Stock Returns, Productivity, and Corruption in Eight European Fast-Emerging Markets

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This article addresses the impact of productivity, corruption, and trade openness on the stock returns of 265 industrial companies listed in eight Eastern European fast-emerging markets, over the 2004– 2013 period. Through a three-factor model that includes both measures at firm level and macro-level control variables, our findings suggest that country corruption index is negatively correlated with the total annual return of the stocks of the listed industrial companies of our sample. Moreover, the most productive firms are featured by higher stock returns, while leverage seems not to be a key predictor of stock returns. In addition, the article uncovers innovative evidence about trade openness that is nega- tively correlated with stock returns due to its connection with the recent financial crisis. That is, firms operating in markets that are more open to trade show a higher degree of interconnection with other economies and are more likely to undergo the effects of negative fluctuations from foreign markets during the economic crisis.

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Introduction and Literature Review

Although corporate finance has historically researched about the determinants of stock returns and modeling future yields (e.g., forecasting cost of capital and capital budgeting issues), recently corporate governance has focused its attention on measuring the impact of different control variables (e.g., governance indexes, corruption, productivity, and trade openness) on listed companies' stock returns. This field of study has become more relevant over time because of an increasing significance of control variables viewed as powerful devices for attracting foreign direct investment and fostering economic development.

Moreover, in the past several years the financial turmoil, which has violently shaken many European economies, has contributed to a more precisely focused analysis of second-best variables (Arnone, Bellavite Pellegrini, & Graziadei, 2006; Qerimi & Sergi, 2012, 2015) in different geographical and economic environments. Unlike other studies (Bellavite Pellegrini, 2008; Bellavite Pellegrini, Romelli, & Sironi, 2011), our study takes into consideration 265 listed industrial companies belonging to eight Eastern European fast-emerging markets, over the years 2004–2013. By focusing our attention on Eastern European countries, which are usually part of a less intensive stream of research and which represent a possible center of gravity of financial markets in the next year (Kandogan, 2014), we provide additional institutional and empirical evidence to the international debates. Therefore, our research mainly analyzes the impact and the influence of an extensive set of governance variables that might affect stock returns of listed industrial companies, which are located in the evolving institutional and economic markets of Eastern Europe. Finally, we provide some policy suggestions.

Furthermore, this period encompasses the last years of the economic euphoria (2003–2006) and the multifaceted aspects of the economic and financial crisis (2007–2013), providing partially different evidence in comparison with precrisis times. In order to implement our analysis, we adopt a Fama and French (1992, 1993, 1995) three-factor model for forecasting stock performances, adding further control variables in terms of productivity at firm level (Parhizgari & Aburachis, 2003) and of corruption (Arnone & Borlini, 2014) and trade openness at country level.

This article provides interesting proof about the impact of the above-mentioned variables on stock returns in the context of cross-country analysis. In details, the results show that, while investors require lower returns in countries that show unimportant level of corruption, trade openness is likely to play a different role, according to business and economic cycles.

The remainder of the article is organized as follows: The next section is devoted to the data description, followed by a third section on estimation and methodology. The fourth section implements an empirical analysis in order to understand the impact of the above-mentioned control variables on stock returns. Finally, some concluding remarks provide suggestions for future research agenda.

Data

We considered in our analysis 265 industrial companies[1] listed in Estonia, Latvia, Lithuania, Poland, Hungary, Czech Republic, Slovak Republic, and Slovenia over the period from January 1, 2004, to the end of December 2013. We dropped the companies belonging to the financial sector from our sample mainly because of the limited comparability with industrial companies' indices. In Tables 1 and 2, we provide some evidence about gross

TABLE 1 Relative Weight of the National Gross Domestic Product (%)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average Value
Czech Republic	19.72	19.58	19.96	19.38	19.90	20.71	20.1	20.05	19.46	18.71	19.74
Estonia	2.00	2.02	2.18	2.28	2.04	1.97	1.89	2.01	2.13	2.23	2.06
Latvia	2.42	2.46	2.78	3.18	3.02	2.63	2.32	2.48	2.69	2.77	2.64
Lithuania	3.75	3.76	3.88	4.08	4.04	3.76	3.60	3.83	4.03	4.16	3.90
Hungary	17.10	16.11	14.67	14.22	13.24	13.04	12.57	12.3	11.93	11.96	13.99
Poland	42.15	43.81	44.11	44.05	44.95	43.93	46.24	46.21	46.68	47.11	44.73
Slovenia	5.71	5.22	5.09	4.94	4.69	5.05	4.65	4.52	4.35	4.30	4.94
Slovakia	7.15	7.04	7.33	7.87	8.12	8.91	8.63	8.60	8.73	8.76	7.99

Note: Authors' elaboration on Eurostat data.

