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THE ANALYSIS OF THE RELATIONSHIP BETWEEN BOARD CHARACTERISTICS AND FIRM FINANCIAL PERFORMANCE IN THE CENTRAL EASTERN EUROPEAN REGION

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Doctoral Dissertation

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1 Introduction

In the dissertation, the author analyzes the relationship between corporate governance characteristics and firm financial performance measures in the Central and Eastern European (CEE) region among listed companies between 2006 and 2016. In addition, the author presents the results of two empirical published papers. In the dissertation, the author presents the empirical results of two published papers. The title of the first paper is: Do larger boards improve shareholder value creation? – Effects of the board size on the business performance in Eastern Central Europe. In this research, the author analyzes the impact of board size on firm financial performance among listed companies in the CEE region. The title of the second paper is: Does female presence on corporate boards impact firm performance? Evidence from Central Eastern Europe. In this research, the author investigates board diversity's impact on a firm's financial performance. In this research, board diversity means gender diversity, more precisely, the effect of female directors on corporate boards on firm performance.

The author himself carried out data collection. The first of the two studies is a single-authored paper, while the second is a co-authored paper. In the latter study, the author was involved in assembling the data, mainly in the conceptualization, validation, formal analysis, and visualization of the data. The author completed the analysis with a separate chapter, which was not part of the published study.

The database consists of the 300 largest market capitalization companies in the CEE region (Bulgaria, the Czech Republic, Hungary, Poland, Romania, and Slovakia) excluding firms from financials and utilities. Financial data have been downloaded from the Bloomberg monitor system, while information on corporate boards have been collected manually from annual reports. Financial data are year-end data (December 31), while the size of the board (number of directors) reflects the status as of January 1 in the given year. The dataset covers years 2007 to 2016. Database consists of secondary data.

The fact that the impact of corporate governance is a less researched area makes the CEE region attractive. There have yet to be studied so far in which researchers have analyzed the impact of board size and board diversity on firm financial performance in the entire CEE region. While there are partial answers for the developed economies, there needs to be more knowledge about the economies of Central and Eastern Europe regarding the corporate governance effect. The CEE countries have only been functioning as market economies for about 30 years, sufficient time for developing economic and legal frameworks. However, these countries have followed

a different social change path than developed economies. This fact is particularly actual for listed companies with relevant economic power, where the institution of passive monitoring is significant alongside active monitoring. The value of a company can be increased if appropriate rules and policies are applied to the functioning and composition of company boards.

For these analyses, the author uses econometric methods. In the research of the impact of board size on firm performance, the author uses firm fixed effects and dynamical effects panel regression techniques. In the study of the impact of board diversity on firm performance, the author applies fixed effects panel regression, G2SLS instrumental regression techniques, and probit model for predicting some regressors.

The primary research question for the board size analysis paper is how board size affects firm performance. In this research, the author sets up the following hypotheses. According to Hypothesis 1, a negative relation between management board size and firm market performance measures can be expected. According to Hypothesis 2, a positive relationship between management board size and firm operational performance measures can be expected. Hypothesis 3 claims a positive relation between the outside director ratio and firm market performance measures can be expected based on the pairwise correlation. Hypothesis 4 claims a negative relation between outside director ratio and firm operational performance measures can be expected. Moreover, based on Guest's paper (2008), using board size multiplied by firm size interactive term, board size has a positive impact on firm performance. However, this interactive term has a negative impact on firm performance. This is the Hypothesis 5.

The main results of the research show that the management board has a significant positive impact on both market and operational performance measures. However, this effect is limited, shown by the significant negative sign of the interaction term between board size and firm size. Firm performance cannot be improved if the management board size increases along with the firm size. The outside director ratio also has a positive impact on a firm's performance measures in dynamic regression models, and this effect is significant for Tobin's Q and the market-to-book value ratio. The interaction term between management board size and cash has the same effect on firm performance as the outside director ratio. These results indicate that larger cash can have a disciplining effect on the management board.

Testing the hypotheses, H1 is not supported, but H2 is. Controlling individual firm characteristics in firm fixed effects or in dynamic panel regression models, the impact of management board size on firm market performance is the opposite as the pairwise correlations

would indicate. In the case of firm operational measures, this individual firm characteristic does not matter. H3 is only supported in the dynamic regression models, but H4 is rejected. Moreover, the outside director ratio has a positive impact on firm operational performance according to both regression techniques. H5 is supported by both regression techniques.

For countries, the dynamical panel regression models show that Bulgaria, the Czech Republic, and Poland's management boards positively impact financial performance. In contrast, for Hungary, the effect is the opposite. However, significant effects can only be observed in Bulgaria and Poland. Moreover, according to empirical results, a large management board is favorable for Hungarian firms, but the effect is not significant. Large boards for Bulgaria, the Czech Republic, and Poland negatively impact financial performance, but this effect is only significant for Bulgaria and Poland.

The outside director ratio has a positive impact on financial performance for Bulgarian and Czech firms but a negative for Hungarian and Slovakian firms. However, these effects are not significant. According to the results, large supervisory boards are favorable for Hungarian and Polish firms but small for Czech and Slovakian firms. The disciplinary effect of large cash on the management board can be shown for Czech, Polish, and Slovakian firms.

For the board diversity study, the research questions are the followings. 1. Do female executive directors enhance or hinder firm performance? 2. What drives the appointment of female and male executive directors? 3. Does gender diversity count in monitoring activities? 4. Does glass cliff selection of female supervisory board members exist?

In this research, the author sets up the following hypotheses. Hypothesis 1 The greater the firm’s proportion of female directors on its management board, the better its performance.

Hypothesis 2 The greater a firm’s proportion of female directors on its supervisory board, the better its performance.

Hypothesis 3 The possibility of a new female (management/supervisory) director appointment is higher if (a) the firm’s performance was previously weaker; and/or (b) tthe firm’s gender diversity on its boards is higher; and/or (c) the sectorial average of the gender diversity of the boards is higher. The three arguments may explain a) glass cliff, b) homophily, c) network effects. According to the last, the members of female manager minorities invite each other to participate in their own boards.

Increasing the number of female directors on boards improves the financial performance of companies, and gender diversity on boards creates value. However, in the case of CEE firms, a glass-rock phenomenon can be observed, with the poor financial performance of firms predicting the appointment of female directors. In addition, a higher proportion of female directors on the board than the sectoral average of the previous year increases the likelihood of female appointments. However, a higher proportion of women on the supervisory board does not affect appointments, and the results suggest no significant relationship between the appointment of new female supervisory board members and past financial performance. The sectorial average of female members of supervisory boards and the firm average of female board directors has a significant positive effect on the appointment of female directors. Thus, a pro-women corporate environment positively influences the appointment of female directors to supervisory boards.

Based on the empirical results, the following research questions were answered.

1. Do female executive directors enhance or hinder firm performance?

The empirical results suggest that the presence of women on the board of directors has a significant positive effect on the ROA indicator, and that gender diversity on boards creates value. This supports hypothesis H1.

2. What drives the appointment of female and male executive directors?

Poor financial performance of firms is a predictor of appointments through the glass-rock phenomenon. Supporting H3/a.

A higher proportion of female directors on boards than the industry average in the preceding year increases the likelihood of female appointments. Support H3/b.

A higher proportion of women on the supervisory board has no effect on appointments, which does not support hypothesis H3/c.

3. Does gender diversity count in monitoring activities?

Only non-robust results can be observed, higher ROA through better monitoring activities of different boards if we do not assume that there is no endogeneity between past firm performance and the gender diversity of boards and no evidence of Tobin Q effects. This does not fully support Hypothesis 2.

4. Does glass cliff selection of female supervisory board members exist?

No significant relationship has been found between the appointment of new female board members and past financial performance. This does not support hypothesis H3 a) for the supervisory board. The sectorial average of female members on supervisory boards and the firm average of female directors on boards have a significant positive effect on the appointment of female directors. Thus, a pro-women corporate environment positively affects the appointment of female directors to supervisory boards. Hypotheses H3 b) and H3 c) are accepted.

The main findings are for the study of the impact of board composition on financial performance. An increase in the number of female directors on the board improves the financial performance of firms, and the gender diversity of boards creates value. However, for firms in Central and Eastern Europe, a glass-rock phenomenon is observed, with the poor financial performance of firms predicting the appointment of female directors. In addition, a higher proportion of female directors on the board than the sectoral average of the previous year increases the chances of female appointments. However, a higher proportion of women on the supervisory board does not affect appointments, and the results suggest no significant relationship between the appointment of new female supervisory board members and past financial performance. The sectoral average of female members of supervisory boards and the firm average of female directors on boards significantly positively affect the appointment of female directors. Thus, a pro-women corporate environment positively influences the appointment of female directors to supervisory boards.

In addition to presenting the results of empirical research, the author also presents a detailed literature review. *Corporate governance* is the system by which companies are managed and controlled. The board of directors is the highest decision-making body in a company and is responsible for the management of the company. The theory of corporate governance is that in public limited companies, particularly those listed on a stock exchange, there is a separation of control and ownership. The board of directors controls a company, but the shareholders own the shares. The board's main task is to protect the interests of the shareholders. Just as there is no single definition of corporate governance, there is no single corporate governance theory.

For companies, the two corporate governance structures are one-tier and two-tier. In a one-tier corporate governance structure, the board of directors is the highest governance body and consists of the company's managers, executive directors, and non-executive directors. In a two-tier governance structure, the board of directors consists of the company's directors and

managers and is also known as the management board. In the case of a two-tier corporate governance structure, a supervisory board is mandatory, and its members are independent persons. Listed companies in Central and Eastern Europe may choose to operate under a single or two-tier corporate governance system, depending on the regulations in their countries.

