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The impact of governance and productivity on stock returns in European industrial companies

Abstract

The target of our research is focused on the measurement of the impact of a Country Governance Index and of a Corporate Productivity Index on the total annual investment returns of stocks of a large sample of European Industrial Companies from January 1, 1996 to December 31, 2008. The authors take into account an innovative database of observations of corporations belonging to a large number of European euro and not euro countries. In order to achieve this target, the paper juxtaposes the Fama and French (1992, 1993) three factors model, with the studies of Doidge et al. (2007) and Gompers et al. (2003), analyzing governance and the index suggested by Parhizgari and Aburachis (2003) in order to measure the impact of corporate productivity on stock returns. Empirical evidence suggests that the Country Governance Index is negatively correlated with the total annual investment return of stocks of the listed industrial companies of our sample, meanwhile the more productive firms are characterized by higher stock returns.

Keywords: stock returns, corporate governance, productivity.
JEL Classification: G10, G34, J24.

Introduction

Corporate finance literature has devoted much effort in analyzing stock returns and implementing models that are able to forecast their future yields on the stock exchanges; indeed, the different purposes of these forecasts animate the economic activity and perspectives of countries and corporations. A correct and accurate determination of the equity cost is necessary for various reasons, ranging from corporate issues, like capital budgeting or optimal financial structure, to market issues, like asset allocation, portfolio management or financial trading. Notwithstanding this relevant volume of related studies, stock returns' forecasts continue to face severe theoretical challenges. Hence, this issue is one of the most challenging and evergreen "financial puzzle" ever analyzed.

According to a recent survey of Subrahmanyam (2010) the financial literature on cross-sectional expected stock returns may be usefully summarized according to different approaches. The first of them, the neoclassical approach like the Capital Asset Pricing Model (Sharpe, 1964; Lintner, 1965) (hereafter CAPM), or the Arbitrage Pricing Theory (Ross, 1976) (henceforth APT), would consist in the first hypothesis against which we test different innovative approaches developed by the financial literature afterwards. These different neoclassical approaches detect a linear relation between risk and returns[1], where the CAPM represents a single market risk and the APT focuses its attention on different macroeconomic factors of risk. Both models mainly consider a deeply connected notion of risk to state macroeconomic variables. The theoretical "Roll critique" (1977) and the empirical analysis of the poor performances of neoclassical models testing[2] (Black, Jensen and Scholes, 1972; Fama and MacBeth, 1973; Roll and Ross, 1980; Chen et al., 1986) have severely weakened the CAPM-APT neoclassical approach.

A second approach draws its inspiration and it roots in the analysis of firm fundamentals or in the current wisdom of practitioners. This point of view has been historically documented by Graham and Dodd (1934) observation about the virtue of the ratio of price to earning in predicting stock returns and has been successively developed by Basu (1977) and by Banz (1981), who displayed the existence of a size effect in stock returns. Harris and Gurel (1986) find a consistent premium in stock returns for firms that have been included in S&P 500, meanwhile Chan et al. (1991) give evidence to the same size effect in explaining the returns of the Japanese stocks in the period of 1971-1988. A relevant stimulus to this second approach has been received by the studies of Fama and French (1992, 1993, 1995, and 1996). The two authors summarize the previous literature and demonstrate that some firm fundamentals, like the ratio of price to earnings, market capitalization or price to book value are much more capable of producing accurate stock returns forecasts than the neoclassical models. Indeed, these would be proxies or shadow indicators of state macroeconomic variables, even if financial literature does not provide a full comprehension of which state variables are these firm fundamentals shadow variables of Fama

[1] Theory has clearly showed that markets correctly price the risk connected with the covariance and not the one arising from the variance of different securities composing investors' portfolio, because of the risk minimizing effect of diversification.

