DAY OF THE WEEK EFFECT IN EMERGING MARKETS:
COMPARING THE REGRESSION AND NON-PARAMETRIC TEST

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Abstract: This study aims at providing a comparative analysis on the existence of the day of the week effect for 15 emerging stock markets by the use of both regression and non-parametric test. The results of both analysis indicates that Argentina, Czech Rep, Hong Kong, Poland stock markets have no significant day of the week. The day of the week effect is present for the Chile, Brazil, Hungary, Malaysia, Peru, Thailand, Slovakia and Slovenia according to both analyses. The countries Australia, Indonesia and Romania exhibit the day of week effect under one analysis. Copyright © 2007 IFAC

Keywords: Day of the week effect; market efficiency

1. INTRODUCTION

The efficient market hypothesis states that the price of a security is a reflection of all available information, which also indicates that no one can predict the security prices and generate abnormal returns continuously. However, for the last few decades, a vast amount of evidence has been found on the existence of calendar anomalies, such as day of the week effect, which contradicts the claim of the efficient market hypothesis.

The day-of-the-week effect can be defined as statistically significant positive or negative return regularities in weekdays, like the positive returns on Friday and negative returns on Monday. Cross (1973) found that if SP Composite rise on Friday, there will be a further gain on Monday at 49 per cent of the time; however, if there is a decline on Friday, there will be a subsequent rise on Monday only 24 per cent of the time.

This study aims at providing a comparative analysis on the existence of the day of the week effect for 15 emerging stock markets by the use of both regression and non-parametric test.

2. LITERATURE REVIEW

Several studies searched for the existence of the day of the week effect by relying on the OLS methodology (see Gibbons and Hess, 1981; Keim and Stambaugh, 1984; Jaffe and Westerfield, 1985; Condoyanni et al., 1987; Lakonishok and Maberly, 1990; Lee et al., 1990; Chang et al., 1993). The OLS methodology has some drawbacks, which are strong assumptions like normality, linearity of the relation, independent and identically distributed error terms. One possible remedy for these drawbacks is the use of GARCH methodology (Bollerslev, 1986), which can be utilised for investigating the calendar anomalies (Kiymaz and Berument, 2003; Chusanachoti and Kamath, 2002; Al-Loughani and Chappell, 2001; Poshakwale and Murinde, 2001; Easthon and Faff, 1994).
Another solution to overcome the drawbacks of the OLS methodology is to utilize nonparametric techniques (Kohers et al., 2004; Wong and Yuanto, 1999; Board and Sutcliffe, 1988).

Several studies (Choy and O’Hanlon, 1989; Kohers and Kohers, 1995; Balaban et al., 2001; Berument and Kiyimaz, 2001; Gregoriou, et al., 2004; Kohers et al., 2004) were devoted to investigate the day of the week effect in developed countries. On the other hand, there has been a growing interest in studying the day of the week effect in emerging markets. Although the main interest has been placed on the Pacific Rim emerging markets (Ho, 1990; Tang, 1997; Kamath et al., 1998; Clare et al., 1998; Wong and Yuanto, 1999; Choudhry, 2000; Brooks and Persand, 2001; Chusanachoti and Kamath, 2002; Hui, 2005), for the last decade studies have been devoted to investigate the East European emerging markets (Davidson and Faff, 1999; Poshakwale and Murinde, 2001; Ajayi et al., 2004; Dimitar and Tae-Hwan, 2004; Tonchev and Kim, 2004) and Latin American markets (Basher and Sadosky, 2006). Although the day of the week effect has been well documented in the literature, some recent studies have reported that the day of the week effect have been disappearing in developed countries (Tan and Tat, 1998; Steeley, 2001; Chusanachoti and Kamath, 2002; Kohers et al., 2004).

