The paper deals with the problem of crisis, and post-crisis, performance of capital markets in the European Union and Turkey. Due to liberalization of all balance of payments accounts and increasing financial integration of the Eurozone with the rest of the world there was a very strong response of stock exchanges to the sub-prime loan crisis that has origins in the United States. There was no country that escaped the wave effects of this crisis. There should be no doubt that what matters for each and every economy in the world these days is not the resistance for external factors, but the speed of recovery. In this regard internal factors play the crucial role, both in the private sector, and in a national economic policy. We should no longer ask questions whether economic integration is beneficial or not, but the focus should be on economic policies and general economic framework, including legal rules, that allow for fast and dynamic recovery and returning on a sustainable growth path.

When observing economic performance of the European Union and its neighbors, it becomes evident that there are economies that managed to recover quickly after a short recession caused by global factors. A good example is Turkey with its dynamic economy and fast growing standard of living. Changes in the wealth of a nation lead to permanent changes in consumption patterns and as such create market opportunities for European exporters. However, before the real sector expansion is announced, there is a need for fixed capital formation domestically. For emerging and developing economies it is necessary to import capital and initiate growth on the basis of foreign savings. Turkey is such a case, where prior to fast economic expansion, a significant development of a national stock market happened. The Istanbul Stock Exchange attracted also foreign investors, allowing the European capital to take part in the success of Turkish economy.

Using simple statistical methods of cointegration to disclose co-movements in stock market indices, it became possible to answer questions about the nature and strength of integration of financial markets in the European Union and in Turkey. It turned out that performance of the Istanbul Stock Exchange is strongly related to the London Stock Exchange and it responds more than proportionately to all developments in the UK capital market. In the same time, the cointegration with the stock market in Frankfurt is less pronounced. Despite FTSE and DAX are highly positively correlated, the response of the ISE to developments in DAX are less than proportional. It is possible to observe stronger relationship in the crisis and post-crisis period. While DAX and FTSE diverged, the strength of response of the ISE to both: DAX and FTSE was much stronger.

Introduction

It has been already about three years since the outbreak of the global financial system crisis in 2008. Consecutive waves of the sub-prime crisis, originating in the USA, were traveling around the globe, hitting even remote economies. This was a result of far-reaching integration of financial markets. Despite this integration brings transaction costs down [Młodkowski 2005] and allows for better growth opportunities [Bekaert, et al. 2007], it represents a threat of suffering from spill-over effects. Only few countries resisted the negative influence of the greed-generated problem. Most economies in the world suffered, however, a severe decline in the general economic activity. Unemployment rose, as real sector experienced restricted access to loans due to insufficient capital adequacy at banks. Bankruptcies lead to serious social problems, when households were caught in the debt-trap, with nominal mortgage liabilities exceeding the declining value of the real estate, representing a collateral for these liabilities. With the problems of the real sector, performance of capital markets around the world suffered even a deeper decline. It may be explained by referring to the precautionary motif in wealth management in unstable times. Since developments in the global economy increased the uncertainty about the future, and future cash flows, societies decided to keep more of their wealth in a form of more liquid instruments. Such behavior of cash hoarding was already observed in the post-crisis period in Japan after 1991. A substantial change in preferences made...
economic policies impotent in initiating economic growth. This is again a feature of some economies. However, there are many countries that either resisted the crisis or managed to recover relatively quickly and to resume economic growth.

One may ask a question about the responses of the EU capital markets to the global financial crisis. The purpose here is to compare this response with a post-crisis performance of emerging economy of Turkey. A scientific problem in this exercise is the recognition of factors that are potentially responsible for observed differences in behavior of capital markets. A speed of economic recovery and future growth prospects may be country-specific in two dimensions. The first is the structure of the underlying real sector and its model of financing. The other is a set of economic policies that support the national economy in times of an external shock.

The aim of this paper may be presented in the following manner. First, it is to recognize and compare capital market response, in the European Union and Turkey, to the most recent crisis. Second, the aim is to conclude on factors responsible for observed differences and similarities.

The object of this paper are capital markets. For many years scientific literature presents financial intermediation as a growth engine [Greenwood and Jovanovic 1990, Galetovic 1996, Levine and Zervos 1998, Bekaaert and, Harvey 1998, Levine 2005, Demirguc-Kunt et al. 2011]. As may be concluded from the empirical and theoretical studies on the role of efficient capital markets in stimulating, facilitating and enabling economic growth, modern economy needs an efficient financial sector. Its role is interpreted as not only pooling domestic savings for productive use in investment projects, but also as a vehicle of mobilizing foreign capital for domestic use [Beck and Levine 2004]. Bekaaert and Harvey [1998] claim that productive investment projects will not be made use of without an efficient set of financial intermediaries. Inefficiency in financial intermediation is similar to taxation of investment projects, and as such is detrimental to economic growth [Stiglitz 1989].