[2] These empirical tests that point out a much weaker relation between risk and return in comparison to theoretical assumptions, have been implemented on almost exclusively American stock returns data, beginning since the 1930's.

and French (2002). A third approach conciliates the previous described approaches with the attention to institutional features, modelled by variables like accounting standards (Frankel and Lee, 1998), investment policy (Titman et al., 2004), shareholders protection quality (La Porta et al., 1998; Gianetti and Koskinen, 2005; Gompers et al., 2003; Doidge et al., 2007) and the impact of productivity on stock returns (Parhizgari and Aburachis, 2003).

In this framework, our research represents a further and original contribution to the existing literature due to different reasons: first of all, we analyze European data; surveys on global stock returns are presented in literature (Hou et al., 2011) but a comparative stock return analysis on continental Europe as a whole has not been achievable, mainly due to the lack of data, particularly in Eastern European countries until the end of the last century. While the establishment and the following enlargement of the European Union (that represents an important step toward a more well conceived European integration), made it partially possible to consider the European Union as a block of countries, with the introduction of a larger political and economic area.

Furthermore, from a methodological point of view, our study is placed in the Fama and French theoretical framework and is interested in measuring the impact of a Country Governance Index and of a Corporate Productivity Index on total annual investment returns of stocks. Hence, our research matches this approach with an evolution of the previous mentioned studies of Gompers et al. (2003) and Doidge et al. (2007) with respect to governance and of Parhizgari and Aburachis (2003) with respect to productivity. The strategy of the paper consists in adding a Corporate Productivity Index and a Corporate Governance Index as control variables to a Fama and French model, jointly to other additional explanatory variables at firm level. In this framework, we remark that while Doidge et al. (2007) and Gompers et al. (2003) try to highlight the existence of a premium for good corporate governance, in this paper we take into account the impact of a Governance Index measured at country level on the stock returns of industrial companies for the whole European Union sample.

Although the existent literature gives evidence that these variables are in broad terms "second best conditions" (Arnone et al., 2006) in determining stock returns, they appear more important for Europe, than for not European economic areas. Consequently, the European countries are characterized by a great variety of European Commercial Codes, and a Corporate Governance Index is not available for all the listed corporations of the sample. Therefore, we construct a Country Governance Index elaborated by the Heritage Foundation, that is a partially substitute for a Corporate Governance Index (Aggarwal et al., 2010). Moreover, we introduce in our model a Corporate Productivity Index. Productivity is likely to be a crucial economic ingredient for the European area that suffers a weaker growth dynamic in comparison with others world regions.

This research is organized as follows. After the introductory presentation of theoretical literature, this research develops the following issues: section 1 focuses its attention on data and methodology, section 2 describes the estimation strategy. Section 3 implements an empirical analysis in order to verify the importance of the above mentioned control variable of productivity and governance within industrial companies listed in European Union's stock exchanges. Finally, the last section sketches some concluding remarks and some suggestions for future research agenda.

1. Data

Our study takes into consideration 8,064[1] industrial companies listed in one of the stock exchanges of the European Union from the 1st January 1996 until the end of December 2008. Data concerning the name of the listed companies have been manually collected from end-of-year annual reports, published by the institutions responsible for the organization and management of the different stock exchanges. We decided to drop out from the sample all financial companies[2] because of the peculiarities of their balance sheet and the poor comparability with industrial companies' indices. In addition, the research considers only firms characterized by a statutory prevision of "one share – one vote" (Harris and Raviv, 1988) and the ones with completely available balance-sheet data. Therefore, our database is finally composed by 5,213 industrial listed companies, belonging to twenty-two countries[3] (over the twenty-seven member of the European Union). We provide some macroeconomic and financial statistical descriptions of our database. In the examined years, the countries of the sample were characterized by the following relative dynamic of Gross Domestic Product.

[1] 8,064 is the total number of industrial companies listed in the stock exchange of European Union between 1996 and 2008.

[2] Banks, Insurance and General financial companies, as classified by Thomson Datastream.

