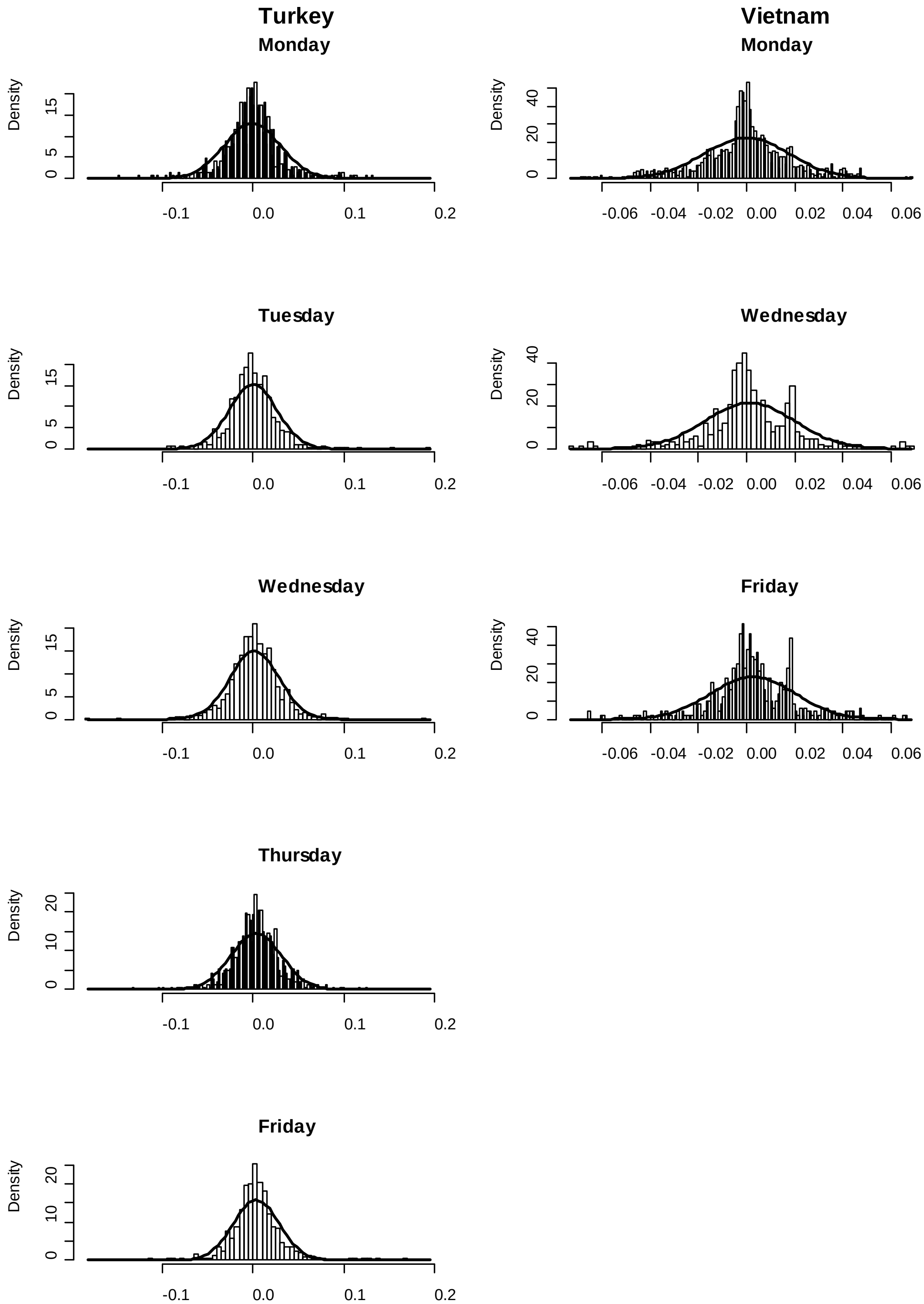
GRAPH 3
DAILY RETURNS' HISTOGRAMS: COLOMBIA AND EGYPT



GRAPH 4
DAILY RETURNS' HISTOGRAMS: INDONESIA AND SOUTH AFRICA



GRAPH 5
DAILY RETURNS' HISTOGRAMS: TURKEY AND VIETNAM



The difference between the empirical distribution of the data and the normal distribution is evident. The returns show a rather peaky or leptokurtic distribution for each of the days considered in the analysis. Heavier tails are obtained simultaneously which entails a higher likelihood of obtaining extreme values versus what one would expect to attain in a normal distribution.