TABLE 2 Relative Weight of the Market Capitalization of Each National Stock Exchange (%)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average Value
Estonia	1.07	1.08	0.98	0.98	0.92	0.89	0.86	0.82	0.78	0.74	0.93
Lithuania	1.21	1.16	1.02	0.94	0.97	0.93	0.89	0.84	0.80	0.76	0.98
Latvia	0.80	0.78	0.71	0.71	0.68	0.66	0.65	0.63	0.61	0.60	0.70
Poland	63.34	62.65	60.37	60.43	59.69	58.96	58.29	57.67	57.13	56.77	59.9
Hungary	16.74	16.55	15.94	15.95	15.75	15.55	15.37	15.2	15.05	14.95	15.81
Slovenia	4.75	4.69	4.54	4.55	4.49	4.45	4.39	4.34	4.30	4.28	4.50
Czech Republic	10.99	12.03	15.45	15.46	16.56	17.65	18.66	19.63	20.49	21.07	16.23
Slovak	1.10	1.06	0.99	0.98	0.94	0.91	0.89	0.87	0.84	0.83	0.96

Note: Authors' elaboration on Eurostat data.

TABLE 3 Descriptive Statistics of the Sample

Country	Estonia	Latvia	Lithuania	Poland	Hungary	Czech Republic	Slovakia	Slovenia	Total
Total number of listed industrial companies	10	14	20	175	19	5	3	19	265
Percentage of the sample	3.77	5.28	7.54	66.03	7.16	1.88	1.13	7.16	100

Note: Authors' elaboration on Eurostat data.

domestic product (GDP) and market capitalization of the different countries belonging to the sample, and in Table 3 we present some descriptive statistics about the geographical distribution of the companies composing the sample.

The weight of Poland, Czech Republic, and Hungary represents on average values of 78.46% of the GDP of the sample. However, the relative weight of Poland increases by 11.77%, the Czech Republic is substantially stable, and Hungary experiences a significant decrease of 30.05%. Moreover, we notice that even if in absolute terms the weight of Slovakia is marginal, in relative terms the country registers an increase of 22.51% while in the case of Slovenia it is the other way around, with a decrease of 24.69%. [The relative increase of GDP share is computed with the formula 100*[GDP(2013)-GDP(2004)]/GDP(2004)]

Table 2 provides some further information about the relevance of the previously mentioned countries in terms of market capitalization. In average values, the relative weight of Poland, Hungary, and the Czech Republic sums up to 91.94%, attributing to all the other countries of the sample a quite marginal relative weight. However, the relative weights of Poland and Hungary, respectively, decreased by 10.37% and 10.69%. Meanwhile, the Czech Republic doubled the relative weight of the market capitalization over the years 2004–2013.

Finally, Table 3 provides some information about the geographical distribution of the population of the listed industrial companies composing the sample. This distribution only partially reflects the above-mentioned evidence about GDP and market capitalization. Indeed, Polish companies represent 66.03%; meanwhile, Lithuania, Hungary, and Slovenia, which register very similar weights, represent altogether 21.86% of the sample.