[3] The countries are the following: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Slovakia, Slovenia, Spain, Czech Republic, Denmark, Estonia, Hungary, Lithuania, Poland, Romania, Sweden. As we can note from Tables 1 and 2, for our analysis we dropped five of the twenty-seven member of the European Union: Cyprus, Malta, Bulgaria and Latvia due to lack of data; the United Kingdom for its impartiality with respect to the overall European Union's economic and institutional policy.

Table 1. Relative weight of the national Gross Domestic Product

Country	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	MEAN
Euro area														
Austria	2.88	2.81	2.80	2.78	2.75	2.69	2.67	2.65	2.64	2.65	2.64	2.64	2.66	2.71
Belgium	3.38	3.39	3.37	3.34	3.33	3.28	3.27	3.26	3.28	3.29	3.29	3.27	3.24	3.31
Finland	1.59	1.65	1.72	1.72	1.75	1.77	1.76	1.73	1.73	1.71	1.72	1.75	1.74	1.72
France	19.6	19.4	19.4	19.2	19.1	18.9	18.9	18.9	18.8	18.8	18.6	18.5	18.4	18.98
Germany	30.0	29.3	28.9	28.8	27.3	26.8	26.1	25.7	25.1	24.4	23.9	23.7	23.5	26.39
Greece	1.54	1.63	1.70	1.73	1.80	1.86	1.91	2.03	2.11	2.15	2.20	2.23	2.29	1.94
Ireland	0.94	1.04	1.15	1.27	1.39	1.48	1.59	1.66	1.69	1.76	1.82	1.85	1.71	1.49
Italy	16.1	16.1	16.0	15.8	15.8	15.8	15.8	15.8	15.8	15.6	15.3	15.1	14.8	15.68
Luxembourg	0.25	0.25	0.26	0.28	0.29	0.29	0.29	0.31	0.31	0.33	0.35	0.35	0.35	0.30
Netherlands	5.12	5.24	5.32	5.43	5.53	5.67	5.68	5.66	5.58	5.59	5.57	5.55	5.62	5.50
Portugal	1.45	1.50	1.56	1.60	1.62	1.64	1.65	1.64	1.64	1.62	1.60	1.59	1.57	1.59
Slovakia	0.34	0.37	0.38	0.39	0.41	0.43	0.45	0.48	0.51	0.54	0.57	0.60	0.63	0.47
Slovenia	0.19	0.21	0.22	0.24	0.24	0.26	0.28	0.30	0.31	0.31	0.32	0.34	0.35	0.27
Spain	7.58	7.72	7.92	8.15	8.35	8.62	8.90	9.29	9.56	9.89	10.1	10.3	10.3	8.97
Non euro area														
Czech Republic	0.70	0.79	0.81	0.79	0.81	0.87	0.98	0.96	1.00	1.09	1.17	1.24	1.40	0.97
Denmark	2.30	2.29	2.29	2.29	2.30	2.27	2.25	2.24	2.24	2.26	2.25	2.21	2.19	2.26
Estonia	0.06	0.07	0.07	0.08	0.08	0.09	0.09	0.10	0.11	0.12	0.14	0.15	0.15	0.10
Hungary	0.54	0.58	0.58	0.63	0.69	0.75	0.86	0.88	0.93	0.97	0.97	0.99	1.00	0.80
Lithuania	0.13	0.15	0.16	0.14	0.16	0.17	0.18	0.20	0.21	0.23	0.25	0.28	0.30	0.20
Poland	1.71	1.98	2.04	2.21	2.46	2.69	2.56	2.27	2.32	2.66	2.81	3.03	3.41	2.47
Romania	0.05	0.11	0.15	0.21	0.30	0.42	0.52	0.65	0.78	0.88	1.01	1.21	1.29	0.58
Sweden	3.50	3.40	3.15	3.39	3.53	3.18	3.23	3.27	3.27	3.21	3.23	3.23	3.10	3.28
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	
Euro area	0.91	0.91	0.91	0.90	0.90	0.90	0.89	0.89	0.89	0.89	0.88	0.88	0.87	0.89
Non euro area	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.12	0.12	0.13	0.11

Source: Authors' elaboration on Eurostat data.