In this respect, the results are similar to those obtained by Alonso C. & Arcos (2006) whose study did not make any distinction among the different days of the week. On the other hand, those histograms provided some indication of a possible DOW effect for each country. Of course, this approach is only descriptive.

The most common approach to determine the day-of-the-week effect on daily returns (R_t) is based on the OLS estimation of the following model:

FIGURE 1
MODEL FOR OLS ESTIMATION WITH DUMMY VARIABLES

$$R_t = \delta + \sum_{i=1}^{4} \beta_i D_{it} + u_t$$

where u_t stands for an error term with a zero mean and constant variance. D_{it} represents the dummy variables depending on the day of the week. In this respect, $D_{1t} = 1$ if *t* corresponds to a Tuesday, and $D_{1t} = 0$ otherwise. Similarly, $D_{2t} = 1$ if *t* corresponds to a Wednesday, and so forth. Thus, the Monday effect is gathered by the constant δ , and the estimated coefficients in FIGURE 1 represent the difference in the average returns in any given day with respect to Monday. It is worth noting that this kind of approach is the same as that used in most of the above-mentioned studies for the CIVETS.

It is well known that inefficient estimators will be obtained for the parameters in FIGURE 1 if u_t (the error term) is heteroscedastic and self-correlated. Consequently, a better approach to model the returns on stock indexes implies to take into account the fact that returns have a non-constant behavior.

Thus, it is interesting to be able to capture the periods of steadiness and high volatility in each series and model the variance, because model in FIGURE 1 only considers the case of a conditional mean. The GARCH-M model allows not only modeling an appropriate conditional mean return (based on unbiased efficient estimators), but also modeling day-of-the-week effects on the variance. Special consideration was given to the following GARCH-M model:

FIGURE 2
GARCH-M MODEL

$$R_t = \delta + \sum_{i=1}^{4} \beta_i D_{it} + \lambda \sigma_t + \varepsilon_t$$

$$\sigma_t^2 = \kappa + \sum_{i=1}^{4} \alpha_i D_{it} + \sum_{i=1}^{p} \phi_i \sigma_{t-i}^2 + \sum_{i=1}^{q} \theta_i \varepsilon_{t-i}^2 + \upsilon_t$$

where ε_t stands for a random error term with a mean equal to zero and heteroscedastic variance that reflects the behavior described in the second equation in FIGURE 2. It is worth noting that a similar specification was suggested by Berument (2003).

The α_i coefficients in the second equation in FIGURE 2 capture the day-of-the-week effect on the volatility of returns with respect to Mondays. The model described FIGURE 2 above would also allow verifying whether empirical results are consistent with classical financial theory, i.e. the higher the conditional variance of returns (risk), the higher the necessary compensation must be (return). This statement is confirmed by coefficient λ .

On the other hand, a special case of the GARCH-M model is the restricted case when $\sum_{i=1}^{p}\phi_i + \sum_{i=1}^{q}\theta_i = 1$. In this case, the model is known as IGARCH-M (Integrated Generalized Autoregressive Conditional Heteroskedasticity). The IGARCH model implies a unit root in the GARCH process, i.e. persistence in the volatility process.

EMPIRICAL EVIDENCE

Estimations derived from the GARCH-M model (FIGURE 2) using Bollerslev's and Wooldridge's quasi-maximum likelihood method (QMLE) (Bollerslev & Wooldridge., 1992) and assuming normally distributed errors are shown in TABLE 1 and TABLE 2[4].