The object of this paper is the recent performance of capital markets in the EU and in Turkey captured in two dimensions. The first one is the secondary market behavior during the most recent crisis and afterwards. Despite the secondary market performance covers also the dividend policy, this particular corporate policy is not covered by this paper. For some insights into crisis-related issues in dividend policy one can refer to Młodkowski (2010). Focus on developments of stock prices is supposed to provide information about the speed of recovery of the real sector, since the stock market index is an acclaimed leading indicator. The second dimension of this study focuses on the primary market performance in the EU and in Turkey. This is captured by the Initial Public Offerings and is supposed to offer information about growth potential in the underlying national economies.

Research methods used in this paper cover a cointegration analysis of stock market indices plus a regression analysis of an IPO capital surplus ratio.

Dataset is compiled using databases of national stock exchanges. Several variables describing level of development of the financial sector are taken from the World Development Indicators database, by the World Bank. Information about Initial Public Offerings in Europe comes from PriceWaterhouseCooper IPO Watch Europe. The database is available from the corresponding author on request.

**One more time about the crisis, and its original causes**

The global financial crisis started from initial internal problems of the financial sector in the USA that appeared already in 2007. However, due to liberalization of financial account in the balance-of-payments of most countries, numerous investors were holding financial instruments associated with toxic assets that became non-performing. The global consequences of sub-prime loans, and Collateralized Debt Obligations (CDO) and in general – credit derivatives, started to spread only in the fourth quarter of 2008. There should be no doubt that the faith in financial engineering and the belief that it is possible to create something from nothing (creatio ex nihilo) were only temporary imaginations of greed-possessed minds. However, costs of these misperceptions and consequences of irresponsibility in the USA were imposed on societies even in the most remote parts of the world.

![Figure 1. AD and AS adjustments](image-url)

Source: Authors’.  

**Figure 1. AD and AS adjustments**

Capital losses that followed, hit the real sector in two ways. First, the decrease in wealth resulted in lower consumption spending and demand fell (Figure 1). Second, weakened financial institutions restricted access to loans for consumption and investment. In real terms, there was a shift in aggregated demand and aggregated supply in most countries. Only few resisted the adjustments to a loss in the total wealth.

The economies that managed to resist unfavorable external conditions were only few. They were characterized by three main features. First, they were highly diversified in terms of production structure. Second, they had a strong and vibrant agriculture sector. And third, there was a strong internal demand financed by current income rather than loans. These “green islands” were: Poland, in Europe, and India, in Asia. Despite the real economy did not contract in these countries, the capital markets suffered from an outflow of foreign capital.

Figure 2 presents performance of three stock market indices standarized by their respective means. The presented values are defined as percentages of a mean value of an index over the period 2000 – 2012 (1=100%). It can already be observed that the biggest stock markets in the European Union show high positive correlation (0,95), while the performance of the stock market in Turkey develops along a different path (XU100-DAX correlation coefficient = 0,49, XU100-FTSE100 correlation coefficient = 0,35). When analyzing the magnitude of an adjustment in stock prices at the respective stock markets, it turns out that the developing country did not suffer significantly more than the EU capital markets.
A simple regression model may be proposed for testing the postulated cointegration of stock market indices:

\[
DAX_i = \text{const} + DAX_{i-1} + FTSE_i + FTSE_{i-1} + \epsilon_i
\]  

(1)

Table 3. VAR model #1: 2002 to 2012

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>Std.Error</th>
<th>t-value</th>
<th>t-prob</th>
<th>PartR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const.</td>
<td>-0.007</td>
<td>0.0281</td>
<td>-0.260</td>
<td>0.8026</td>
<td>0.0095</td>
</tr>
<tr>
<td>DAX-1</td>
<td>-0.159</td>
<td>0.4155</td>
<td>-0.383</td>
<td>0.7129</td>
<td>0.0206</td>
</tr>
<tr>
<td>FTSE</td>
<td>1.569</td>
<td>0.1396</td>
<td>11.242</td>
<td>0.0000</td>
<td>0.9475</td>
</tr>
<tr>
<td>FTSE-1</td>
<td>0.340</td>
<td>0.6741</td>
<td>0.505</td>
<td>0.6288</td>
<td>0.0352</td>
</tr>
</tbody>
</table>

R²= 0.96 F(3,7) = 56.375 [0.0000], DW = 2.01
RSS= 0.057 for 4 variables and 11 observations
Source: Authors’.