In the CEE region, the listed companies usually operate in a two-tier governance structure which means that there is a management board (sometimes called the board of directors) consists of executive directors, and a supervisory board consists of independent directors.

The main theories of corporate governance are agency theory, stewardship theory, resource dependence theory, and stakeholder theory. Each theory has a different view of the board's role and, thus, its size and composition.

According to agency theory, the board's primary role is to monitor management and protect the owners' interests. The aim is to maximize shareholder value. The main conclusion of the theory is that independent boards ensure that shareholders' rights are protected. The theory was developed by Jensen and Meckling (1976). According to stakeholder theory, the board's role is to protect stakeholders' interests. Maximizing shareholder value is one of many objectives; the interests of all stakeholders should be equally protected. Freeman created this theory (1984, 2010). According to the stewardship theory, the role of the board of directors is management empowerment and reputation. Controlled by corporate management, the board has the authority and responsibility to manage corporate assets. The theory is associated with Donaldson and Davis (1991).

According to resource dependence theory, the primary role of the board of directors is to complement the board (co-optation). A board with solid external connections is a cooperative mechanism for firms to access external resources. The theory originates in sociology and is associated with Pfeffer and Salancik (1978).

However, Bedő (2011) cites O'Sullivan (2000), who thinks that corporate governance is an advocacy system among a company's stakeholders. Corporate governance determines the opportunity to participate in the decision-making process and the ability to access income. Corporate governance can also be understood as a struggle for advocacy. Bedő (2011) emphasizes that in Anglo-Saxon economies, the dominance of money and capital markets is the main reason the relationship of corporate governance is limited to the owner and the

manager. However, in Germany, employee representativeness or France's traditionally vital role of trade unions influences the corporate governance model.

Bélyácz (2017) discusses the dysfunction of corporate governance. Bélyácz (2017) claims that the owner's role in corporate governance became more relative when the owner-entrepreneur model was replaced by a representative management based on the separation of ownership and control. Bélyácz (2017) thinks that there are limits to sustainably effective corporate governance, and he stresses the importance of the moral responsibility of the board of directors. Bélyácz (2017) emphasizes the shareholder value maximization principle versus stakeholder loss minimization.

Agent theory focuses on the control of the leaders and managers of the company. The company's managers are the agents, while the owners or shareholders are the principals. This theory explains the separation of control and ownership because the company's managers have the expertise and control of the company but typically do not own the company. On the other hand, owners need to gain expertise in managing the company and insight into day-to-day governance. The board's main task is to protect the owners' interests by monitoring the company's management. The need for this monitoring reflects the informal asymmetry between principal and agent, with agent theory considering managers to be self-interested.

According to the other three theories, company managers act in the owners' interest. There is no reason to assume otherwise. Kováts (2018) emphasizes the role of trust in comparing agent theory and stewardship theory. According to agent theory, an agent takes advantage of an opportunity to gain a financial advantage for himself at the expense of the principal. The principal can only prevent this by setting up monitoring and incentive systems. Kováts (2018) thinks the theory is therefore based on mistrust. Kováts (2018) cites Davis-Schoorman-Donaldson (1997), who argues that the essence of agent theory is the unwillingness to be vulnerable. Kováts (2018) argues that agent theory thus contributes to the institutionalization of mistrust.

On the other hand, the theory of concern holds that agents are not self-interested and act in the interest of their principals. There is no fundamental conflict of interest between the agent, and the principal, Kováts (2018) argues that this is consistent with the motivational theories of people working in the public sector. Davis-Schoorman-Donaldson (1997) argues that this does not mean the agent always acts in the principal's interest in all circumstances. However, they argue that only in certain circumstances do agents become entirely self-interested. Kováts

(2018) writes, "... *in cases of conflict between the individual and community goals, and community goals may be preferred if cooperative behavior is of greater utility to someone*." (p. 542-543) This phenomenon is more observable in the case of stakeholder theory.

On a theoretical approach, the agent theory prefers smaller boards, believing that larger boards lead to higher monitoring costs. The other three theories do not assume that managers are not acting in owners' interests and therefore consider larger boards to be more appropriate. In the case of larger boards, the knowledge of professionals from multiple disciplines leads to better decision-making. Beiner et al. (2004), based on a survey of Swiss companies, argue that the size of the board can also be seen as an autonomous (independent) corporate governance mechanism.

The main criticism of larger boards is that the decision-making mechanism slows down, coordination and communication failures occur, and responsibilities are less clear. Not to mention that larger boards are also more costly. At the same time, larger boards are more diversified in age, gender, nationality, expertise, and knowledge. More diversified boards are more sensitive to economic or social problems and can make more effective decisions. Diversity also ensures a stronger sense of belonging to the community. In larger boards, expertise is also pooled, the workload is shared, and more people can fill positions on committees.

The advantages of smaller boards include a more meaningful membership, clearer ownership, and a greater sense of ownership by board members due to the smaller size. In addition, while large boards can be prone to disengagement or cliques, smaller boards are less likely to do so. As a result, there may be fewer members who will not attend meetings or no voting members or groups.

However, the size of the board is determined by the size of the company, the type of industry, strategic needs, and the stage of the business cycle, all contributing to determining how many board members the company needs to still be at its best performance. In addition, as companies change over time, they need to assess how many directors they need constantly.

Regulatory and economic volatility and uncertainty justify the creation of larger boards by larger companies. Larger boards tend to have more diverse thinking and perspectives than smaller boards. Larger boards have a more comprehensive network of contacts, such as customers, creditors, and suppliers. Larger boards have greater access to industry experts such as investment bankers, lawyers, and consultants.

At the same time, today's boards work well with fewer directors. Many successful companies have smaller boards. It is advised that today's boards would do well to focus on diversity and independence first, with less attention paid to the number of board seats. In considering the number and composition of boards, boards should consider the specific needs of companies. The example of large companies such as Apple, Netflix, Toyota shows that reducing board size is a good strategy for success.

Researchers see the diversity of the board of directors as an advantageous characteristic. Board diversity refers not only to age, race, gender, education, background, skills, and experience but also to fewer tangible factors, such as personal beliefs and attitudes. Academic studies and research projects show a strong correlation between board diversity, financial performance, and value creation. In addition, diversity brings many benefits to the board. These include better decision-making, access to a broader range of talent, better customer insight, improved investor relations, a more substantial corporate reputation, and better-quality corporate governance.

Inclusive and diverse boards are more likely to be effective boards. Board diversity is a competitive advantage in a globalized economy and a key driver of growth and value creation. However, according to the 2018 PwC (PricewaterhouseCoopers) Annual Corporate Board Survey, directors value diversity but question the motivation to achieve diversity. Moreover, more than half of them believe that board diversity efforts are driven by political correctness.

The challenges to board diversity come from both inside and outside the board. Board members should be open to diversity and welcome a more diverse and heterogeneous Board. Diversity, a key component of good corporate governance, is also a challenge for boards to consider.

The structure of the dissertation is as follows. After the introductory section, in the second chapter, the author presents the definitions of corporate governance, corporate governance models, corporate governance theories, and then the role of the board of directors in the corporate governance mechanism. In the third chapter, econometric methods used in empirical studies are presented, focusing on how each method can address the endogeneity that arises in empirical research on corporate governance. In the fourth chapter, the impact of board size on financial performance is discussed, while in the fifth chapter, the impact of board composition on financial performance is presented. Finally, the dissertation concludes with a chapter on conclusions.

2 Corporate governance: definitions, models, theories

2.1 Definitions of corporate governance

The objects of observation in the research presented in the dissertation are publicly listed companies. These firms are also publicly traded, meaning that their shares are listed on a stock exchange and their shares are tradeable. A company goes public through an Initial Public Offering (IPO) process whereby a certain number of shares are made available to the public while the dominant shareholder retains control. Going public also means entering the secondary market, the Stock Exchange. Investors can trade with the company's shares on the Stock Exchange, which impacts the company's value. Going public is a rigorous process during which all regulatory requirements must be met, and later a listed company must disclose all information that could affect the company's value. Apart from stock exchange rules in different countries or regions, listed companies have similar characteristics.

A Public Limited Company can be characterized by the following features: separate legal entity, limited liability, easy transferability, perpetual succession, legal regulation, separation of control, and ownership.

The CFA Institute in the Manual for Investors, The Corporate Governance of Listed Companies, emphasizes the importance of corporate governance to investors. Active and prudent shareholder participation is necessary to achieve effective corporate governance. Already Graham and Dodd recognized in the 1930s that there is a strong correlation between active ownership and strong corporate governance. For listed companies, it is not so much the ownership role that is important but the fact that the company's owners are also investors.

There is no single general definition of corporate governance as a concept, but a generally accepted definition of corporate governance is the next: "*Corporate governance is the system by which companies are directed and controlled*." (ICAEW: Institute of Chartered Accountants in England and Wales and CGI: Chartered Governance Institute UK&Ireland). According to ICAEW, "*Boards of directors are responsible for the governance of their companies*.", "*The shareholders' role in governance is to appoint the directors and the auditors and to satisfy themselves that an appropriate governance structure is in place*.", "*The purpose of corporate governance is to facilitate effective, entrepreneurial and prudent management that can deliver the long-term success of the company*."

According to CGI, "*As the home of good governance, the Institute believes that good governance is important as it provides the infrastructure to improve the quality of the decisions made by those who manage businesses. Good quality, ethical decision-making builds sustainable businesses and enables them to create long-term value more effectively*."

CFA Institute defines corporate governance as follows: "*Corporate governance is the system of internal controls and procedures by which individual companies are managed. It provides a framework that defines the rights, roles, and responsibilities of various groups—including management, the board, controlling shareowners, and minority or noncontrolling shareowners—within an organization*."