It is worth highlighting several results with respect to the conditional mean. As far as the Colombian stock exchange index is concerned, the mean return is different from zero only on Thursday and Friday. For Indonesia, returns on Mondays and Tuesdays are on average negative. Wednesdays, Thursdays and Fridays' returns are positive. For South Africa, the results show that Thursdays' returns are similar to returns on Mondays, and the other days of the week present a different average. Estimations for Turkey imply that the mean return is different from zero on Wednesdays, Thursdays and Fridays. In the case of Egypt and Vietnam the mean return is different from zero only on Thursdays and Fridays, respectively

With regard to the performance of the variance, for Colombia, Indonesia, and Egypt there is not a day-of-the-week effect. The returns of the stock market index for South Africa, Turkey and Vietnam do present a DOW effect in volatility.

TABLE 1
GARCH MODELS

	COLOMBIA		INDONESIA		SOUTH AFRICA		TURKEY	
	GARCH-M (QMLE) Dependent variable: Returns (z- statistic in parenthesis)							
Eq. for the mean	**COLOMBIA**		**INDONESIA**		**SOUTH AFRICA**		**TURKEY**	
Constant	0.0004		-0.0007		0.0015		0.0000	
	(0.717)		(2.393)	**	(4.130)	***	(0.055)	
Tuesday	-0.0002		0.0003		-0.0010		-0.0005	
	(0.306)		(0.990)		(2.513)	**	(0.555)	
Wednesday	0.0009		0.0015		-0.0014		0.0019	
	(1.512)		(3.984)	***	(2.940)	***	(1.920)	*
Thursday	0.0013		0.0014		-0.0005		0.0032	
	(2.166)	**	(3.559)	***	(1.086)		(3.012)	***
Friday	0.0023		0.0020		-0.0010		0.0024	
	(3.944)	***	(5.781)	***	(2.317)	**	(2.463)	**
σ^2_t	1.6470		0.1214		1.0523		0.5882	
	(0.740)		(0.109)		(0.568)		(0.630)	
AR(1)	0.2633	***	0.2918	***	-0.4293	**	1.2673	***
	(6.532)		(13.095)		(2.215)		(11.317)	
AR(1) × Tuesday	-0.1065		-0.2214		-0.2186		-0.2506	
	(1.875)	*	(6.456)	***	(4.491)	***	(5.615)	***
AR(1) × Wednesday	-0.0941		-0.0743		-0.0246		-0.1679	
	(1.704)	*	(2.077)	**	(0.454)		(3.428)	***
AR(1) × Thursday	0.0107		-0.0880		-0.0877		-0.0917	
	(0.174)		(2.437)	**	(1.685)	*	(1.829)	*
AR(1) × Friday	-0.1250		-0.0948		-0.0896		-0.1104	
	(2.136)	**	(2.694)	***	(1.783)	**	(2.356)	**
Eq. for the variance								
Constant	0.0000		0.0000		0.0000		0.0001	
	(1.643)		(0.987)		(0.435)		(4.063)	***
Tuesday	0.0000		0.0000		0.0000		-0.0001	
	(0.679)		(0.083)		(0.008)		(3.299)	***
Wednesday	0.0000		0.0000		0.0000		-0.0001	
	(1.625)		(0.179)		(1.911)	*	(1.691)	*
Thursday	0.0000		0.1837		0.0000		-0.0001	
	(0.547)		(0.854)		(0.236)		(1.398)	
Friday	0.0000		-0.6325		0.0000		-0.0002	
	(0.464)		(0.527)		(1.933)	*	(4.166)	***
σ^2_{t-1}	0.6824		0.8268		0.8955		0.8478	
	(17.477)	***	(70.011)	***	(108.058)	***	(64.148)	***
ε^2_{t-1}	0.1670		0.1261		0.0477		0.0950	
	(4.244)	***	(8.440)	***	(5.403)	***	(7.692)	***
$\varepsilon^2_{t-1} \times (\varepsilon_{t-1} < 0)$	0.1249		0.0968		0.0909		0.0737	
	(2.569)	**	(4.476)	***	(6.676)	***	(3.930)	***
AR(p)	1		1		1		5	
MA(q)	0		0		2		5	
GED PARAMETER	1.2352		1.2329		1.5886		1.4243	
	(28.460)	***	(44.391)	***	(36.480)	***	(33.803)	***
R^2	0.0475		0.0437		0.0083		0.0228	
Durbin Watson	2.0558		2.0178		2.0373		2.0023	
Number of Obs.	2225		4986		3792		3624	