Good fit of this model, with no autocorrelation of the error term allows for concluding that the biggest stock markets in the European Union have a very similar performance in the turbulent times of the global crisis.

An analogous exercise for the Istanbul Stock Exchange index (XU100) delivers the following results, on the basis of two equations:

\[
XU_i = \text{const} + XU_{i-1} + FTSE_i + FTSE_{i-1} + \epsilon_i
\]  

(2)

\[
XU_i = \text{const} + XU_{i-1} + DAX_i + DAX_{i-1} + \epsilon_i
\]  

(3)

From the initial statistical analysis it should be expected that the capital market in Turkey is strongly cointegrated with the Eurozone’s stock exchange. The correlation coefficient between DAX and XU100 is higher than for the FTSE100 and XU100.

Table 4. Model #2: 2008-2012

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>Std.Error</th>
<th>t-value</th>
<th>t-prob</th>
<th>PartR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const.</td>
<td>0.135</td>
<td>0.067</td>
<td>2.012</td>
<td>0.084</td>
<td>0.366</td>
</tr>
<tr>
<td>XU-1</td>
<td>-0.248</td>
<td>0.232</td>
<td>-1.072</td>
<td>0.319</td>
<td>0.141</td>
</tr>
<tr>
<td>FTSE</td>
<td>1.179</td>
<td>0.287</td>
<td>4.098</td>
<td>0.004</td>
<td>0.705</td>
</tr>
<tr>
<td>FTSE-1</td>
<td>-0.027</td>
<td>0.385</td>
<td>-0.071</td>
<td>0.945</td>
<td>0.000</td>
</tr>
</tbody>
</table>

R²= 0.725 F(3,7) = 6.16 [0.0224], DW = 1.50
RSS= 0.313 for 4 variables and 11 observations
Source: Authors’.

The only two variables that are statistically significant in model 2 are: (1) a constant, and (2) contemporary return on the FTSE100 index. The relationship between these two stock markets is strong and positive. However, there is a positive autocorrelation of the error term in the regression, and therefore the magnitude of the relationship may be at a different level. The model #3, which test the relationship between the stock market in Turkey and in Germany, delivers again the same information of strong positive influence. Changes in the Turkish stock exchange are however less than proportional to changes in DAX, while the model #2suggests that Istanbul Stock Exchange reacts more than proportionately to developments at the London Stock Exchange.

The fitness of model #2 is higher, in terms of R², but the Durbin-Watson statistic much below “2” suggests that the

There was a remarkable recovery and magnificent growth of the stock market in Turkey in 2010. It not only allowed to make up for the loss recognized in 2009, but it pushed prices of equity twice as high, as at the two largest European stock markets. This behavior can be explained by vibrant national economy that offers numerous productive investments, and by accumulation of domestic capital due to fast growth of income in Turkey. The efficient stock market intermediated between investors and companies in facilitating flow of financial resources for fueling economic recovery and growth. Using the stock market index as a leading indicator it could be concluded that the real sector performance will make up for the loss recognized in 2009, but it pushed prices of equity twice as high, as at the two largest European stock markets in the European Union have a very similar performance in the turbulent times of the global crisis.

When studying cointegration of the rates of change of main EU stock markets, their co-movement is not strong and positive. However, there is a positive autocorrelation of the error term allows for concluding that the biggest stock markets in the European Union have a very similar performance in the turbulent times of the global crisis.

Figure 2. Stock market indicies performance: DAX, FTSE100 and XU100 2000 – 2012.

Table 1. Rates of return on stock market indicies (DAX, FTSE100, and XU100) 2008-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>DAX</th>
<th>FTSE100</th>
<th>XU100</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>1%</td>
<td>-5%</td>
<td>4%</td>
</tr>
<tr>
<td>2009</td>
<td>-57%</td>
<td>-41%</td>
<td>-64%</td>
</tr>
<tr>
<td>2010</td>
<td>22%</td>
<td>20%</td>
<td>52%</td>
</tr>
<tr>
<td>2011</td>
<td>20%</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>2012</td>
<td>-9%</td>
<td>-3%</td>
<td>-10%</td>
</tr>
</tbody>
</table>

Source: Authors’.