According to the G20/OECD Principles of Corporate Governance: "*Corporate governance involves a set of relationships between a company's management, its board, its shareholders, and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined*." Corporate governance can be considered as the structure and the relationship which determine corporate direction and performance. OECD already defines what good corporate governance means (Organization for Economic Co-operation and Development): "*Good corporate governance helps to build an environment of trust, transparency and accountability necessary for fostering long-term investment, financial stability and business integrity, thereby supporting stronger growth and more inclusive societies*." The G20/OECD Principles of Corporate Governance state that these principles help policymakers evaluate and improve corporate governance's legal, regulatory, and institutional framework to contribute to economic efficiency, sustainable growth, and financial stability. In the 2004 version of the OECD Principles, there has already been emphasized a high level of transparency, accountability, board oversight, respect for the rights of shareholders, and the role of key stakeholders is part of the foundation of a well-functioning corporate governance system. The Preface of the G20/OECD Principles states that corporate governance should provide the benchmark to build an environment of trust, transparency, and accountability. A corporate governance system consists of rules and regulations. Furthermore, these principles focus on publicly traded companies, both financial and non-financial.

Dobák and Steger (2003, page 223) defines corporate governance similar when they write that "*Corporate governance from an overall perspective is the structuring of the control*

mechanisms, monitoring, and organization of a company or group of companies in a manner that satisfies owners' objectives."

If we want to give an academic definition of corporate governance, one of the most well-known comes from Shleifer and Vishny (1997, page 738), "*how investors get the managers to give them back their money*". Shleifer and Vishny (1997) began their study with the question of how suppliers of finance to corporations can get the managers not to steal their investment or not to invest in bad projects but give them a return on their investment. They ask how investors control the managers at all. If we identify the suppliers of finance to corporations as shareholders, the corporate governance system should assure that they can get the return on their investment.

Tirole (2006, page 16) also defines the main purpose of corporate governance as it relates to the "*ways in which the suppliers of finance to corporations assure themselves of getting a return on their investment*." Although he notices that this definition is narrow because this only focuses on investors' returns. Many academics argue that other stakeholders, such as employees, suppliers, customers, regulators, or other communities, are interested in how a firm operates. Jensen (1983) writes that four control forces affect a firm's operation. These are capital markets, legal/political/regulatory systems, product and factor markets, and internal control systems headed by the board of directors. This latter is called a corporate governance system. Jensen argues that an internal corporate system must exist in a company because the product and factor markets are slow to act as a controlled force and the effective mechanism of the capital markets depends on the internal control system.

However, Bedő (2011) cites O'Sullivan (2000), who thinks that corporate governance is an advocacy system among a company's stakeholders. Corporate governance determines the opportunity to participate in the decision-making process and the ability to access income. Corporate governance can also be understood as a struggle for advocacy. Bedő (2011) emphasizes that in Anglo-Saxon economies, the dominance of money and capital markets is the main reason the relationship of corporate governance is limited to the owner and the manager. However, in Germany, employee representativeness or France's traditionally vital role of trade unions influences the corporate governance model.

Some committees influence corporate governance. The first is the Cadbury Report in the UK in 1992. Its title is Financial Aspects of Corporate Governance. The chairman of this committee was Adrian Cadbury, and this committee made proposals about the companies' boards to mitigate corporate governance risks and failures. According to the Cadbury Report, corporate

governance can be defined as a "*system by which companies are directed and controlled*." The primary purpose of this report was to make British companies adopt voluntary best practices of corporate governance by this report and the "comply or explain" principles. As it is written in the report: "*We believe that the flexibility provided by the adoption of the voluntary code of best practice is the strength of corporate governance in the UK, yet the constantly evolving UK corporate governance code may be an indication of a deeper problem*." (page 1)

The other committee that significantly affected corporate governance is the Sarbanes–Oxley Act of 2002, also known as the "*Public Company Accounting Reform and Investor Protection Act.*" The Sarbanes-Oxley was named after U.S. Senator Paul Sarbanes (D-MD) and U.S. Representative Michael G. Oxley (R-OH). The bill answered big corporate and accounting scandals such as Enron and WorldCom. This Act specifies the responsibilities of a corporation's Board of directors and defines how public corporations are to comply with the law. Sarbanes–Oxley Act (SOX) requires governance systems that protect the rights of shareholders and the interests of stakeholders (employees, suppliers, buyers, and the local community). SOX also specifies skills and independence requirements for the members of the Board of directors.

2.2 Corporate governance models

The main models of corporate governance are the Anglo-Saxon or Anglo-American (Anglo-US), German, and Japanese models. The Anglo-Saxon is called a one-tiered corporate governance structure, while the other is called a two-tiered one. Some academics differentiate the German and the Japanese model. In contrast, others consider the Italian corporate governance structure as an independent model (Merendino, 2013) or the corporate governance model of the BRICS countries (Brazil, Russia, India, China, and South Africa) (Oliveira). In the developed capital markets, the three primary models are the Anglo-US, the German, and the Japanese corporate governance model.

The structure of a company's corporate governance system is influenced by a number of factors, including the legal and regulatory environment in the country where the company operates. Nevertheless, this environment depends on tradition and other cultural factors too. Denis (2010, page 125) mentions: "*The most noticeable difference in governance systems across countries is in the ownership structure of individual firms*." However, he also says that broad patterns are observed. In Anglo-Saxon countries such as US and UK, many small shareholders hold many firms.

Nevertheless, in the continental European countries, the shareholder structure is more concentrated. There are instead a few blockholders than many small shareholders. One form of stylized differences is the ownership structure and its consequence, the role of investor protection. Andres et al. (2010) review the main taxonomies of corporate governance systems. These main taxonomies are market-based versus bank-based systems, insider versus outsider systems, legal families: civil law versus common law, electoral systems: proportional versus majoritarian, political determinants: social democracy, and the "*Varieties of Capitalism*" (VOC) literature. Besides the ownership structure, the role of the market is different. In Anglo-Saxon countries market for corporate control is decisive, and an active market for corporate control is in the outsider or market-based system. These are the takeovers of corporations. Already Hicks distinguished between market-based economies and bank-based economies.

2.2.1 The Anglo-Saxon corporate governance structure

Earlier, the Anglo-Saxon or Anglo-US corporate governance structure was characterized by small and dispersed shareholders, but from the 1980s, the institutional investors' role has increased. In this system, these shareholders are not affiliated with the corporation and are called "outsiders." The legal framework defines the rights and responsibilities of the shareholders, the firm's management, and the board's directors. This latter is called the Board of Directors. Equity financing is a standard method of raising capital for corporations in market-based countries. And its consequence that there is a causal relationship between the importance of equity financing, the size of the capital market and the development of a corporate governance system. The market for control is crucial, and institutional investors play an important role. The three main players in the Anglo-US model, the shareholders (owners), the management and the Board of Directors. Other important players are government agencies, stock exchanges, self-regulatory organizations, and consulting firms which advise corporations and shareholders on corporate governance and proxy voting.

The Anglo-US model has been developed in free market economies, and ownership and control have been separated in publicly held corporations. Shareholders are the owners, but the management operates the companies. In this model, it is believed that shareholders may need more ability to run the company professionally (Somnez/Yildirim, 2015). As owners invest their capital in companies, shareholders are considered risk bearers (Muir/Saba, 1995). The primary objective of the Anglo-US model is to maximize the shareholders' value (Somnez/Yildirim, 2015). The agency theory explains this model. According to the agency

theory, the interaction between the (shareholders) owners and the management can be modeled with the principal-agent problem or shortly with the agency problem. The role of the Board of Directors is to protect the owners' interests by monitoring the management.

The Board of Directors consists of two kinds of directors, the insiders who are either employed by the corporation as an executive, manager, or employee or who have significant personal or business relationships with corporate management. The outsiders are individuals or institutions with no direct relationship with the corporation or corporate management. (Three Models of Corporate Governance from Developed Capital Markets). An insider is an executive director; a synonym for an outsider is a non-executive director or independent director.

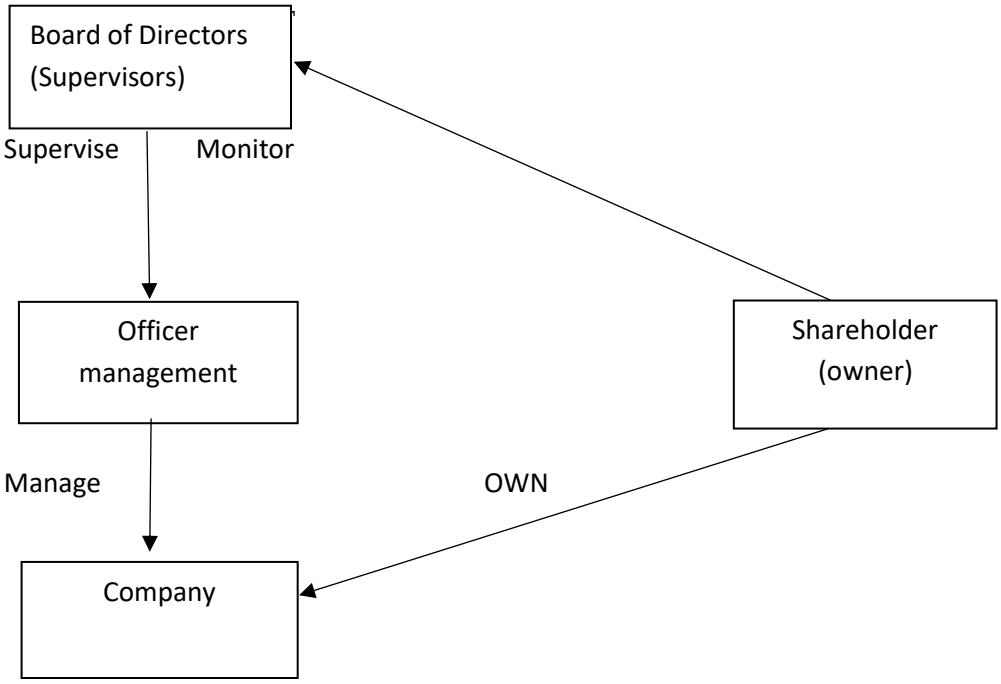

Figure 1 The Anglo-US corporate governance model (Source: Somnez/Yildirim, 2015)

2.2.2 The Japanese corporate governance structure

In the Japanese corporate governance model, banks and large companies have high stocks. One of its main characteristics is its substantial and long-term relationship with banks. Such a legal and industrial policy has been designed that supports this corporate governance structure. This is a large industrial group called “keiretsu,” and cross-shareholdings of debt and equity characterize this group. This model has a bank and a financial/industrial network or keiretsu in the center. Almost all Japanese corporations have a close relationship with the leading bank. The bank provides its corporate client with loans and services related to bond issues, equity

issues, settlement accounts, and related consulting services. The leading bank is generally a significant shareholder in the corporation (Three Models of Corporate Governance from Developed Capital Markets).