3. RESEARCH DESIGN

The daily stock indices for 15 emerging markets, Argentina (MERVAL), Brazil (BOVESPA), Chile (IGRA), Peru (IGRA), Czech Republic (PX50), Hungary (BUX), Poland (WIG20), Romania (BETI), Slovakia (SAX), Slovenia (SBI), Hong Kong (Hang-Seng), Indonesia (Jakarta Stock Exchange Composite), Malaysia (Kuala Lumpur Stock Exchange Composite), Thailand (SETI), Australia (All Ordinary) were analysed in order to assess the existence of day of the week effect.

The sample data was covering the time period from 19/05/1995 to 19/05/2006 for all the markets except Romania, which started at 23/09/1997.

In order to remove the holiday effects, both pre and post holiday returns were removed from the data i.e. if Wednesday was holiday both Tuesday and Thursday returns were removed.

Return was calculated as \( R_t = \ln(I_{i,t}/I_{i,t-1}) \) where \( R_t \) was denoting the daily return of stock index \( i \) on day \( t \), and \( I_{i,t} \) and \( I_{i,t-1} \) were the closing values on day \( t \) and \( t-1 \) for the same index, respectively.

4. EMPIRICAL FINDINGS

Kolmogorov-Smirnov test is utilised in order to check the normality of the daily returns. Table 1 provides the p-values for the test. It can be observed that for most of the markets, the returns are not normally distributed with respect to day of the week (61 out of 75).

<table>
<thead>
<tr>
<th>Country</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>0.001</td>
<td>0.071</td>
<td>0.019</td>
<td>0.001</td>
<td>0.007</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.013</td>
<td>0.009</td>
<td>0.206</td>
<td>0.114</td>
<td>0.126</td>
</tr>
<tr>
<td>Chile</td>
<td>0.055</td>
<td>0.082</td>
<td>0.289</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Czech Rep.</td>
<td>0.039</td>
<td>0.019</td>
<td>0.003</td>
<td>0.005</td>
<td>0.084</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>0.001</td>
<td>0.003</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.000</td>
<td>0.000</td>
<td>0.016</td>
<td>0.000</td>
<td>0.005</td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.000</td>
<td>0.001</td>
<td>0.003</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Malaysia</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Peru</td>
<td>0.000</td>
<td>0.023</td>
<td>0.025</td>
<td>0.002</td>
<td>0.004</td>
</tr>
<tr>
<td>Poland</td>
<td>0.024</td>
<td>0.043</td>
<td>0.060</td>
<td>0.031</td>
<td>0.111</td>
</tr>
<tr>
<td>Romania</td>
<td>0.001</td>
<td>0.002</td>
<td>0.005</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.003</td>
<td>0.104</td>
<td>0.028</td>
<td>0.004</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Separate regression equations are estimated for each country by the use of dummy variables to determine the day of the week effect. The dummy variables are defined as \( \text{Mo}, \text{Tu}, \text{We}, \text{Th}, \text{Fr} \) for Monday, Tuesday, Wednesday, Thursday, and Friday respectively.

\[
R_t = \beta_0 + \beta_1 \text{Mo}_t + \beta_2 \text{Tu}_t + \beta_3 \text{We}_t + \beta_4 \text{Th}_t + \beta_5 \text{Fr}_t
\]

where \( i = 1, 2, ..., 15 \) indicates the number of countries in the analysis.

Table 2 provides a summary of the significance test for regression coefficients. According to Table 2, 4 markets (out of 9) have significant negative Monday returns. These markets are Indonesia and Malaysia at 0.05 level, and Chile and Thailand at 0.01 level. On the other hand, only in Hungary has a significant positive Monday return at 0.01 level.

<table>
<thead>
<tr>
<th>Day Of the Week</th>
<th>Negative Return</th>
<th>Positive Return</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Significant</td>
<td>5%</td>
</tr>
<tr>
<td>Monday</td>
<td>5</td>
<td>2a</td>
</tr>
<tr>
<td>Tuesday</td>
<td>5</td>
<td>1d</td>
</tr>
<tr>
<td>Wednesday</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Thursday</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>8</td>
<td>2e</td>
</tr>
</tbody>
</table>

Total: 19 3 2 42 3 6

a: Indonesia-Malaysia  b: Chile-Thailand  c: Hungary  d: Slovenia  e: Romania-Slovakia  f: Brazil-Chile-Peru-Slovenia-Thailand
Slovenia market is the only one that has significant negative Tuesday and significant positive Wednesday return at 0.05 level.