TABLE 2
IGARCH MODELS

	IGARCH-M (QMLE) Dependent variable: Returns (z- statistic in parenthesis)			
Eq. for the mean	**EGYPT**		**VIETNAM**	
Constant	0.0007		-3.3583	
	(1.322)		(0.001)	
Monday	-0.0008		-	
	(1.337)		-	
Tuesday	-0.0008		-	
	(1.186)		-	
Wednesday	-0.0004		-0.0001	
	(0.575)		(0.194)	
Thursday	0.0011		-	
	(1.833)	*	-	
Friday	-		0.0009	
	-		(2.619)	***
σ^2_t	0.3388		-0.8635	
	(0.239)		(0.518)	
AR(1)	1.17768	***	0.9999	***
	11.311		(607.834)	
AR(1) × Monday	-0.0977		-	
	(2.139)	**	-	
AR(1) × Tuesday	-0.1255		-	
	(2.444)	**	-	
AR(1) × Wednesday	-0.1495		-0.1251	
	(3.008)	***	(3.669)	***
AR(1) × Thursday	-0.1713		-	
	(3.592)	***	-	
AR(1) × Friday	-		-0.0390	
	-		(0.991)	
Eq. for the variance				
Monday	0.0000		-	
	(0.203)		-	
Tuesday	0.0000		-	
	(1.474)		-	
Wednesday	0.0000		0.0000	
	(0.294)		(1.092)	
Thursday	0.0000		-	
	(1.320)		-	
Friday	-		0.0000	
	-		(5.165)	***
σ^2_{t-1}	0.8571		0.7164	
	(67.100)	***	(38.067)	***
ε^2_{t-1}	0.1429		0.2836	
	(11.188)	***	(15.073)	***
AR(p)	2		1	
MA(q)	3		2	
GED PARAMETER	1.3175		1.4450	
	(39.797)	***	(28.943)	***
R^2	0.0443		0.1298	
Durbin Watson	2.0287		1.9492	
Number of Obs.	3136		2363	

FINAL REMARKS

We used a GARCH-M model, which, unlike an estimation based on a conventional linear model that uses OLS, allows determining a consistent efficient approach to estimate the DOW effect on mean returns. This approach also allows estimating the DOW effect on volatility.

In our case, the weekly behavior patterns of financial markets (DOW effect) are identified for the stock-exchange-market indexes of the CIVETS. All five countries present day-of-the-week effect on mean returns. On the other hand, DOW effect was not found in the returns' volatility for Colombia, Indonesia and Egypt.

Likewise it must also be noted that volatility of returns does not have any effect on the mean return on the CIVETS' stock-market indexes. These results contradict classical financial theory which states that the higher the conditional variance (risk) of returns, the higher the necessary compensation (return).

Finally, the behavior pattern of mean returns in the stock exchange market implies that there is a possibility to establish negotiating rules and, therefore, provides some sort of evidence that these markets is inefficient. This finding should be discussed and examined in more detail in further studies.

ENDNOTES

1. See Rozeff & Kinney(1976) for one of the first studies of this subject matter.
2. Ariel (1987) released one of the first papers on this subject
3. Keim (1983) was one of the pioneers in this subject.
4. The models selected in all cases conform to a GARCH(1,1). These models were selected based on modified criteria of AIC and SBC as suggested by Enders (2004). On the other hand, in the case were the sum of the ARCH and GARCH terms is not statistical different from 1, an IGARCH-M model is estimated.

REFERENCES

Aksoy, M., & Dastan, I. (2011). Short Selling and the Day of the Week Effect for Istanbul Stock Exchange. *International Research Journal of Finance and Economics* (70), 13.