In this structure, the Board of Directors consists of almost only insiders. Equity financing is essential for Japanese corporations, but insiders and affiliate firms are primarily the major shareholders (Three Models of Corporate Governance from Developed Capital Markets). One disadvantage of this model is that the interests of outside shareholders are marginal against the Anglo-US corporate governance model. Also, the role of foreign investors is small.

In the Japanese corporate governance model, the company focuses on the long-term relationship against the short-term interests of the shareholders in the Anglo-US model (Muir/Saba, 1995). Merendino (2013) calls this relationship a stable relational bond because the relationship is long-term and involves a continuous exchange of information and ideas.

Somnez and Yildirim (2015) also mention that the board members comprise the largest shareholders, and they emphasize the leading bank's key role as an outside manager of the company. Somnez and Yildirim (2015) also mention that the leading bank monitors the company and elects a director to the supervisory board. The Japanese corporate governance structure is called a two-tiered system since a supervisory board supervises the company's management, and its primary role is to represent the interests of the shareholders. In the two-tiered structure, the management board directs the company. However, the supervisory board consists of bank representatives also who are considered insiders. The two-tiered structure is also called the dualistic or vertical model (Meredino, 2013). Merendino (2013). also mentions that Japanese banks hold shares only in the period in which the company needs capital funding.

2.2.3 The German corporate governance structure

The German corporate governance system is like the Japanese as both are two-tiered structure models. The management board is responsible for operative management, and there is a supervisory board to control the management board. The management board consists of insiders and executives of the corporation. The supervisory consist of labor/employee representatives and shareholder representatives. The election of labor/employee representatives is mandatory in the German model. The two boards are entirely distinct; no one may serve simultaneously on a corporation’s management board and supervisory board. The supervisory board size is set

by law and cannot be changed by shareholders. Half of the supervisory board members are elected by shareholders, and the other half are selected by stakeholders (Fernando, 2006).

Moreover, in the German model, voting rights restrictions are legal; these limit a shareholder to voting a certain percentage of the corporation's total share capital, regardless of share ownership position. In the German model, banks hold a long-term stake in German corporations, as in the Japanese model. Bank representatives also are elected to the supervisory board.

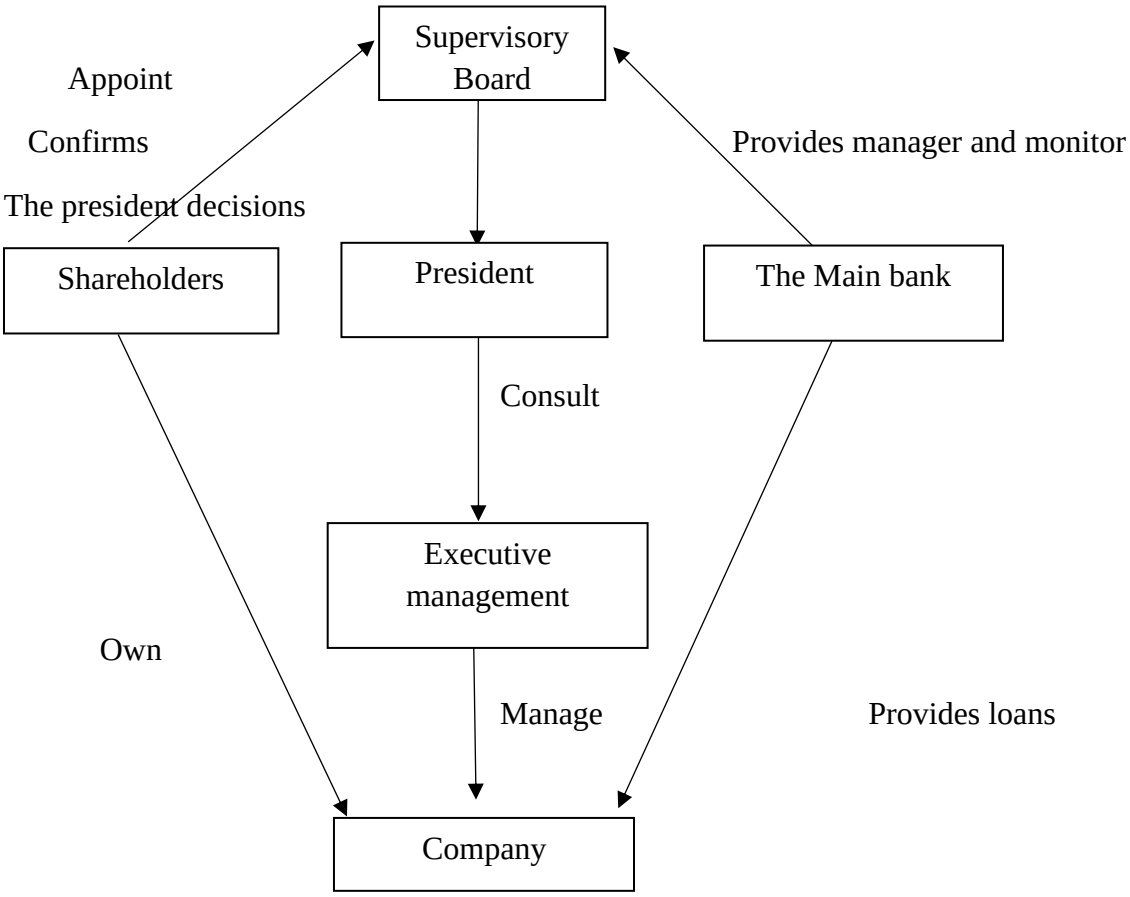

Figure 2 The Japanese corporate governance model (Source: Somnez/Yildirim, 2015)

In the German model, this representation is constant against the Japanese model, where bank representatives are elected to a corporate board only in times of financial distress (Three models of corporate governance). A further characteristic of the German corporate governance structure is that banking finance is preferred over equity financing, the level of individual stock ownership is low, and the role of blockholders is essential. Therefore, minority shareholders' rights are lesser important than in US or UK. In Germany, corporations are also shareholders, sometimes holding long-term stakes in other corporations, even where there is no industrial or commercial affiliation between the two firms (Three models of corporate governance). The

German model is also known as a Continental European approach because many European countries implement the German model. Such as the Netherlands, France, and Central-European countries (Fernando, 2006).

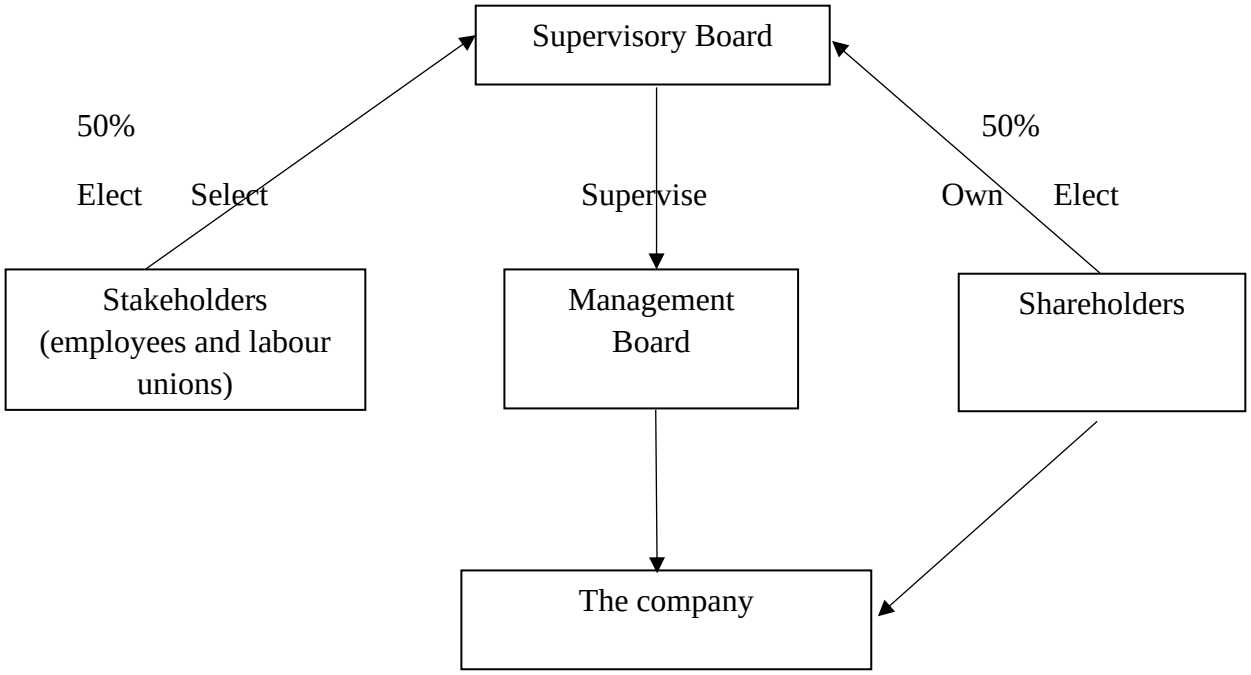

Figure 3 The German corporate governance model (Source: Somnez/Yildirim, 2015)

2.3 Corporate governance theories

The theoretical models of corporate governance mean that academics try to explain how and why the different corporate governance systems evolved in practice. But as there does not exist one and unique corporate governance definition, the corporate governance systems, which evolved in different countries, cannot be explained by one theoretical model.