All Friday returns are positive, but only 7 of them are significant. The Romania and Slovakia exhibits positive Friday returns at 0.05 significance level and Brazil, Chile, Peru, Slovenia, Thailand are significant at 0.01 level.

<table>
<thead>
<tr>
<th>Day Of the Week</th>
<th>Negative Return</th>
<th>Positive Return</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Significant</td>
<td>1%</td>
</tr>
<tr>
<td>Monday</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Tuesday</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Wednesday</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Thursday</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Friday</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>3</td>
</tr>
</tbody>
</table>

When the day of the week effect is analysed by the use of Wilcoxon signed rank test, the findings are changing. Table 3 provides a summary of the Wilcoxon singed rank test. The findings imply that the negative Monday returns for 3 markets (Chile, Malaysia and Thailand) are significant at 0.01 level. On the other hand, when the positive Monday returns are taken into account, Australia and Hungary have significant returns at 0.01 and at 0.05 level, respectively.

Slovenia market is the only one that has significant positive Wednesday return at 0.01 level, and moreover Slovakia and Slovenia have significant positive returns on Thursday at 0.01 level.

All of the markets exhibit positive Friday returns, however only 7 markets have significant positive returns. These markets are Brazil, Chile, Slovakia, Slovenia, Peru and Thailand at 0.01 level and Hungary at 0.05 level of significance.

The results of both regression and Wilcoxon statistics indicate that Argentina, Czech Rep. (consistent with Tonchev and Kim, 2004; Ajayi et al., 2004), Hong Kong (inconsistent with Ho, 1990; Balaban et al., 2001; Kohers, et al., 2004), Poland stock markets have no significant day of the week effect.

For 6 markets, both statistics exhibit the same day of the week effect at the same significance level. Chile and Thailand (consistent with Kamath et al., 1998; Choudhry, 2000 and inconsistent with Brooks and Persand, 2001) have negative Monday returns at 0.01 significance level; Malaysia (consistent with Balaban et al., 2004) has negative Monday return at 0.05 significance level; Brazil, Chile, Peru, Slovenia (inconsistent with Tonchev and Kim, 2004) and Thailand (consistent with Kamath et al., 1998) have positive Friday returns at 0.01 significance level.

On the other hand, for three markets, although both of the statistics indicate the same day of the week, the significance levels for these days are different for each statistics. For Hungary Monday return is positive at 0.01 and 0.05 significance levels according to regression and Wilcoxon statistics, respectively. The regression statistics exhibits positive Friday return for Slovakia (inconsistent with Tonchev and Kim, 2004) at 0.05 significance level, while Wilcoxon statistics points out 0.01 significance level. Hence, Slovenia (inconsistent with Tonchev and Kim, 2004) has positive Wednesday return at 0.05 and 0.01 significance levels according to regression and Wilcoxon statistics, respectively.

IV. CONCLUSION

This study aims at providing a comparative analysis on the existence of the day of the week effect for 15 emerging stock markets by the use of both regression and non-parametric test.

No significant day of the week can be found for Argentina, Czech Rep, Hong Kong, Poland stock markets under both analyses. Both statistics exhibits the day of the week effect for the Chile, Brazil, Hungary, Malaysia, Peru, Thailand, Slovakia and Slovenia. On the other hand, the day of week effect is presents in Australia, Indonesia and Romania under one analysis.

The comparative findings of this study indicate that the day of the week effect is still present in most of the developing stock markets. The anomalies can be detected by the use of either regression or non-parametric tests.

REFERENCES