France, Belgium, Austria and Scandinavian countries show a stable relative weight of their GDP compared to the GDP of the other analyzed countries; on the contrary, Poland and Spain register a substantial growth of this ratio. All countries with a small impact, in 1996, of their GDP over the total area GDP, register high relative rates of growth of GDP weight, albeit with different absolute significance. On the other hand, Germany and Italy show a reduction of their weight, even if with a different percentage of decreasing. If we consider similar evidence in terms of market capitalization, we obtain the following results.

Table 2. Relative weight of the market capitalization of each national stock exchange

Country	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	MEAN
Euro area														
Austria	1.2	1.04	0.72	0.53	0.51	0.52	0.83	1.01	1.3	1.75	1.97	1.95	1.27	1.12
Belgium	4.24	4.01	5.15	1.6	2.96	3.08	3.63	3.18	4.13	4.05	4.08	3.3	2.93	3.69
Finland	2.23	2.14	3.24	5.59	4.96	4.06	3.63	3.12	2.77	2.94	2.73	3.15	2.7	3.33
France	20.9	19.7	20.8	23.6	24.4	25	25.2	24.8	23.5	24.7	25	23.7	26.1	23.66
Germany	23.7	24.1	22.9	22.9	21.4	22.8	18	19.8	18	17.1	16.8	17.9	19.4	20.4
Greece	0.85	1	1.68	3.27	1.87	1.84	1.8	1.96	1.89	2.04	2.14	2.26	1.58	1.87
Ireland	1.23	1.44	1.4	1.1	1.38	1.6	1.58	1.56	1.72	1.6	1.68	1.23	0.87	1.41
Italy	9.12	10.1	11.9	11.6	12.8	11.2	12.5	11.2	11.9	11.2	10.6	9.16	9.12	10.99
Luxembourg	1.16	0.99	0.74	0.58	0.57	0.51	0.65	0.68	0.76	0.72	0.63	1.42	1.16	0.8
Netherlands	13.4	13.7	12.6	11.1	10.81	9.76	10.48	8.95	8.13	8.32	8.02	8.17	6.8	10.03
Portugal	0.87	1.14	1.32	1.06	1.02	0.99	1.12	1.07	1.06	0.94	1.07	1.13	1.2	1.08
Slovenia	0.02	0.05	0.05	0.03	0.04	0.06	0.12	0.13	0.15	0.11	0.16	0.25	0.21	0.1
Slovakia	0.08	0.05	0.02	0.02	0.02	0.03	0.05	0.05	0.07	0.06	0.06	0.06	0.09	0.01
Spain	8.58	8.49	8.43	6.91	8.51	9.98	12.14	13.31	14.2	13.48	13.62	15.37	16.57	11.51

Table 2(cont.). Relative weight of the market capitalization of each national stock exchange

Country	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	MEAN
Non euro area														
Czech Republic	0.64	0.37	0.25	0.19	0.19	0.2	0.42	0.32	0.47	0.54	0.5	0.63	0.86	0.43
Denmark	2.53	2.74	2.07	1.68	1.82	1.88	2.01	2.23	2.29	2.5	2.38	2.37	2.3	2.3
Estonia	0.03	0.03	0.01	0.03	0.03	0.03	0.06	0.07	0.09	0.05	0.06	0.05	0.03	0.1
Hungary	0.19	0.44	0.29	0.26	0.22	0.22	0.34	0.31	0.43	0.46	0.43	0.41	0.33	0.33
Lithuania	0.03	0.05	0.02	0.02	0.03	0.03	0.04	0.6	0.1	0.11	0.1	0.09	0.06	0.1
Poland	0.3	0.35	0.43	0.47	0.53	0.55	0.75	0.68	1.07	1.32	1.53	1.77	1.58	0.87
Romania	0	0.02	0.02	0.01	0.02	0.05	0.12	0.1	0.18	0.29	0.34	0.38	0.35	0.1
Sweden	8.74	7.98	5.84	5.97	5.54	5.04	4.68	5.31	5.69	5.67	5.9	5.23	4.42	5.85
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	
Euro area	0.88	0.88	0.91	0.91	0.92	0.92	0.92	0.90	0.90	0.89	0.89	0.89	0.90	0.90
Non euro area	0.12	0.12	0.09	0.09	0.08	0.08	0.08	0.10	0.10	0.11	0.11	0.11	0.10	0.10