2.3.1 Corporate governance regimes in historical context

Joo (2010) presents the classification of different corporate governance regimes in a historical context. According to this classification, he distinguishes six theories: artificial entity theory; aggregation theory; the fiduciary model; managerialism; contractarianism as the connection between the contract theory and corporate governance theory; and the post-contractarian directions.

The artificial theory comes from the fact that until about the mid-1800s, American and British corporations were created exclusively by special enabling legislation. This fact means that the

state gave corporate status for public benefits, such as a church, school, or a toll road or bridge. Joo (2010, page 820) writes that British and early American law routinely referred to corporations as "*artificial entities*." Chatman (2018) cites Supreme Court directly addressed the nature of the corporation in *Trustees of Dartmouth College v. Woodward*, "*A corporation is an artificial being, invisible, intangible, and existing only in contemplation of law*."

The aggregation theory comes from the fact that in the late nineteenth century, as Joo (2010, page 159) writes that "… *some federal cases held that corporations were nothing more than "aggregations of individuals*." In the US, in the so-called Jacksonian democracy, the American states began to give special rights to corporations although the purpose of these companies was not for public benefit. In this era, the laissez-faire ideology determined the economy, there was a broad fear of European socialism, and Henry Osborn Taylor and other theorists rejected the characterization of corporations as artificial entities. Joo (2010) cites Taylor, who mentions that corporate law governs corporations because individuals voluntarily. Chtaman (2018, page 822) claims that "*Supporters of the aggregate theory believe that the corporation can do nothing unless human beings act on its behalf*." Chatman (2018, page 822) writes that: "*The aggregate theory was also initially a theory of limitations, binding corporations to only those things its people were capable of doing. Eventually, the theory evolved into a theory of expansion, invoking a grant of purely personal human rights to corporations*."

Joo (2010) wrote that aggregation theory failed to explain the hierarchical governance of the large, publicly traded corporation regarding individuals' voluntary contracts. The fiduciary model comes from the "other people's money" problem in a corporate context. Chatman (2018, page 823) calls this theory *real entity theory* and writes that "…*views the corporation as a stand-alone entity, separate and distinct from the state and its shareholders*" Joo (2010, page 160) writes that "*In trust law and agency law, a principal party gives a "fiduciary" (trusted person) the power to control the principal's property. The fiduciary lacks ownership interest in the property and is obligated to use his control for the benefit of the principal (or a third party*)." Corporate law usually refers to corporate directors, managers, and other officers as fiduciaries, agents, or trustees of shareholders. Corporate directors have fiduciary duties to shareholders, but their responsibility is limited. Corporate directors or managers can be impeached for misconduct, disloyalty, or self-dealing but not for negligence or poor performance. The concept of managerialism comes from the opinions of many theorists from the 1960ies and 1970ies. Professional managers ran large companies, and these corporations had significant economic and social influence. In the twentieth century, centralized management control rose, and

Chandler (1977) thought this was the most efficient form of large-scale production. Galbraith (1967) thought that corporate managements were beyond shareholders' control and could only be responsible to the state. However, in the 1970ies, many corporate bankruptcies happened, and the American industry began to decline; greater corporate accountability to society was called for, and shareholders' advocates called for greater management accountability to shareholders. In this context, Eisenberg (1976) developed the model of the "monitoring board". Eisenberg (1976) observed that directors of large companies delegate most executive power to professional executives, but these managers were beyond shareholder control. Eisenberg recommended that boards should not be viewed as part of management but must monitor the managers' behavior. Klikauer (2013) defines *managerialism* such as "*Managerialism combines management knowledge and ideology to establish itself systemically in organizations and society while depriving owners, employees (organizational-economical) and civil society (social-political) of all decision-making powers. Managerialism justifies the application of managerial techniques to all areas of society on the grounds of superior ideology, expert training, and the exclusive possession of managerial knowledge necessary to efficiently run corporations and societies.*" (Citation from Klikauer's book from Wikipedia)

Modern corporate governance theory is based on contractarianism. According to contractarianism, the corporation is the natural outcome of private interactions. Since the twentieth century, a contract has been used as a broader concept. Klausner (2006) calls as the contraction theory of corporate law. Klausner (2006, page 872) claims that "*The contractarian theory posits that the relationship between the managers and shareholders of a public corporation is contractual.*"

Joo (2010, page 164) cites MacNeil (1978) who argued that the parties do not enter into a contract in exchange of discrete promises to perform narrowly specified obligations as earlier but "*they transacted within a complex context of social relationships such that the discrete terms of a contract were only part of a deeper, ongoing relationship whose precise content was open-ended and flexible.*" Hart and Moore (1988) call these contracts as "incomplete contracts". Hence, it is called the theory of relational contracts. Joo (2010) writes that complete contracts cannot be made due to practical limitations such as transaction costs and information costs, and relational contracts address these limitations by reducing transaction costs. According to the theory of relational contracts, a contract does not need to control all possible events in all possible states because, as Joo (2010, page 164) writes: "*they establish a general relational context in which to address such contingencies*."

The reason for the post-contractarian directions is related to the fact that contractarianism is based on the efficient capital markets hypothesis (EMH), which has been proposed by Fama (1970). As Joo (2010, page 165)) mentions: "*Efficient capital markets protect the purchasers of securities just as competitive product markets protect consumers who sign form contracts. Efficient capital markets further assure the consensual nature of corporate governance by facilitating a "market for corporate control" that disciplines management: Capital markets translate poor management or exploitative governance terms into reduced stock prices, and extreme declines in stock price leave management vulnerable to hostile takeovers. Modern international corporate governance theories.*" This means that the corporate governance mechanism, called the market for corporate control, can be effective because the capital markets are efficient. Although contractarianism is the dominant theory, some assumptions have been questioned. Behavioral finance has become prevalent, and it is thought that investors behave irrationally rather than rationally and that markets are not efficient. Joo (2010,page 170) writes that "… *the current state of corporate governance theory might be characterized as a model-destroying phase.*"

2.3.2 Agency theory

From a theoretical view, there are four primary corporate governance models, which are based on the agency theory, the stewardship theory, the stakeholder theory, and the resource dependence theory. The dominant theoretical model in the corporate governance literature is the agency theory. Agency theory has been proposed by Jensen and Meckling (1976) as an explanation of how corporations, primarily public companies, operate. Earlier, Berle and Means (1932) already observed the critical problem of public corporations, the separation of ownership and control. Jensen and Meckling (1976) explain the separation of ownership and control that shareholders are the owners, called principals, but they need the expertise of the managers, who are called the agent. Therefore, this theory is also called the principal-agent theory. Jensen and Meckling (1976) define the relationship between principal and agent as a contract in which the principals (shareholders) give the agents (management) decision-making power to perform business activities on their behalf (Merendino, 2013). Jensen and Meckling (1976) think there is a conflict of interest between various contracting parties—shareholders, corporate managers, and debt holders (Clacher et al., 2010). Jensen and Meckling (1976) explain the existence of the Board of Directors that it must be prevented the agent acts on his behalf and that an organizational unit is needed to represent the interests of the principal.

Moreover, a complete contract cannot control the relationship between the principal and agent because only incomplete contracts exist in the real world. However, the consequence of the incomplete contract is that agent must be monitored, which causes costs that are called Type I agency costs (Clacher et al., 2010). However, Fama and Jensen (1985) think if there were fully competitive markets for products, labor, and corporate control, there would be no agency costs because self-interested managers would maximize their wealth by maximizing shareholder value (Merendino, 2013). Merendino (2013) represents the agent-principal relationship with the following figure.

Clacher et al. (2010) define Type I agency costs, which are the consequence of incomplete contracts between managers and shareholders, and Type II agency costs, where conflicts occur between majority and minority shareholders. Clacher et. al (2010, page 142) write that "*The basic agency problem arises because of a separation between decision making, which is carried out by professional managers, and the bearing of residual risk by shareholders*."

They cite Brennan (1995), who thinks that agency problems cannot be costless controlled because of the impossibility of perfectly contracting. Jensen and Meckling (1976) define agency costs as the sum of monitoring costs, bonding costs, and residual loss. Clacher et al. (2010, page 142) write that "*Monitoring costs are expenditures paid by the principal to measure, observe, and control an agent's behavior. These costs may include audits, writing executive compensation contracts, and ultimately the cost of hiring and firing top managers."*

However, according to Fama and Jensen (1983), the agent will bear the costs of monitoring at the end because the agent's compensation will be adjusted to these costs. Bonding costs come from the monitoring agent's need to set up structures. The costs of establishing and adhering to these systems are known as bonding costs (Jensen/Meckling, 1976). Clacher et al. (2010, page 143) mention that bonding costs are more than just financial. For example, "*bonding costs may include the effort of providing timely and accurate information to external shareholders*."