Table 2. Unit-root tests 2002 to 2012 for the rates of change of stock market indicies (Critical values: 5%=−1.975 1%=−2.827)

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAX</td>
<td>-3.2219**</td>
</tr>
<tr>
<td>FTSE100</td>
<td>-3.0905**</td>
</tr>
<tr>
<td>XU100</td>
<td>-4.2898**</td>
</tr>
</tbody>
</table>

Source: Authors’.
relationship may be overestimated, and therefore must be interpreted with caution. The stock markets in the European Union countries are highly cointegrated. There are, however, still some specific features that make performance of the London Stock Exchange and Frankfurt Stock Exchange different, when compared with a common benchmark.

Table 5. Model #3: 2008-2012

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>Std.Error</th>
<th>t-value</th>
<th>t-prob</th>
<th>PartR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Const.</td>
<td>0.128</td>
<td>0.081</td>
<td>1.580</td>
<td>0.1581</td>
<td>0.262</td>
</tr>
<tr>
<td>XU-1</td>
<td>-0.186</td>
<td>0.257</td>
<td>-0.723</td>
<td>0.492</td>
<td>0.069</td>
</tr>
<tr>
<td>DAX</td>
<td>0.638</td>
<td>0.212</td>
<td>3.007</td>
<td>0.019</td>
<td>0.563</td>
</tr>
<tr>
<td>DAX-1</td>
<td>-0.118</td>
<td>0.263</td>
<td>-0.451</td>
<td>0.665</td>
<td>0.028</td>
</tr>
</tbody>
</table>

R² = 0.605 F(3,7) = 3.5779 [0.0748] DW = 1.78
RSS = 0.450 for 4 variables and 11 observations

Source: Authors’.

Table 6. Estimated coefficients of equations #1, #2, and #3, for 2000-2008 and 2000-2012 (t-Statistic)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>1.7923</td>
<td>1.569</td>
<td>dax-fsse</td>
</tr>
<tr>
<td>#2</td>
<td>0.825</td>
<td>1.179</td>
<td>ux-fsse</td>
</tr>
<tr>
<td>#3</td>
<td>0.399</td>
<td>0.638</td>
<td>ux-dax</td>
</tr>
</tbody>
</table>

Source: Authors’.

A comparative analysis of performance of capital markets in the two periods: (1) pre-crisis:2000-2008, and (2) whole period: 2000-2012 allows for several interesting conclusions. First equation suggests that the cointegration of stock exchanges in the European Union decreased. This may be explained to some extent by different economic developments in the Eurozone and in the UK due to Spain, Greece and Italy debt problem. Equations two and three suggest a substantial increase in the similarity of behavior between Turkish stock market and both European stock exchanges. On one hand, this result may be motivated by a common decline in 2009. On the other hand, this may indicate that Istanbul Stock Exchange became more integrated with the neighboring stock markets and follows more and more similar paths.

Despite the stock market index and its developments are commonly perceived and used as a leading indicator for general economic activity, there is still another dimension of a capital market that may provide information about the performance and prospects of a national economy. This other dimension is the primary market, where new shares are sold for the first time.

Primary market performance during the crisis, and its recovery afterwards – IPO study.

The IPO process has an objective to introduce a company to the general public and allow interested investors diversify their portfolios with new shares of a company that used to be privately hold. When evaluating potential consequences of an IPO for a national economy, it is perceived as a medium for achieving a better match in capital market, which results in faster fixed capital formation. Despite the reasoning in this case is appealing, most empirical studies recognize that an IPO is followed by a decline in investment activity of the issuing company [Pastor and Veronesi, 2005]. From the company point of view, the IPO process may serve two purposes:

- to efficiently close long positions in company stocks for founders, angels, initial providers of start-up capital,
- to gather new, additional, capital for the purpose of further development of the underlying business organization [Młodkowski 2002b].

However, in the case of a government that tends to conduct an ownership change reform (privatization) of state-owned companies, the IPO may be an efficient way to privatize enterprises. Therefore, in addition to the two purposes, listed above, one may add that Initial Public Offers represent potential gains also for government, in such a case. This element may, to some extent, be responsible for a different intensity of the IPO initiatives in developed countries and in emerging economies that conduct privatizations in the process of economic transformation. This fact should be controlled, when comparing the IPO intensity in the European Union countries with emerging economies, like Turkey. At the privatization of previously state-owned companies, intensity of the IPO activity may provide insights into the underlying economy, its quality and prospects.