Source: Authors' elaboration on Eurostat data.

If we consider the weight of the ratio of single country market capitalization on the market capitalization of the whole sample, we do find the following evidence: the relative weight of the market capitalization of German, Swedish and Dutch stock exchanges drops significantly, while it is possible to verify a substantial growth of the relative weight for the Spanish financial market; all the remaining countries show a stable weight of their market capitalization.

2. Estimation strategy

The aim of the paper is the identification of the determinants of the stock returns of the sample through regression analyses. In a first instance, the analysis is implemented for the whole sample, while in the second part, it is focused on a smaller group of firms. The companies of the latter sub sample obtained ranking the firms of the entire population based on their market capitalization and selecting the companies to reach 80% of total market capitalization. The model is specified as follows:

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

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, allowing the clustering of observations corresponding to a given firm. Consequently, we assume that the error term is i.i.d. across firms but not necessarily for different observations within the same company. 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 into account the panel data structure of our sample.

According to Fama and French (1992, 1993) and the other previously mentioned studies, the variables considered as regressors of our analysis are the market capitalization, the trade openness, the market risk premium, a Corporate Productivity Index and the average of the series of Countries' Governance Indices (Bellavite Pellegrini, 2008). In addition, in this survey we control for the effect of two additional firm specific variables: the leverage and the volatility of stock prices. These last indices appear suitable proxies to identify the financial risk of the different companies, useful to check the robustness of the effects of Corporate Productivity and Country Governance Indices. Finally, we introduce sectoral and year dummies, whose coefficients are omitted in the tables. This subsection briefly describes these variables and their database source.

The annual total investment return[1] of each company (our dependent variable) represents the annual return index of a public traded company. It tracks down both the capital gains of the stock over time, and any cash distribution, such as dividends, assuming that the latter ones are reinvested back into the company. It displays a more accurate representation of the stock returns.

We use the following ones as independent variables:

1. Country governance index.
2. Leverage.
3. Market capitalization.
4. Market risk premium.
5. Price volatility.
6. Corporate productivity index.
7. The trade openness.

[1] Nomenclature in Thomson Financial Datastream: total return index.