They cite Denis (2001, page 143), who thinks "*the best solution to a Type I agency problem is to provide managers with a contract to bond them to do exactly as shareholders want in any given state of nature*." Jensen and Meckling (1976) define residual loss as representing the net loss (over any accrued benefits) from enforcing suboptimal incentive contracts. Denis (2010) explains that management cannot be overly constrained but must let them decide on their discretion.

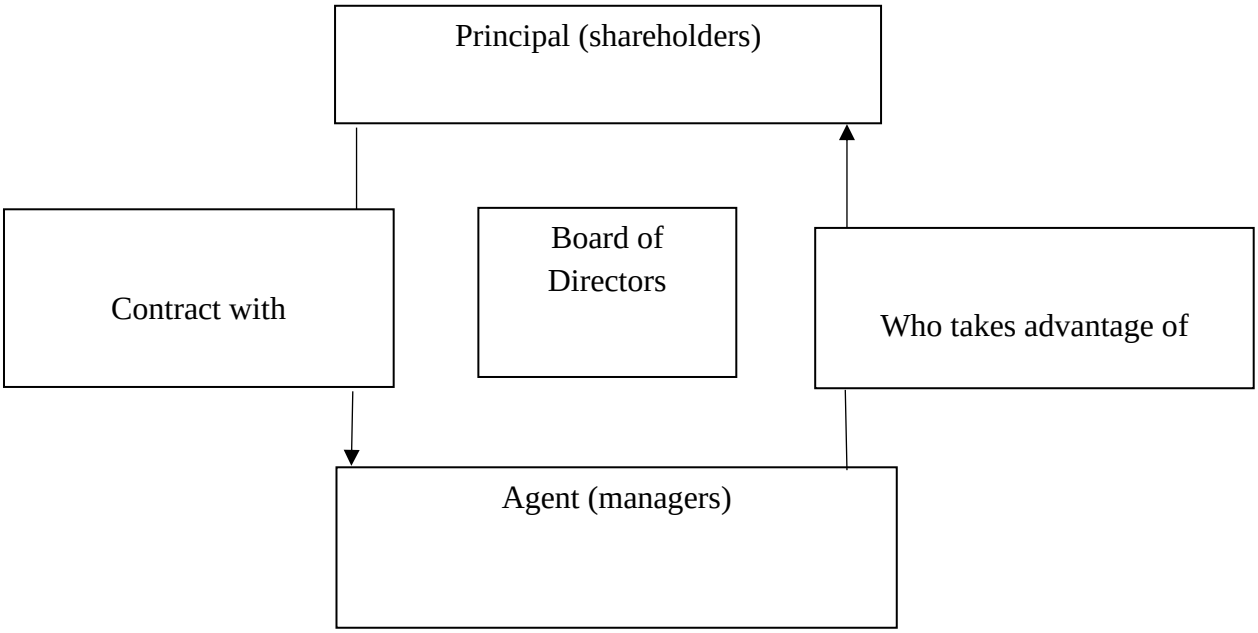

Figure 4 Relationship between principal and agent in agency theory (Source: Merendino, 2013, page 39)

Clacher et al. (2010) distinguish four sources of agency conflict. One agency conflict is moral hazard which has been proposed by Jensen and Meckling (1976). Jensen and Meckling (1976) described such a situation when the ownership structure is dispersed, and corporate managers do not own a substantial proportion of their company's shares.

A moral hazard can emerge if these managers try to get a private benefit, not investing in positive net present value (NPV) projects to maximize shareholders' wealth but investing in those projects which only increase the size of the firm. Managers' salaries and bonuses usually are enormous at large firms. Although Jensen (1983) warned that moral hazard problems are likely to be more extensive in larger companies. Monitoring managers will be more complex, and their costs will be higher. Jensen (1986) also thought that in larger, more mature companies, free cash flow problems will make it more challenging to solve problems caused by moral hazard. Managers must get incentives to invest the free cash in maximizing shareholders' wealth and not to get a private benefit.

Another agency conflict can be emerged from earnings retention. Brennan (1995) thought that the moral hazard concept oversimplifies the agency problem and that this would be the main reason for effort aversion. Clacher et al. (2010, page 145) cite Jensen (1986) that "… *managers prefer to retain earnings, whereas shareholders prefer higher levels of cash distributions, especially where the company has few positive NPV investment opportunities*." "*By definition,*

managers should not use this cash for further investment opportunities but should retain such funds in securities that generate a reasonable return to investors or distribute the cash to shareholders through dividends or share repurchases" (page 145).

Time horizon agency conflicts can be emerged that "… *shareholders are assumed to be concerned with all future cash flows of the company into the indefinite future, but managers may only be concerned with company cash flows for their term of employment*" (page 145).

Managerial risk aversion agency conflicts relate to managerial risk aversion arise because of portfolio diversification constraints. Clacher et al. (2010) cite Fama (1980) who thought that "… *company managers rent a substantial fraction of their wealth—namely their human capital stock—to the company that employs them. The rental rates for their human capital depend upon the success or failure of the company during their tenure*" (page 145). "… *shareholders are considered to be concerned only with systematic risk, whereas company managers are concerned with both systematic and unsystematic (firm-specific) risk*" (page 145).

2.3.3 Stakeholder theory

In corporate governance theory, the two competing views are the shareholder and the stakeholder concept. Agency theory considers the theory of corporate governance from the aspect of the shareholders, and this theory calls the two central roles of the corporate board: control and value creation. The Board of Directors must control the company's management to maximize the shareholders' wealth. Both roles are for the interests of the shareholders. However, stakeholder theory expanded this view.

The stakeholder theory has been proposed by Freeman (1984), but initially, the theory only dealt with those groups without whose support the company ceased to exist (Merendino, 2013). As Freeman (1984) said: "*a stakeholder in an organization is any group or individual who can affect or is affected by the achievement of the organization's objectives*." (Merendino, 2013, page 25) Later this view has been expanded to include any individual or group who can affect or is influenced by the firm activities by Freeman (2010) and Sternberg (1997). As Merendino (2013) writes, firms should be governed for the benefit and interests of all stakeholders, i.e., customers, employees, suppliers, communities, managers, and shareholders. Clarkson (1995) states that a stakeholder can be a voluntary or involuntary risk bearer. Voluntary stakeholders bear some form of risk because of having invested some form of capital in the organization - human or finance - something of value. Involuntary stakeholders are placed at risk because of

the firm's activities. "*Stakeholder theory is a set of propositions that suggest that management of companies have obligations to some group of stakeholders* (Merendino, 2013, page 25)." Merendino (2013) cites Donaldson and Preston (1995) that the company must consider the various interests of stakeholders who are affected by the firm's activities. Based on this, the Board of Directors must contribute maximize all stakeholders' wealth not just shareholders' wealth. As Merendino (2013), page 38 states, "*the group of networks is important other than owner-manager relation as in agency theory*." In this regard, the stakeholder is a theory of organizational management and ethics. Nordberg (2010) writes that stakeholder theory has become popular in Germany and Japan. In Germany, the supervisory boards of companies must have a seat for the representative members of the workforce. Earlier in Germany, large banks and insurance companies also had privileged supervisory board positions. In Japan, the effect of stakeholder theory can be seen in the favored treatment of suppliers and customers in the families of companies known as keiretsu.

Stakeholder theory can be considered as an ethical approach since, according to this theory, a company must also look after stakeholders' interests and not just shareholders' interests. As Nordberg (2010, page 181) mentions: "*This approach to stakeholder theory has shaped the thinking behind corporate social responsibility*."

2.3.4 Stewardship theory

Stewardship theory has been initially defined by Donaldson and Davis (1991). According to this theory, managers are considered excellent and trustworthy stewards, acting for the interests of the firm and the shareholders. Managers are not selfish, and their behavior can be influenced through appropriate incentives and rewards (Davis et al., 1997). Merendino (2013) thinks that stewardship theory does not necessarily consider the separation of ownership and control as a problem, while managers only sometimes act to maximize their own personal interests. Merendino (2013) cites Donaldson and Davis (1991), who recognized the importance of structures that empower the manager as a steward. Managers have ensured autonomy because the relationship between managers and owners is based on trust. Merendino (2013) also cites Davis et al. (1997) that according to the stewardship theory, the costs of monitoring and controlling agents' behavior can be minimized. Merendino (2013) says that shareholders appoint managers who act as stewards of their interests. Moreover, managers report to the owners on the results of stewardship. Merendino (2013) represents this stewardship relation with the following figure.