Estimation Strategy

The aim of the article is the identification of the determinants of the stock returns of the sample of 265 industrial companies listed in time interval 2004–2013. The model is specified as follows:

$$y_{it} = \alpha + \beta x'_{it} + \varepsilon_{it}$$

where i represents the i-th company in the sample in the year of observation t. The dependent variable y_{it} indicates the annual investment return of the stock for the i-th company in year t, and the regressors are included in the vector of observations x'_{it}; α is the intercept, while the vector of β coefficients measures the impact of each regressor on the expected value of the dependent variable and is obtained by the method of ordinary least squares. Concerning the error term (ε_{it}) distribution, we relax the assumption of its independence across t, allow-

ing the clustering of observations corresponding to a specific company. Consequently, we assume that the error term is independent and identically distributed across firms, taking into account the nonindependence of within-firm observations. All reported standard errors are adjusted for clustering (Huber, 1967; White, 1980). This procedure enhances the robustness of our findings and allows us to take the panel data structure of our sample into account. In addition, this specification of the model allows us to control the effects of country fixed effects that are dropped in a fixed-effects model due to the collinearity with fixed effects at firm level. The estimates of the coefficients of the dummy years and of the control variables are consistent in the sign and in the significance with the estimates obtained running a fixed-effects model that we have implemented as robustness checks.

The variables considered as regressors are the market capitalization, the trade openness, single-country market risk premium, a corporate productivity index, and the index of control of corruption. In addition, we control for the effect of two additional firm-specific variables: the corporate gearing and the volatility of stock prices. These last indices appear to be suitable proxies to identify the financial risk of the different companies and are useful to check the robustness of the effects of corporate productivity and control of corruption. Finally, we introduce country and year dummies.

In the model, the stock investment return of each company (the dependent variable) is the financial performance of a listed company, calculated as the variation in share prices.

In our analysis, we consider the following independent variables: (1) control of corruption index, (2) gearing, (3) market capitalization, (4) market risk premium, (5) price volatility, (6) corporate productivity index, and (7) trade openness. The *control of corruption* is represented by a specific index elaborated by the World Bank. It captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. It has been calculated for each country every year. The *gearing* has been computed as the ratio of the total debt over its equity and is a measure of a company's financial leverage.

The link between leverage indices and stock returns is underlined in the literature (Penman, Richardson, & Tuna, 2007) as a potential predictor of stock returns. *Market capitalization* represents the market value (in euros) of the companies' overall outstanding shares, and it is calculated multiplying the number of outstanding shares of a company by the market price of one share at the end of each year. In our specification, as it is common in corporate governance literature, we include the natural logarithm of this variable in order to improve the fit of the model. *Market risk premium* is another well-known and suitable indicator for the prediction of investment returns (Fama & French, 1992, 1993). It is the difference between the return on a market portfolio and on a risk-free asset. With respect to the period 2004–2013, the market risk premium has been calculated as the difference between a single-country stock exchange index and a single-country central bank discount interest rate. The *price volatility* represents the measure of a stock's average annual price movement to a high and low from a mean price for each year and is a key variable in explaining firms' stock return in literature (Duffee, 1995). The expected value of the volatility coefficients is negative, because higher variability of price per share of a stock company implies a higher risk premium in stock returns. The ratio between sales and total assets represents a suitable proxy of a *corporate productivity index,* indicating the ability of the companies to generate revenues according to the total assets.[2] Following Dellas and Hess (2005), we finally introduced a *trade openness* indicator as a control variable in determining the stock returns. Trade openness is the sum of a country's exports and imports divided by GDP and is obtained from the Penn World Table (PWT), which is the most widely used source for cross-country comparisons for the level and growth rate of macroeconomic variables.

In the empirical model, country and year dummies (not displayed in the table results) are introduced for protecting estimates to the effect of omitted variables and to exogenous shocks, especially because of the financial turmoil since 2007. The decision to adopt a parsimonious model for the regression analysis is necessary to protect estimates by the bias due to the collinearity that is common when several corporate variables are introduced. Indeed, many accounting indices are implemented using deeply interconnected variables, such as total assets, total debts, and revenues. The choice to introduce only two variables that deal with a company's balance sheet (gearing and productivity, which are uncorrelated) produces more reliable and robust estimates.

Descriptive statistics related to the main explanatory variables are illustrated in Table 4.

Empirical Results

Table 5 provides a specification in order to measure whether the previously discussed explanatory variables are statistically significant, with positive or negative effect, for the determination of stock returns.