This is not only the timing of the IPO process that matters, when evaluating the national economy that offers new investment projects and attracts providers of capital. Timing depends in most cases on the contemporary investment climate. Empirical studies show that companies choose for their IPOs periods characterized with high prices at stock markets [Bennenga, Helmantel and Sarig, 2005]. There is even a special term – an IPO cycle – that captures a fact of cyclical behavior of new entrants at stock markets [Lowry and Schwert, 2002].

This study of the performance of the primary capital market – the IPO market – in the European Union and in Turkey uses two measures of intensity and efficiency of the Initial Public Offerings. The first is simply the number of IPOs per annum. It tells about the quantity of new entrants at a stock market. Despite this measure is easy to obtain and easy to use, its quality in international comparative studies is questionable. Therefore, to the extent that is possible, this paper introduces an original measure, and uses it for the first time. It is a measure of efficiency of an IPO.

Innovation introduced by this study is a new synthetic ratio for measuring the IPO capital surplus, relative to the nominal value of the IPO issue. It is given by the following formula:

$$\text{IPOratio} = \frac{(\text{IPORevenues} - \text{IPO Nominal Value})}{\text{IPO Nominal Value}}$$

What may drive the potential of an Initial Public Offering capital surplus? First, it is necessary to recognize the nature of the buildings blocks for this ratio: (1) nominal value of an IPO and (2) total revenue from selling stocks under the IPO. In order to understand the categories that build the ratio one may refer to accounting, and to international accounting and financial reporting standards in this regard, in particular. Stockholders equity-related issues are covered by the following of the International Accounting and Financial Reporting Standards: 1, 8, 16, and 32.

The surplus of capital contributed in excess of par value of stock is a part of equity that is recorded separately from the amount of par value of stock contributed by investors who buy shares in the primary market. Par value for each
category of stocks must be the same, no matter the issue. This characteristic is subject to a decision of owners, when they set up a new business. Later, however, the nominal value of stock can be altered in the process of capital structure management (example: stock split or reversed split). At the microeconomic (corporate) level, information about the nominal value of IPO-sold shares and the total revenue from selling shares via the IPO are available from the balance sheet statement, cash flow statement and changes in equity statement.

The nominal value of stock distributed through an IPO is obtained by multiplying the number of shares by the nominal value of one share. This information is reflected in the balance sheet statement by an increase in the “Common stock” account.

The total revenue from selling shares via the IPO can be obtained by multiplying the average selling price and the number of shares sold. Simultaneously, this amount is presented in the cash flow statement, in the financing section, as the cash-generating financing activity – under the “Sale of stock” heading.

In the same time, the aggregated data on the nominal value of the IPO sales are recorded by the stock exchanges in the process of registration of new entrants. Concerning the total IPO proceeds, this information is also recorded by the institution that maintains the stock market and governs (settles) all transactions. The sum of value of all new capital paid-in for IPO is a feature of investment accounts of all investors who take part in this event.

Factors driving the value of the IPO ratio

The two building blocks of the IPO ratio are: (1) the nominal value of shares sold via the IPO, and (2) the total IPO revenue.

When analyzing factors that could potentially drive the surplus over the nominal value of shares sold via the IPO, the par value of one stock should be taken as given. What really matters, from the theoretical point of view, are variables responsible for propensity to pay for stocks more than their nominal value [Kim and Weisbach 2008].

It is possible to suggest a set of factors that may be responsible for the propensity of investors to pay for stocks in excess of their par value [Młodkowski 2002a, Młodkowski 2002c]:
- current domestic and international investment climate at capital markets,
- current phase of a business cycle,
- inflation rate in the domestic economy,
- external value of a domestic currency,
- real interest rate in the domestic economy.

Discussing relationship between the IPO surplus ratio and each of the factors listed above should allow for understanding of the postulated signs in the variance-covariance matrix.

There should be no doubt that the prices of shares introduced under an IPO are strongly positively correlated with good investment climate at capital markets [Lowry 2003]. For more insights into this relationship one could refer to Lowry and Schwert (2002), Benninga, Helmmantel, Sarig (2005), or Pastor, Veronesi, (2005). Therefore, many issuers, if not all, choose timing of their IPOs according to this criterion. This works perfectly also for seasoned issues.

Often companies maintain “shelf registration” for a new issue of shares so that the actual issue itself can be conducted quickly, when market conditions are favorable [Młodkowski 2002c]. This maximizes the total proceeds from an issue due to propensity of investors to accept higher prices during bullish, rather than bearish periods [Ritter and Welch 2002].

When studying the IPO surplus, it is reasonable to include variables that capture domestic and international investment climate [Henderson, Jegadeesh and Weisbach 2006]. One could suggest here as proxies – stock market indicies or rates of change of stock market indicies, both for the domestic stock market IND_d, and for main global stock exchanges.