The governance index[1] is represented by the Index of Economic Freedom, elaborated by The Heritage Foundation and The Wall Street Journal. It measures the degree of economic freedom in the world nations for each year. This index is calculated as the average of 10 components of economic freedom: Business Freedom, Trade Freedom, Fiscal Freedom, Government Spending, Monetary Freedom, Investment Freedom, Financial Freedom, Property Rights, Freedom from Corruption and Labor Freedom. The leverage has been computed as the ratio of the total debt to the total capital and for this reason can be considered as an indicator of the financial risk of the analyzed companies; in addition, the link between leverage and stock returns is underlined in literature (Penman et al., 2007). The market capitalization[2] represents the market value (in euro) of the companies' overall outstanding shares. 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 the regression analysis, we include the natural logarithm of this variable as in several governance studies in order to improve the fit of the model. The relationship between the outcome of interest and the market capitalization is often non linear; an increase of market capitalization starting from low levels produce more relevant than an equal increase at the highest quantiles. The market risk premium[3] is another well-known and suitable indicator for the prediction of investment returns (Fama and French, 1992; Kent and Titman, 1997); it is the difference between the return on a market portfolio and on a risk-free asset. Because of the difficulty to find an index for European stock exchanges before 2000, the market risk premium of the period of 1996-1999 has been calculated each year as the difference between the return on each country's market portfolio and the 10-year government bonds return. Afterwards, this difference has been weighed by the mean between the relative weight of the national GDP and the national stock exchange market capitalization one. With respect to the period of 2000-2008 the market risk premium has been calculated as the difference between the Morgan Stanley Capital International Euro Index (MSCI EMU)[4] and the European Central Bank (BCE) interest rate. The price volatility represents the measure of a stock 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 (see Duffee, 1995). The expected value of the volatility coefficients is negative, because higher variability of price per share of a stock company implies the need of a high risk premium in stock returns. The Corporate Productivity Index[5] represents the ability of the companies to generate revenues given the number of employees, and it is calculated as the ratio between annual revenues and the number of firm employees: literature gives several solutions for computing productivity index. In our framework, we decide to compute a productivity index applying at corporate level the approach of Freeman (2008). Following Dellas et al. (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, sectoral dummies and year dummies are also introduced in order to protect estimates from the effect of omitted variables and of exogenous shocks, due to the recent economic crisis dating back to 2008.

The decision to adopt a parsimonious model for the regression analysis is required by the need to avoid the bias due to the collinearity that is common when several accounting and financial variables are introduced in the model. Indeed, many accounting indices are built using strongly connected variables, such as total assets, total debts and revenues. The choice to include only two variables that deals with the balance-sheet of a firm (leverage and productivity that are uncorrelated) produce more reliable ad robust estimates[6].

3. Empirical results

After the definition of the different variables considered as regressors, we want to measure if the above mentioned explanatory variables are statistically significant, with positive or negative effect for the determination of stock returns.

[1] Nomenclature in our econometric model: country governance index.
[2] Nomenclature in the econometric model: market capitalization; data taken from Thomson Financial Datastream.
[3] Nomenclature in the econometric model: market premium.
[4] The MSCI EMU Index measures the performance of stocks of 11 developed-markets based in the European Economic and Monetary Union (EMU): Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain. The index contains almost 300 stocks and represents about 85% of the market capitalization in these countries.
[5] Nomenclature in the econometric model: productivity index; data have been taken from Thomson Financial Datastream.
[6] In order to check for the low collinearity among explanatory variables, look at the correlation matrix placed in the Appendix.

Table 3. Total annual investment return for the whole sample (1996-2008)

	Coefficient	T stat.
Country Governance Index	-.0046	-2.83***
Leverage	-.0001	-1.79*
Logarithm of market capitalization	.0299	5.21***
Market premium	.9760	10.01***
Price volatility	.0047	3.74***
Corporate Productivity Index	.0001	2.42**
Trade openness	.0007	2.77***
Intercept	-.1680	-1.39
R^2	.07	
Number of observations	23066	
F stat.	143.38***	

Notes: * p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.
Source: Author's elaborations using Stata.

All the independent variables considered above influence the total investment return and their coefficients are statistically significant. The limited variance explained by the regression sum of squares has to be ascribed to two reasons: the first one can be found in the nature of the analyzed regressors, 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 is related with the decision to proceed with an analysis of the whole sample as a single portfolio, without splitting the sample into groups of more homogeneous companies. This work has been done in our latter model, when we consider only the sub sample of the biggest firms that represent the 80% of total market capitalization of the European Union between 1996 and 2008.

The coefficients of the governance and leverage present a negative effect on the total annual investment return. Both results, as the price volatility, are in line with the risk-return theory. Indeed, countries characterized by a better governance (higher governance index) appear more stable and their investments are less volatile. Consequently, less risky investments, analyzed in the long run, like in our analysis, offer more stable returns, even if their magnitude is lower. The same consideration can be done with the volatility index: more volatile investments compensate the risk with large return[1]. Another measure of risk, more specifically a measure of the company's financial risk, is represented by the leverage. This ratio appears particularly useful to capture the industrial companies that have been penalized mostly during the current crisis. Indeed, after the subprime bubble burst and the following financial crisis the vast majority of the speculative attacks on the stock markets has been addressed to firms characterized by a higher leverage. These companies, appearing riskier and having to refinance their debt at growing spreads, were deeply penalized and this explains why the total annual investment returns present a negative relation with the leverage ratio.