TABLE 4 Descriptive Statistics for the Explanatory Variables

Explanatory Variables	Observations	Mean	Std. Dev.
Control of corruption	2,915	0.397	0.236
Sales/Total assets	2,305	1.158	1.554
Log (market capitalization) (in eur mln)	2,711	10.644	2.036
Price volatility	2,915	0.489	0.259
Trade openness	2,915	16.217	6.732
Country risk premium	2,915	10.708	33.144
Gearing (%)	2,224	58.817	92.769

Note: Author's elaborations using Stata.

TABLE 5 Determinants of Stock Returns for the Whole Sample (2004–2013)

Variables	Coefficient	T stat
Control of corruption	–0.465***	–2.751
Sales/Total assets	0.127***	2.883
Log (market capitalization)	0.115***	2.684
Price volatility	1.376***	2.766
Trade openness	–0.031*	–1.721
Country risk premium	0.014***	5.721
Gearing	–0.001	–0.968
Country fixed effects		
Estonia	0	
Latvia	–0.461	–1.595
Lithuania	–0.866**	–2.411
Poland	–0.897*	–1.917
Czech Republic	–1.203**	–2.529
Slovakia	–1.144**	–2.235
Slovenia	–0.439	–1.544
Hungary	–0.620**	–2.325
Intercept	–0.364	–0.512
Observations	2002	

*0.1 < p < 0.05; **0.05 < p < 0.01; ***p < 0.01.
Note: Year dummies are included but omitted from the outputs.

Almost all of the previously considered independent variables show an impact on the total investment return and their coefficients are statistically significant. There may be two reasons for the limited variance explained by the regression sum of squares (about 6%). The first can be found in the nature of the analyzed regressors, which are different from the usual ones considered by the literature following the Fama and French models and which have shown good performance in the ability to explain the variance. The second reason, instead, is related to the decision to implement an analysis of the whole sample as a single portfolio,[3] without splitting the sample into groups of more homogeneous companies. Past studies (e.g., Bellavite Pellegrini et al., 2011) show that R^2 may greatly increase, splitting the sample in portfolios ranked by capitalization.

The coefficients of control of corruption and gearing present a negative effect on the stock return, even if only the first one seems to be statistically significant. Countries characterized by a lower level of corruption and, in broader terms, by a higher governance index are likely to be considered more reliable by investors. Presumably, these markets are more stable and less volatile, and investors are able to require a lower return because their investments are supposed to be less risky in the long run. These findings have implications for the stock performances of Eastern European listed companies between 2004 and 2013 and substantiate the importance of an anticorruption stance at an international level; indeed, this last aspect has been recently promoted by national and international economic and financial authorities. Moreover, the negative impact of corruption creates a suspicious institutional environment that is less propitious or less suitable to economic and business activity. The variable control of corruption, which represents a risk measure at the macroeconomic level, detects a more relevant impact than a corporate variable like leverage. If leverage seems not to be a key predictor of stock returns at the firm level, the price volatility performs better instead. According to the risk-return theory, more volatile investments have to compensate the additional risk with a larger return; this evidence is true only in the long run: if the analyzed period is short enough to consider a recessive period, less risky assets will offer higher returns, compared to more risky assets.

The coefficients of market capitalization and market risk premium are statistically significant and positively correlated with stocks' returns. Furthermore, the ratio between revenues and the total assets, taken as a proxy of productivity, shows a positive and statistically significant coefficient, although its size is small. These results are coherent with Bellavite Pellegrini (2008) and Bellavite Pellegrini et al. (2011), which utilize, respectively, the ratio between revenues and working capital and between sales and the number of employees as productivity index. Considering that improving and monitoring productivity may be ascribed within the field of managerial actions,

these may be also considered as a way to predict and to foster industrial stock returns.

Another interesting result concerns the negative impact of trade openness index on stock returns; the higher is the incidence of imports and exports on GDP, the lower are the average stock returns of the corporations listed in that country. This inverse relationship is only apparently counterintuitive and may be explained as follows: countries with higher levels of trade openness show also higher degrees of trade interconnection with foreign countries and are potentially more sensible to the economic cycles of the connected economies. While countries may benefit from the respective business relationship when the economic situation is favorable (Yellen, 2013), such interconnection may be a device for propagating risks and losses during financial crises. As our sample covers mostly the years of the different disguises of the Great Financial Depression (2007–2013), probably the negative sign of trade openness incorporates the depressive effect of the economic and financial crisis affecting mainly the strict interconnection between our sample and the Western economies. This outcome casts a shadow over the supposed virtue of trade openness; in particular, its effects on industrial companies' stock returns should be properly declined according to the different phases of economic cycle.