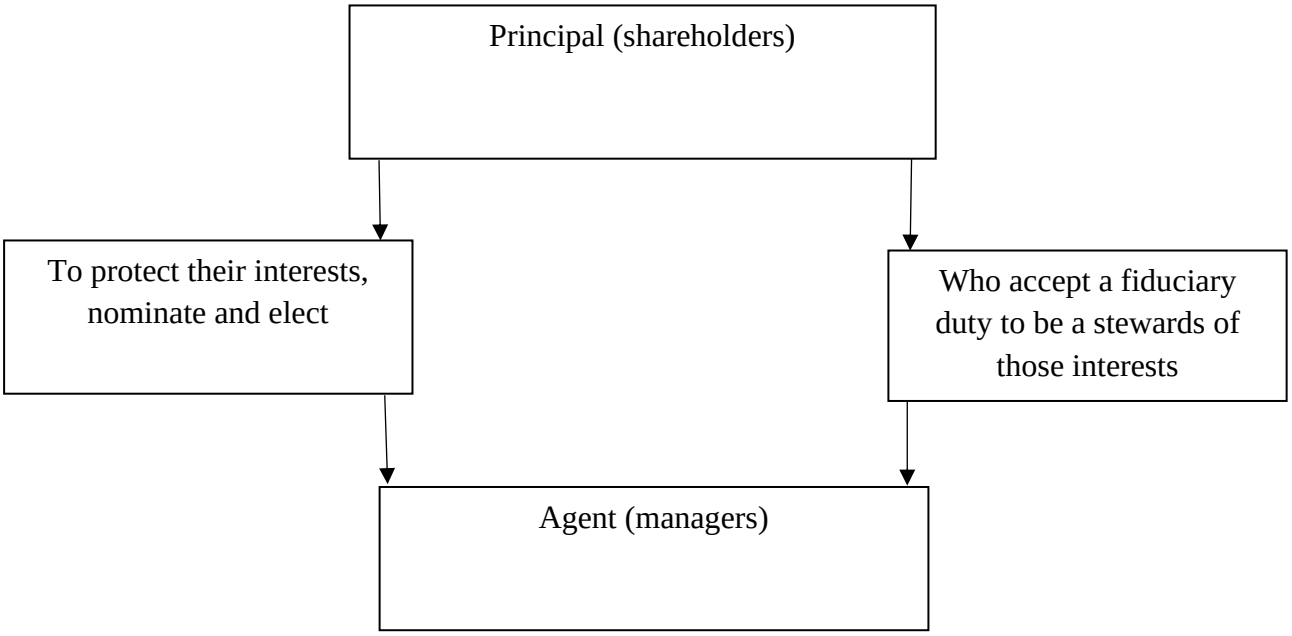

Figure 5 Relationship between principal and agent in stewardship theory (Source: Merendino, 2013,page 39)

2.3.5 Resource dependence theory

The concept of resource dependence theory comes from Pfeffer and Salancik (1978). Zahra and Pearce (1989) write that the grounds for resource dependence theory come from sociology and organizational theory. According to this theory, an organization is dependent on its critical resources, and therefore its actions can be explained how this organization is dealing with these resources. Organizational decisions and actions can be explained by how an organization uses its resources. Merendino (2013) refers to Storey (1994) that a firm may be suffered from the lack or scarcity of internal resources and internal knowledge. Merendino (20013) states that in this regard, the Board of Directors is considered a fundamental source because its skills and professional experience can be helpful to company's management. Resource dependence theory thinks a firm depends on its environment and other organizations, which is critical to gain economic success. Merendino (2013) refers to Pfeffer and Salancik (1978) as the fundamental thought of resource dependence theory is the relevance of external linkages and networks. Merendino (2013, page 40) states that "… *the board is the focal link between the firm and its external network*." He says that these networks and external links can reduce the uncertainty of corporate decisions. Merendino (2013) thinks that directors are key nodes within an external network of firms and boards. Zahra and Pearce (1989) illustrate a company's relationship based on resource dependence theory the figure 6.

According to Zahra and Pearce (1989, page 297) "*the resource dependence theory views boards as important boundary spanners that make timely information available to executive. Furthermore, because of their prestige in their professions and communities, directors are able to extract resources for successful company operations*."

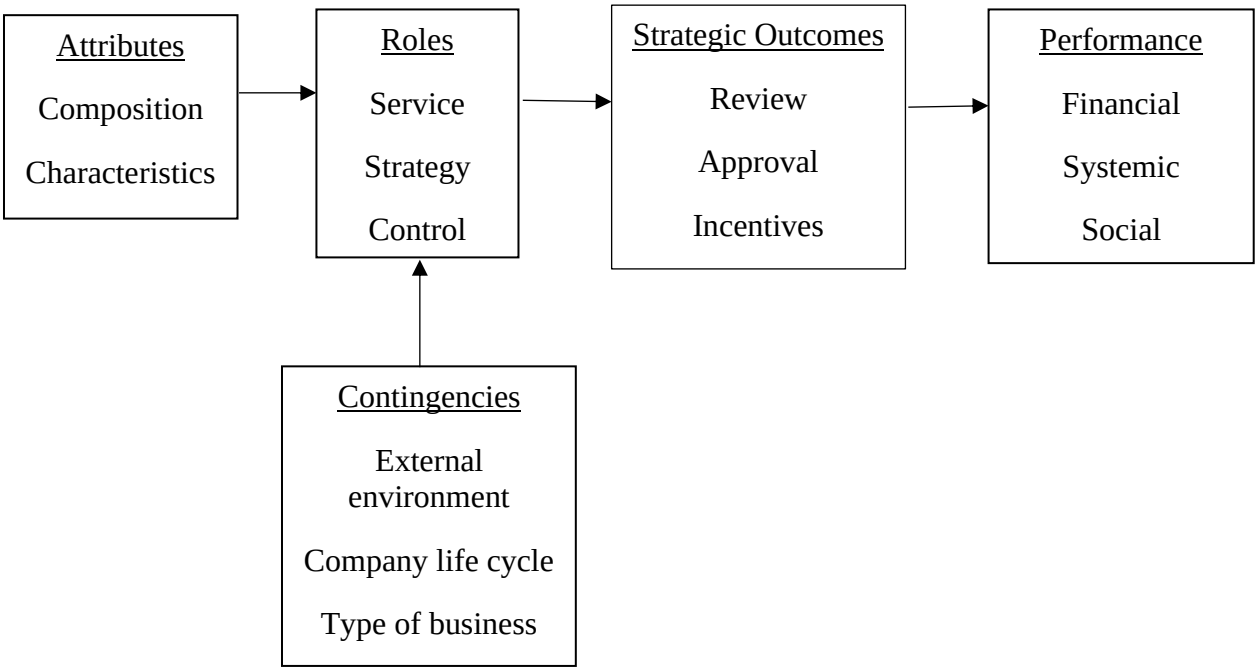

Figure 6 The effect of Boards on company performance according to resource dependence theory (Source: Zahra/Pearce, 1989, page 298)

Zahra and Pearce (1989) write that the board's performance depends on three contingencies, external environment, company life cycle, and type of business. External environment refers to if a firm operates in a volatile and hostile environment. Creating favorable links to this environment by the board is critical. Corporate boards act differently at various points of the company life cycle. Finally, the type of business defines what kind of qualification needs to have by the members of the board or the members of the boards must act or think differently at a for-profit or a non-profit firm.

Table 1 Summary of four theoretical perspectives and implications for boards (Source: Bathula, 2008, p. 33)

Theory	Role of the Board	Implications for the Board
Agency theory	Managerial control	Independent boards are a mechanism for shareholders to retain ownership control rights and monitor performance
Stewardship theory	Managerial empowerment	The board controlled by management is empowered and manages corporate assets responsibly

Resource dependency theory	Co-optation	Board with strong external links is a co-optation mechanism for firms to access external resources
Stakeholder theory	Uphold interests of all stakeholders	Maximizing the shareholder returns is not sole objective; interests of all stakeholders should be equally honored.

Table 2 Comparing the four corporate governance theories (Source: Abid et al., 2014, p. 172)

Basis	Agency theory	Stewardship theory	Stakeholders theory	Resource dependence theory
Focus	Reciprocity (self-interest)	Shareholders' interests	Stakeholders' interests and relationship building	Firm resources and power
Objective	Minimize agency costs	Maximize productivity	Long term relationship	Acquire and exploit resources
Base	Normative	Classical idea	Normative	Classical idea
Model	Individualistic	Collectivistic	Collectivistic	Collectivistic
Time horizon	Short term view	Long term view	Long term view	Long term view
Rooted	Economics	Law	Management	Sociology and management
Behavior	Opportunistic	Pro-organizational	Pro-social	Pro-organizational
Approach	Economic	Sociological and Psychological	Societal level	Strategic
Main theme	Goal congruence	Goal alignment	Goal alignment	Goal congruence

Basis	Agency theory	Stewardship theory	Stakeholders theory	Resource dependence theory
Cultural suitability	High power distance	Low power distance	Low power distance	Mixed
Model of man	Economic man	Self-actualizing man	Self-actualizing man	Economic man
Motivation	Extrinsic	Intrinsic	Intrinsic as well as extrinsic	Intrinsic as well as extrinsic
Structure	Monitor and control	Facilitation and empowerment	Facilitation and empowerment	Structure
Need	Economic need (lower order)	Growth achievement (higher order)	Economic and long-term firm growth	Economic and long-term firm growth
Principal and agent interest	Diverge	Converge	Converge-Liaison	Converge
Management philosophy	Control oriented	Involvement oriented	Involvement with all stakeholders	Control oriented
Mechanism	Control mechanism	Trust mechanism	Trust mechanism	Control mechanism
Attitude towards risk	Risk aversion	Risk propensity	Risk propensity	Risk aversion
Power	Institutional base	Personal base	Institutional base	Institutional base
Commitment	Low level commitment	High level (shared) commitment	High level (shared) commitment	High level (shared) commitment

Basis	Agency theory	Stewardship theory	Stakeholders theory	Resource dependence theory
Relationship	Contract base relationship	Trust base relationship	Trust base relationship	Contract base relationship

Table 3 Summary of theories affecting corporate governance development (Source: Mallin, 2016, page 16, Table 2.1)

Theory name	Summary
Agency	Agency theory identifies the agency relationship where one party (the principal) delegates work to another party (the agent). In the context of a corporation, the owners are the principal, and the directors are the agent.
Transaction cost economics	Transaction cost economics views the firm itself as a governance structure. The choice of an appropriate governance structure can help align the interests of directors and shareholders.
Stakeholder	Stakeholder theory takes account of a wider group of constituents rather than focusing on shareholders. Where there is an emphasis on stakeholders, the governance structure of the company may provide for some direct representation of the stakeholder groups.
Stewardship	Directors are regarded as the stewards of the company's assets and will be predisposed to act in the best interests of the shareholders.
Class hegemony	Directors view themselves as an elite at the top of the company and will recruit/promote to new director appointments taking into account how well new appointments might fit into that elite.
Managerial hegemony	Management of a company, with its knowledge of day-to-day operations, may effectively dominate the directors and hence weaken the influence of the directors.
Path dependence	Path dependence may be structure driven and rule driven; corporate structures depend on the structures with which an economy started.
Resource dependence	Directors are able to connect the company to the resources needed to achieve corporate objectives.
Institutional	The institutional environment influences societal beliefs and practices that impact on various 'actors' within society.
Political	Political theory has a significant influence on different ownership and governance structures.
Network governance	A structure of network governance allows for superior risk management.