The coefficients of market capitalization and market risk premium are statistically significant and positively correlated with the return yield. Furthermore, the ratio of the total revenues to the number of employees, taken as a proxy of productivity, shows a positive and statistically significant coefficient, although its size is small, coherently with the results from Bellavite Pellegrini (2008) that used the ratio of revenues to working capital as a proxy of productivity. Finally, the sign of the coefficient for the openness to trade shows evidence that best companies in terms of stock returns come from countries characterized by a greater volume of imports and exports over the GDP.

Our results confirm the importance of macroeconomic variables in determining the status of returns, but also point out that productivity and governance are a source of "second best" conditions (Arnone, Bellavite Pellegrini and Graziadei, 2006) of some relief. This evidence raises some doubts as to what is the size of the link between management incentives and company performances directly attributable to management decisions, and to whether the managerial incentives are based on the control variables and not on those that come from their activity.

We focus now on the sub sample of the big companies representing the top 80% of market capitalization for European Union between 1996-2008. The results are reported in Table 4.

Table 4. Total annual investment return for top 80% companies for market capitalization (1996-2008)

	Coefficient	T stat.
Country Governance Index	-.0032	-1.45
Leverage	-.0008	-1.88*
Logarithm of market capitalization	.0615	7.23***
Market premium	.6849	6.68***
Price volatility	.0037	3.37***
Corporate Productivity Index	.0001	1.67*
Trade openness	.0007	1.75*
Intercept	-.5726	-3.08***
R^2	.31	
Number of observations	2671	
F stat.	23.11***	

Notes: * p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.
Source: Author's elaborations using Stata.

[1] This evidence is true only in the long run: if the analyzed period is short enough to consider a recessive period, less riskier assets will offer higher returns, compared to more riskier assets.

The explained variance of this second model is slightly better than the one in the previous model, while the coefficients continue to have the same signs and dimensions quite similar to those seen in Table 3. In particular, the impact of price volatility, maintain a value close to that displayed in Table 3. The market premium coefficient decreases from 0.98 to 0.68, preserving the sign of the first model and showing size similar to that found in literature (Bellavite Pellegrini, 2008). Leverage slightly increases its negative effect for the sub-set of big companies.

The only difference with respect to the model in Table 3 concerns the loss of significance of Governance Index. However, the result is not surprising for two reasons: first, we remark that in Table 4 we have stratified the sample based on the level of capitalization, and we dropped the largest number of observations falling in the first quintile. The level of significance is a function of the sample size, and it is obvious to observe a general decrease in p-values. Second, the inclusion of countries belonging to European union but not adopting the euro as its currency may produce bias estimates for the impact of Country Governance Index on stock returns, due to strong existing differences in market regulation.

Hence, Table 5 offers the regression results for total investment results restricted to the big companies belonging to Euro area representing 80% of total market capitalization.

Table 5. Total annual investment return for top 80% companies for market capitalization in Euro area (1996-2008)

	Coefficient	T stat.
Country Governance Index	-.0040	-1.71*
Leverage	-.0007	-1.81*
Logarithm of market capitalization	.0601	6.67***
Market premium	.7015	6.22***
Price volatility	.0055	3.49***
Corporate Productivity Index	.0001	1.81*
Trade openness	.0007	1.56
Intercept	-.5470	-2.78***
R^2	.31	
Number of observations	2341	
F stat.	19.66***	

Notes: * p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01.
Source: Author's elaborations using Stata.