When a more advanced design is in question, then it is possible to create a variable (CLI) that allows to control for incentives of international investors to open their positions in a market that is bullish, while main global markets are in recession. Pure rates of growth of stock indicies are good proxies for a situation at respective stock markets [Stulz 2009].

When there is no symmetry in global situation, then there could be reasons for foreign capital to increase demand for IPO stocks and cause average price to reach higher levels. One can imagine a situation with a global recession and “a green island”, to which capital flights from all other stock markets [Młodkowski 2002a]. Then, a variable for a proxy of this case could take the form of a difference between the growth rate of an index describing a domestic stock market (IND_d) and the growth rate (alternatively) of DJIA, of S&P, or of NIKKEI [Caglio, Weiss-Haney and Marietta-Westberg 2010].

\[
\text{CLI}_t = \frac{\text{IND}_{d,t} - \text{IND}_{d,t-1}}{\text{IND}_{d,t-1}} - \frac{\text{DJIA}_{t} - \text{DJIA}_{t-1}}{\text{DJIA}_{t-1}}
\]

When there is a high positive correlation between a domestic stock market and global stock markets, the variable (CLI) will be close to zero. Positive values indicate that the domestic market is bullish (in comparison with the rest of the world) and the IPO capital surplus may potentially be affected by good investment climate domestically and by inflow of foreign portfolio capital [Stulz 2005]. Negative values of this indicator suggest either faster growth of foreign stock markets, or substantially stronger domestic recession than in the rest of the world.

Table 7. CLI values in basic states of the world [symmetric behavior of stock markets].

<table>
<thead>
<tr>
<th>State of the world</th>
<th>+δIND</th>
<th>−δIND</th>
</tr>
</thead>
<tbody>
<tr>
<td>+δDJIA</td>
<td>CLI ≈ 0</td>
<td>CLI &lt; 0</td>
</tr>
<tr>
<td>−δDJIA</td>
<td>CLI &gt; 0</td>
<td>CLI ≈ 0</td>
</tr>
</tbody>
</table>

Source: Authors’.

Symmetric behavior is understood, as in the OCA theory [Młodkowski 2007], as the matching change domestically and abroad in terms of the direction and the scale of the change. Positive CLI values are associated here with a situation where stock market conditions facilitate IPO. When changes domestically and abroad are matching, then there is no impulse for the capital surplus during the IPO.

When the “beta” of the domestic market is higher than unity (Table 8), then the CLI values are unambiguous in their influence on the IPO surplus, both in expansion and in the recession.
In the last case, the CLI values are again unambiguous, concerning their influence on the IPO capital surplus. Negative values indicate unfavorable IPO conditions, and positive tend to fuel the category of interest (IPO capital surplus ratio). The next variable that potentially drives the IPO capital surplus is the general economic activity that changes cyclically along a business cycle.

The standard variable in most studies that describes the business cycle phase in the national economy is the growth rate of the real GDP [Bordo and Helbling 2010]. This variable is used in the current analysis as the IPO surplus driving factor. Real growth rate of the national economy (GDP) is an exogenous variable in all versions of the estimated econometric model.

Rational justification for inclusion of this macroeconomic variable in the model comes from a belief that the higher the real GDP growth, the better the economic prospects for all businesses in the national economy and the higher the net present value of all future cash flows (including an investment in an IPO stocks). It can also be argued that the process of issuing shares, in general, not only via IPOs, is positively correlated with the business cycle [Doige, Karolyi and Stultz, 2011]. Not only the “shelf registration” aims at maximizing the sales of stock by proper timing, but also the privatization process in Central and Eastern European countries is tailored to match favorable stock market conditions.

There is always a positive correlation in case of the relationship between nominal (monetary) variables and the inflation. The nominal value of stocks offered under an IPO is an exemption from this rule, because it does not fluctuate along with the general price level. Therefore, for this study, the correlation between nominal value of IPO issue should be considered constant. However, the nominal value of the total revenue from the IPO is positively correlated with the inflation rate.

There is another problem to be recognized in the area of IPO-inflation relationship. According to initial statistical analysis conducted for Turkey for 2003-2011, the higher the inflation, the lower the number of Initial Public Offerings. As a consequence, it is possible to suggest that in high inflation economies (or during high inflation periods), companies are reluctant to gather capital via IPOs.