Alagidede, P. (2008). Day of the Week Seasonality in African Stock Markets. *Applied Financial Economics Letters, 4*(1-3), 115-120. doi: http://www.tandf.co.uk/journals/titles/17446546.asp

Alonso C., J. C., & Arcos, M. A. (2006). 4 Hechos Estilizados de las series de rendimientos: Una ilustración para Colombia. *Estudios Gerenciales, En imprenta*.

Aly, H., Mehdian, S., & Perry, M. J. (2004). An Analysis of Day-of-the-Week Effects in the Egyptian Stock Market *International Journal Of Business 9*(3), 301-308.

Ariel, R. A. (1987). A Montly Effect in Stock Returns. *Journal of Financial Economics*(18), 14.

Balvers, R. J., Cosimano, T. F., & MacDonald, B. (1990). Predicting stock returns in an efficient market. *Journal of Finance, 45*, 1109–1128.

Basher, S. A., & Sadorsky, P. (2006). Day-of-the-week effects in emerging stock markets. *Applied Economics Letters* (13), 9.

Berument, H., Coskun, M. N., & Sahin, A. (2007). Day of the week effect on foreign exchange market volatility: Evidence from Turkey. *Research in International Business and Finance, 21*(1), 87-97. doi: http://dx.doi.org/10.1016/j.ribaf.2006.03.003

Berument, H., & Kiymaz, H. (2003). The Day of the Week Effect on Stock Market Volatility and Volume: International Evidence. *Review of Financial Economics*(4), 18.

Black, A., & Fraser, P. (1995). UK stock returns: predictability and business conditions. *The Manchester School Supplement, 63*, 85–102.

Bollerslev, T., & Wooldridge., J. M. (1992). Quasi-maximum likelihood estimation and inference in dynamic models with time-varying covariances. *Econometric Reviews, 11*, 43-72.

Breen, W., Glosten, L. R., & Jagannathan, R. (1990). Predictable variations in stock index returns. *Journal of Finance, 44*, 1177–1189.

Brounen, D., & Ben-Hamo, Y. (2009). Calendar Anomalies: The Case of International Property Shares. *Journal of Real Estate Finance and Economics, 38*(2), 115-136. doi: http://www.springerlink.com/link.asp?id=102945

Campbell, J. Y. (1987). Stock returns and the term structure. *Journal of Financial Economics, 27*, 373-399.

Cinko, M., & Emin, A. (2009). Examining The Day Of The Week Effect In Istanbul Stock Exchange (ISE). *International Business & Economics Research Journal 8*(11), 45-50.

Clare, A. D., Psaradakis, Z., & Thomas, S. H. (1995). An analysis of seasonality in the UK equity market. *Economic Journal, 105*, 398–409.

Corhay, A., Fatemi, A., & Rad, A. T. (1995). On the presence of a day-of-the-week effect in the foreign exchange market. *Managerial Finance, 21*, 32-43.

Cross, F. (1973). The behavior of stock prices on Fridays and Mondays. *Financial Analyst Journal*, 67-69.

Enders, W. (2004). *Applied econometric time series* (2nd ed.). Hoboken, NJ: J. Wiley.

Fama, E. F. (1955). The behavior of stock market prices. *Journal of Bussines*(38), 34-105.

Fama, E. F. (1970). Efficient capital markets: a review of theory and empirical work. *Journal of Finance, 38*, 34-105.

Fama, E. F., & French, K. R. (1989). Business conditions and expected returns on stocks and bonds. *Journal of Financial Economics, 25*, 23-49.

Flannary, M. J., & Protopapadakis, A. A. (1988). From T-bills to common stocks: investigating the generality of intra-week return seasonality. *Journal of Finance, 431-449*.

French, K. (1980). Stock returns and the weekend effect. *Journal of Financial Economics, 8*, 55-69.

Galai, D., & Kedar-Levy, H. (2005). Day-of-the-Week Effect in High Moments. *Financial Markets, Institutions & Instruments, 14*(3), 169-186.