As in Table 5, all the explanatory variables appear significant except for trade openness that has not effect on stock returns. However, the loss of significance of trade openness is expected, because in Table 5 we consider only countries belonging to Euro area, where the presence of a single market does not affect trade among member countries.

Looking at the coefficients of the risk factors, such as the price volatility, the market risk premium and the Country Governance Index, we confirm results from previous regressions: the higher is the risk at a firm level (underlined by the inverse relationship between stock returns and volatility) the greater is the expected total investment return required as a risk premium. Analogous conclusions derive from the positive relationship between stock returns and the market premium, according to Fama and French approach. The innovative contribution of the empirical results from this paper concerns with the introduction of a systemic risk factor measured at a country level: the Country Governance Index. Coherently with the theory of the relationship between the market risk and stock joint companies returns, the sign of the coefficient confirms that the relationship between the total investment returns and a risk factor, although measured at a macro level, is significant and inverse.

In addition, we establish a correlation between the leverage and the stock returns: more in details, the worse is the company's debt the lower are the operative performances. In this framework, the negative relationship between the leverage and the stock returns does not surprise.

Focusing on the Corporate Productivity Index, which is the other innovative regressor introduced in the analysis, we discover a positive and significant impact on total investment returns. The size of the coefficient is low but this result is devalued by the dimensions of the dependent and the explanatory variables. In particular, productivity index has been built using the ratio of total revenues to the number of employees that is a small number compared to the numerator of the fraction.

The results of productivity are mirrored by that of leverage: the better the operative performances of a firm the greater is the stock return. With respect to the market capitalization the results from previous tables are confirmed.

Conclusion

This study refers to the literature of asset pricing arising from the Fama and French approach (1992, 1993, 1995 and 1996), adding control variables at firm level, like leverage and Corporate Productivity Index and macro control variables such as Country Governance Index and openness to trade. Even if Corporate Productivity Index and Country Governance Index represent second best conditions (Arnone, Bellavite Pellegrini, Graziadei, 2006), they appear

to be useful for measuring the effect of the impact of a specific control variable on total annual investment returns. Our study considers an innovative database of observations, focusing its attention on European data of different countries. The construction of the database implicitly considers the European Union, and the Euro area in particular, as an increasingly integrated economical and only partially political block of countries. In this framework, the relevance of specific control variables like a Corporate Productivity Index (Parhizgari and Aburachis, 2003) and a Country Governance Index (Gompers et al., 2003; Doidge et al., 2007) on total annual investment return of the listed industrial companies belonging to European Union between 1996 and 2008 strongly emerges from data analysis: both indices clearly affect the performance of the total annual investment return of the sampled firms, the former with a positive and statistically significant effect and the latter with the opposite magnitude with clearer emphasis in Euro area. The analysis of the data of European countries as a progressively integrated economical and political area consequently introduces new blood in corporate finance research in comparison to studies from the US firms. Moreover, the introduction of control variables in the Fama and French models allows us for measuring the impact of institutional and macroeconomic variables, opening the path to new emerging issues in asset pricing.

A future agenda of research may take into analysis different issues. New control variables may be added in the analysis, in order to measure their impact on total investment returns, using for example corruption indices. Moreover, the study may be extended to the financial sectors of the same European countries, consider some additional years like those following the Great Recession ranging from 2008 to 2010.

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Appendix

Table 1A. Correlation matrix for the explanatory variables

	Governance index	Leverage	Log (market cap.)	Market premium	Price volatility	Productivity index	Trade openness
Governance index	1.0000						
Leverage	-0.0115	1.0000					
Log (market cap.)	0.0397	-0.0096	1.0000				
Market premium	-0.1200	-0.0015	0.0682	1.0000			
Price volatility	-0.1484	0.0278	-0.1615	-0.0703	1.0000		
Productivity index	0.0122	-0.0027	0.0014	-0.0138	-0.0749	1.0000	
Trade openness	0.6405	-0.0121	0.0251	-0.0910	-0.1951	0.0738	1.0000