Interesting findings finally concern the analysis of the sign of country dummies: these coefficients indicate the average difference of average stock returns with respect to the reference category (Estonia in our model), net of the effect of all the other variables. Considering that all the signs are negative, Estonia shows higher stock returns than any other countries of our sample, followed by Latvia and Slovenia, whose performances are in line with that of Estonia; these findings confirm the already known evidence in Western and Central Europe about the outstanding economic and financial performances of small-sized countries in terms of high stock returns (Bellavite Pellegrini, 2008). In particular, the results of Baltic Republics are coherent with the recent literature: Aliouche (2015) analyzed 125 economies between 2007 and 2011 in terms of a country's investment attractiveness; results suggest that Estonia and Latvia, and to a lesser extent Lithuania, experienced specific drops in rankings based on economic/political and legal/regulatory reliability. That increase in markets risks probably was not totally captured by the corruption index included in our model. Hence, higher performances in these countries' financial markets may be justified by the need to pay a specific risk premium. Indeed, country dummies' effects may infer the impact of variables summarizing all sources of residual unobserved heterogeneity in terms of overall risks at the country level.

On the contrary, the Czech Republic and Slovakia detect the lowest levels of stock returns. This last outcome does not surprise, as the Czech Republic and Slovakia, which were connected with the once-upon-a-time Czechoslovakia for historical reason, first experienced the development of their financial markets. In the sampled period, the Czech Republic and Slovakia decreased the intensity of the rate of growth of their firms' stock returns.

Concluding Remarks

A Fama and French (1992, 1993, 1995) three-factor model approach augmented with additional control variables at both the macroeconomic[4] and corporate levels was employed to address the stock returns of a sample of listed industrial companies of Eastern European fast-emerging markets for the period January 1, 2004, to December 31, 2013. Although as "second-best outcomes" (Arnone et al., 2006), our results confirm the importance of different typologies of control variables in determining the stock returns of our sample of listed industrial companies. Our results partially confirm the existing literature, adding however some innovative evidence related to the peculiarity of the sample: market capitalization, price volatility, country risk premium, and corporate productivity affect positively with statistically significant coefficients (although of different magnitudes) the stock return of the sample, while control of corruption, and trade openness are inversely related with statistically significant coefficients.

A lower level of corruption is highly appreciated by investors, who require a lower return for their investments, increasing consequently the current value of their assets. In contrast to the existing literature (e.g., Bellavite Pellegrini et al., 2011), we find innovative evidence about an inverse relationship between trade openness and total investment return due to the different impact of an interconnection index in economic euphoric and otherwise depressed years. Furthermore gearing is not likely to play any role in affecting stock returns.

These outcomes provide some useful implications for implementing optimal economic policy. In particular, considering the importance of an unyielding institutional fight against any intricate forms of corruption that affect economic activity, the relation between interconnection and trade openness has to be more properly declined according to various countries' different institutional features; it follows that any form of managerial

actions able to improve productivity must be promoted thoroughly.

A future agenda of research may develop an analysis of new control variables (e.g., political stability and single countries' legal origin), by extending the methodology to other fast-emerging regions in the world.

Notes

1. All the companies of the sample are featured by a statutory prevision of "one share–one vote" (Harris & Raviv, 1988).

2. The literature gives several solutions for computing a corporate pro- ductivity index, preferring the ratio between annual revenues and the number of firm employees (see, for example, Freeman, 2008). However, due to the lack of data, we prefer a productivity index computed as the ratio between revenues and total assets.

3. In order to overcome the issue of an overall limited explained vari- ance, the established asset pricing financial literature (Black, Jensen, & Scholes, 1972; Fama & Macbeth, 1973) generally assembles large sample of companies into different portfolios according either market capital- ization or β coefficients in order to increase the power of the explained variances of the different specifications.

4. The role of macroeconomic indicators in affecting stock returns is also addressed in recent literature on performances of industrial com- panies (e.g., El Khoury, 2015).

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