Gibbons, M., & Hess, P. (1981). Day of the week effects and asset returns. *Journal of Business, 54*, 579-596.

Granger, C. W. J. (1992). Forecasting Stock Market Prices: Lessons for Forecasters. *International Journal of Forecasting*(8), 10.

Greenwood, J. (2011). After BRICs, CIVETS?, *Wall Street Journal*. Retrieved from http://online.wsj.com/article/SB10001424053111904716604576546632573895382.html

Harvinder, K. (2004). Time Varying Volatility in the Indian Stock Market. *Vikalpa: The Journal for Decision Makers*(29), 18.

Hau, L. L. (2010) Day-Of-The-Week Effects in Different Stock Markets: New Evidence on Model-Dependency in Testing Seasonalities in Stock Returns. In D. a. P. R. C. (DEPOCEN) (Series Ed.), *DEPOCEN WORKING PAPER SERIES* (pp. 34).

Ikeda, M. (1988). Day of the week effect and the mixture of normal distribution hypothesis. *Japan Financial Review, 18*, 27-54.

Jaffe, J., & R., W. (1985). The weekend effect in common stock returns: The international evidence. *Journal of Finance, 40,*, 433-454.

Jarrett, J., & Kyper, E. (2006). Capital market efficiency and the predictability of daily returns. *Applied Economics, 38*, 631-636.

Kamaly, A., & Tooma, E. A. (2009). Calendar anomolies and stock market volatility in selected Arab stock exchanges *Applied Financial Economics 19*(11), 881 – 892.

Kamath, R., & Chinpiao, L. (2010). An Investigation Of The Day-Of-The-Week Effect On The Istanbul Stock Exchange Of Turkey. *Journal of International Business Research, 9*(1), 15-27.

Kato, K. (1990). Weekly patterns in Japanese stock returns. *Management Science, 36*, 1031-1043.

Keim, D. (1983). SIze-related anomalies and stock return seasonaliry: Further empirical Evidence. *Journal of Financial Economics, 12*, 13-32.

Keim, D. B., & Stambaugh, F. (1984). A further investigation of weekend effects in stock returns. *Journal of Finance*(39), 819-840.

Lakonishok, J., & Levi, M. (1982). Weekend effect in stock return: A note. *Journal of Finance, 37*, 883-889.

Lean, H. H., Smyth, R., & Wong, W.-K. (2007). Revisiting calendar anomalies in Asian stock markets using a stochastic dominance approach. *Journal of Multinational Financial Management, 17*(2), 125-141. doi: http://dx.doi.org/10.1016/j.mulfin.2006.05.003

O'Neill, J. (2001) Building Better Global Economic BRICs In Goldman Sachs Economic Research Group (Series Ed.), *Global Economics Paper* (pp. 15). London: Goldman Sachs,.

Pesaran, M. H., & Timmermann, A. (1995). The robustness and economic significance of predictability of stock returns. *Journal of Finance, 50*, 1201-1228.

Pettway, R., & Tapley, T. (1984). The Tokyo Stock Exchange: An analysis of stock market prices. *Keio Bussiness Review*, 75-93.

Rivera, D. M. (2009). Modelación del Efecto del Día de la Semana para los Índices Accionarios de Colombia mediante un Modelo STAR GARCH. (Spanish). *Revista de Economía del Rosario, 12*(1), 1-24.

Rogalski, R. J. (1984). New findings regarding day-of-the-week returns over trading and non-trading periods: A note. *Journal of Finance*, 1603-1614.

Rozeff, M. A., & Kinney, W. R. (1976). Capital market seasonality- The case of stock returns. *Journal of Financial Economics, 3*, 379-402.

Wellington, V. U. (2005). Day-of-the-Week Effects in the Pre-holiday Returns of the Standard & Poor's 500 Stock Index. *Applied Financial Economics, 15*(2), 107-119.

Yalcin, Y., & Yucel, E. M. (2006). The Day-of-the-Week Effect on Stock-Market Volatility and Return: Evidence from Emerging Markets *Czech Journal of Economics and Finance*(56), 22.