When looking for a rational explanation of the observed behavior, one could point out the fact of higher operating risk associated with higher inflation. This risk is bear by providers of capital. The discounted value of equity suffers much more from inflation than the value of debt. This is because the debt holders are usually protected by inflation-indexing in the bond/loan contract. High and variable inflation discourages investors from holding equity. They prefer to hold bond portfolios instead.

Another explanation of the negative correlation coefficients between number of IPOs and inflation is associated with problems in setting an optimal selling price of stocks when general level of prices changes dynamically. The difference (of timing) between consecutive phases of an IPO make it sub-optimal for enterprises to use equity for financing investment projects.

Having observed the described behavior of the IPO capital surplus and the number of IPOs allows for including an inflation variable (GDP deflator or alternatively CPI) in the set of exogenous variables.

The exchange rate developments are also potentially important for the IPO capital surplus, especially in economies that fully liberalized financial account of their balance of payments. If there is a depreciation of the domestic currency, it makes IPOs more attractive for foreign investors. As a consequence, it may lead to increased demand and higher selling prices of IPO issues. Total demand (T) at the primary market can be decomposed into two elements: D – demand from domestic investors, and F – demand from foreign investors (T = D + F). While domestic investors interested in the IPO market are indifferent concerning the exchange rate, this does not apply to foreign investors. In their case, the lower the external value of the domestic currency in a country they open long positions, the higher the purchasing power of their cash balances, denominated in foreign currencies. Therefore, with the depreciation of the domestic money, all investment opportunities for incoming foreign capital become cheaper. This potentially adds to the total demand (T) also at the IPO (primary stock) market. The supply of shares is perfectly rigid and is represented by a vertical “S” line in both figures. This shape is a result of the nature of the IPO offer that is based on a fixed number of shares that does not respond positively to fluctuations in demand.

Additional demand (F) from foreign investors pushes the price of the IPO-sold shares up. Following this manner of interpretation of the potential relationship between the exchange rate developments, it is reasonable to include the external value of the domestic currency in a model that describes IPO capital surplus.

The last factor that has a potential of driving the IPO capital surplus ratio is the real interest rate. This variable is derived from the Fisher Equation. It defines relationship between the nominal interest rate (i) and the expected inflation (E[Π]):

\[ 1 + i = (1 + r)(1 + E[Π]) \]  

which delivers the real rate of return (r):

\[ r = \frac{(1 + i)}{(1 + E[Π])} - 1 \]  

The real interest rate is a potentially important variable for capital structure management and for all decisions concerning gathering the capital and in decisions about investment. As such, it is also a factor driving the propensity to bid higher prices for shares offered under IPOs. When considering the statistical test for correlations between the IPO capital surplus

<table>
<thead>
<tr>
<th>Table 8. CLI values in advanced combinations of states of the world [asymmetric behavior of stock markets]</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of the world</td>
</tr>
<tr>
<td>+δDJIA</td>
</tr>
<tr>
<td>−δDJIA</td>
</tr>
</tbody>
</table>

Source: Authors’.

<table>
<thead>
<tr>
<th>Table 9. CLI values in advanced combinations of states of the world [asymmetric behavior of stock markets]</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of the world</td>
</tr>
<tr>
<td>+δDJIA</td>
</tr>
<tr>
<td>−δDJIA</td>
</tr>
</tbody>
</table>

Source: Authors’.
and the real interest rate, it is evident that there is a positive correlation between them, no matter which proxy of inflation is used (CPI or GDP deflator) for calculating the real variables.

The presented discussion on the potential IPO capital surplus drivers allows for following conclusions. There are several factors that may have significant influence on the total net benefits a company receives from conducting an IPO.

**Model formulation**

In the proposed model the dependent variable is the value of the IPO capital surplus ratio, as defined by the equation 4. There are five explanatory variables, described above. The relationship between the exogenous variables and endogenous variables is assumed linear, which delivers the following formulation of functional relationships:

\[ IPO_i = \text{const} + \alpha \text{CLI}_i + \beta \text{GDP}_i + \chi \text{EXR}_i + \delta \text{INF}_i + \gamma \text{RR}_i + \varepsilon_i \]  

(8)

where:
- IPO – capital surplus ratio,
- CLI – investment climate at capital markets,
- GDP – real GDP growth rate (annual),
- EXR – exchange rate of the domestic currency (number of units of domestic currency per unit of the USD),
- INF – annual inflation rate (measured by either the CPI or the GDP deflator),
- RR – real interest rate in the domestic economy,
- \( \varepsilon \) – the standard error term with the mean \( E(\varepsilon) = 0 \) and constant variance \( \sigma^2 = \text{const.} \), uncorrelated with other explanatory variables.

The lack of lagged variables is a consequence of strong pro-cyclical behavior of companies that conduct IPOs. The number of IPOs and the value of the IPO capital surplus ratio are responding to contemporary economic conditions with a short lag, or with no lag at all.

The initial results for Turkey are presented in table 10.

**Table 10. Estimated model of the IPO surplus for Turkey 2004-2011**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff.</th>
<th>Std.error</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GDP</td>
<td>0.34</td>
<td>0.12</td>
<td>2.833</td>
</tr>
<tr>
<td>CLI</td>
<td>0.71</td>
<td>0.23</td>
<td>3.086</td>
</tr>
<tr>
<td>EXR</td>
<td>-0.30</td>
<td>0.14</td>
<td>-2.142</td>
</tr>
<tr>
<td>INF</td>
<td>-0.01</td>
<td>0.0065</td>
<td>-1.538</td>
</tr>
<tr>
<td>RR</td>
<td>0.03</td>
<td>0.017</td>
<td>1.764</td>
</tr>
</tbody>
</table>

\( R^2 = 0.511, \text{DW} = 2.54 \)

Source: Authors’.

The set of explanatory variables captured about 50% of variability of the IPO capital surplus in Turkey. Departure of the Durbin-Watson statistic for the autocorrelation of the error term indicates that there is a slight negative autocorrelation and it leads to an underestimation of the level of statistical significance of coefficients. The problems in obtaining a better fit of the model result from relatively few observations. It was possible, however, to recognize general properties of relationships between the IPO surplus ratio and five factors that were chosen as explanatory variables.

Lack of comparable data for European Union made the international comparative study impossible in regard to the primary market (IPO market). However, it is already possible at this stage, with the presented estimation results, to conclude about the new measure of the efficiency of an IPO process. Using aggregated microeconomic data for IPOs and several explanatory macroeconomic variables a set of factors driving the cost of capital was recognized.

For the international comparative study of the primary market in the EU and in Turkey it is necessary to refer to quantitative information about the number of IPOs over the several last years. According to the Istanbul Stock Exchange database, the number of the IPOs was fluctuating strongly from 2003 to 2011. PriceWaterhouseCooper offers “The IPO Watch Europe”, a publication that presents aggregated data on primary market in the EU. Table 11 compares number of the IPO in Turkey and in the European Union over the last several years.

**Table 11. Number of IPOs in the EU and in Turkey 2007 – 2011**

<table>
<thead>
<tr>
<th>Year</th>
<th>EU</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>771</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>295</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>126</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>380</td>
<td>15</td>
</tr>
<tr>
<td>2011</td>
<td>430</td>
<td>55</td>
</tr>
</tbody>
</table>

Source: Authors’, based on the ISE database and PWC IPO Watch Europe 2011.

The post-crisis performance of the Turkish economy shows unprecedented growth in the number of new entrants in the capital market. This indicates dynamic national economy that seeks capital for attractive investment projects. As such, it can be interpreted as a new emerging economy that started the process of catching up. With the help of foreign capital there should be expected a substantial fixed capital formation and capital accumulation. In turn, the underlying society will change the consumption pattern and behavior and will become another significant export market for the EU producers.

**Conclusions**

The international comparative study conducted in this paper was designed to test for similarities and differences between performance of capital markets in the European Union and in Turkey. The formulated question dealt with the response to the global financial crisis and the post-crisis performance. Simple statistical methods delivered results for concluding on the developments at the secondary capital market. Lack of comparable data for the European Union restricted comparison of the primary capital market. However, the results for Turkey indicate high positive correlation of propensity to go public, by private limited companies, with business cycle. Instead of direct and formal econometric study of the IPO market, a reference to number of IPOs in Turkey and in the European Union was used to show post-crisis recovery. Simple comparison indicates that Turkey experienced a recovery already in 2010, followed by a dynamic expansion in 2011. In the European Union the primary market was stagnant for longer than in case of Turkey. It may be concluded that despite of globalization and integration of financial markets between Turkey and the European Union, the strength of the underlying economy still
matters. With a growing efficiency and high diversification of production structure, Turkey managed to resume dynamic economic growth after one-period recession in 2009. It is, however, not the case for the European Union economies. One can use the observed performance of stock markets as leading indicators and conclude that the European Union is not going to return to growth path in 2012. Investment opportunities in Turkey seem much more attractive and promising. This may lead to further capital reallocation between the EU-27 and Turkey in the long run.

References


The article has been reviewed.

Received in April, 2012; accepted in June, 2012.