2.3.6 Other perspectives

From another perspective, Merendino (2013) distinguishes the different interpretive logicalities of corporate governance. They are the followings: the structural-functional, the dimensional, the temporal, the accountability, the multidisciplinary and others. The structural-functional logicality is the combination of both. The *structural perspective* relates on the understanding bodies necessaries to govern a company, while the *functional* relates on the understanding which mechanisms and procedures necessaries for those bodies to fulfil their role. As Merendino (2013, page 17) cites Zattoni (2004) when he writes: " *It may, therefore, indentify two related variables: a) the structures and mechanisms of corporate governance - which is in turn subdivided into: i) the board of directors, ii) a number of other structures and mechanisms), b) interests referred to in the process of corporate governance - which is in turn subdivided into i) shareholders, ii) all stakeholders.*"

Merendino (2013) cites Mazzotta (2007) that according to dimensional logicality, all the definitions of corporate governance may have internal or external value for the company. The internal values refer on those characteristics or factors which are different by firms, as ownership, senior management, administrators. The external values refer on the combination of those actors and variables which are not company-specific but are different by countries, as markets, legal system, economic system.

Moreover, Merendino (2013) distinguishes two kind of corporate governance approaches. Merendino (2013) states that it is preferable to study the approaches of corporate governance rather than a definition. Merendino (2013) cites Zattoni (2000) who distinguishes the restrictive and extensive approach. The restrictive approach deals with the interests of the shareholders primarily and the Board of Directors is in the focus of this approach. According to the restrictive approach, the Board is responsible for the solution of any conflicts between shareholders and managers. On the other hand, the extensive approach considers the corporate governance as a set of mechanisms, procedures, rules, and formal bodies in order to satisfy interests of all stakeholders.

Table 4 The effect of boards on company performance according to resource dependence theory (Source: Merendino, 2013, page 24)

		FOCUS	
		STRUCTURE	PROCESS
APPROACH	RESTRICTIVE	"Structured interface" Ways in which firm is governed Board of Directors vs shareholders	Set of internal forces that affect firm processes Set of mechanism that influence firm decisions
	EXTENSIVE	Structure and functioning of the control/monitoring bodies Rules, principles, and recommendations which discipline relations among stakeholders	Relationship between shareholders and stakeholders Fulfilment of all stakeholders' expectations High attention to social and economic context

The main reason for the Sarbanes–Oxley Act of 2002 was to define good corporate governance. This act is also known as the "*Public Company Accounting Reform and Investor Protection Act*." The significant elements of this act are the next. A Public Company Accounting Oversight Board (PCAOB) must be established to provide independent oversight of public accounting firms providing audit services ("auditors"). Auditor Independence establishes standards for external auditor independence to limit conflicts of interest. Corporate responsibility means that senior executives take individual responsibility for the accuracy and completeness of corporate financial reports. Enhanced Financial Disclosures mean enhanced reporting requirements for financial transactions, including off-balance-sheet transactions, pro-forma figures, and stock transactions of corporate officers. Analyst Conflicts of Interest refer to the codes of conduct for securities analysts and requires disclosure of knowable conflicts of interest. Commission Resources and Authority defines practices to restore investor confidence in securities analysts. Studies and Reports refer to performing various studies and reporting their findings according to SEC rules. Corporate and Criminal Fraud Accountability describes specific criminal penalties for manipulating, destroying, or altering financial records or other interference with investigations while providing certain protections for whistle-blowers. White Collar Crime Penalty Enhancement states that criminal penalties have been increased associated with white-collar crimes and conspiracies. Corporate Tax Returns mean that the Chief Executive Officer should sign the company tax return. Corporate Fraud Accountability identifies corporate fraud and records tampering as criminal offenses and joins those offenses to specific penalties.

Besides, the Sarbanes–Oxley Act of 2002 defined some reasons why caused corporate governance systems could not prevent the problems. Auditor conflicts of interest refer to the problem that auditing firms were self-regulated and consulting agreements were far more lucrative than auditing engagement. Boardroom failures could happen, which means the members of the Board of Directors either did not fulfill their responsibilities or did not have the expertise to understand the complexities of the businesses. Securities analysts' conflicts of interest refer to the fact that securities analysts have to give buy or sell recommendations on companies' stocks and bonds. In contrast, these companies took investment banking services from the investment bank where these analysts worked. Such banking practices existed that several significant banks gave large loans to such companies without understanding or just ignoring the risks of these companies. Executive compensation, such as stock options and bonuses, contributed to the high volatility in stock prices because managers were pressured to meet their targets. They had to invest even if they feared a price decline in the future.

The main reason for modeling or understanding the role of corporate governance is to prevent such large corporate failures that happened in the past. Recently, the definition of corporate governance is to define what good corporate governance means. As it can be seen in the Preface of G20/OECD Principles of Corporate Governance: "*The purpose of corporate governance is to help build an environment of trust, transparency, and accountability necessary for fostering long-term investment, financial stability, and business integrity, thereby supporting stronger growth and more inclusive societies*." (page 7) For example, the National Committee on Governance Indonesia defines good corporate governance with five basic principles: Transparency, Accountability, Responsibility, Independency, and Fairness (TARIF).

2.4 The role of the Board of Directors in the corporate governance mechanism

The main goal of this chapter is to present the theoretical foundations of the important role of the Board of Directors[1] in the corporate governance mechanism and to find possible answers to why plays the Board a central role in empirical corporate governance studies. The present study is meant as a niche article since many empirical studies have been written in the past 25 years in which the connection between firm performance and board of directors' characteristics were

[1] *Hereinafter the expression the Board will be used as the synonym of the Board of Directors. In one-tiered governance structure, the Board of Directors is the main corporate body, while in two-tiered structure there is the supervisory board which plays the same role as the Board of Directors.*

analyzed but very few articles were made about the theoretical role of the Board (Dennis, 2010; Weisbach et al., 2008).

2.4.1 The role of the Board of directors from theoretical view

As Fama and Jensen (1983, page 311) stated, "*the separation of residual risk bearing, and decision management leads to decision systems that separate decision management from decision control*". Tamburini (2016, page 27) says that "*Decision management is responsibility of the company's managers, while the decision control role is covered by the Board of Directors*." Hermalin and Weisbach (2003) define as "*Board of directors are an economic institution that, in theory, helps to solve the agency problems inherent in managing an organization. Although boards satisfy numerous regulatory requirements, their economic function is determined by the organizational problems they help to address*." Moreover, Hermalin and Weisbach (2003, page 6) writes, "*A more plausible hypothesis is that boards are a market solution to an organizational design problem, an endogenously determined institution that helps to ameliorate the agency problems that plague any large organization*." Corporate boards do not only exist because of the regulation. Jensen (1993) thinks that the Board, as the head of the internal corporate governance system, is one from the four control forces which can influence managers' decisions. These four forces are: capital markets, legal/political/regulatory system, product and factor markets, and internal control system. Croci (2018) refers on Monks and Minnow (2011) who consider the members of the Board are middlemen whose main role to mediate between top management and shareholders. This concept can also be observed at Thomsen and Conyon (2012). Bebchuck and Weisbach (2009) think that shareholders can govern the firm directly through the Board whose members are elected by the shareholders. But there is a conflict of interest between shareholders and the board that already has been noticed by Smith (1776) and Berle and Means (1932), and which the agency theory based on. Bebchuck and Weisbach (2009, page 5) write that this is a *"... complex three-way relationship among shareholders, boards, and top management*...."

In their study, Hermalin and Weisbach (2003) asked these two questions about the Board: what determines their makeup and what determines their actions? Weisbach et al. (2008, page 1) write that "*Given that all corporations have boards, the question of whether boards play a role cannot be answered econometrically as there is no variation in the explanatory variable. Instead, studies look at differences across boards and ask whether these differences explain differences in the way firms function and how they perform. The board differences that one*

would most like to capture are differences in behavior." After, it is hard to observe the differences in behavior and even harder to quantify them. Therefore, empirical articles focus on structural differences across boards that are presumed to correlate with differences in behavior. For instance, outside (non-executive) and inside (executive) directors behave differently, so different ratios of outside to inside directors can show whether conduct varies in a statistically significant manner across different ratios. Adams et al. (2010, page 59) mention that "*when conduct is not directly observable (e.g., advice to the CEO about strategy), one can look at a firm's financial performance to see whether board structure matters (e.g., the way accounting profits vary with the ratio of outside to inside directors)*."

Harrison (1987), Johnson et al. (1996), and Withers and Hillman (2008) emphasize the oversight role of the board over the company's strategy and monitoring of the top management. McNulty and Pettigrew (1999) highlight the three main perspectives of the board, the governance perspectives, which is essentially a monitoring role. The strategic perspective means making strategic decisions, and the resource perspective means providing resources.

Madhani (2017) summarizes the roles of corporate boards through various corporate governance theories. Agency theory clearly emphasizes the monitoring role of the board of directors. According to the theory, the internal control mechanism is the most crucial governance mechanism. It assumes outside board members are more effective than internal directors in controlling management and protecting shareholders' interests. This finding is supported, for example, by Zahra and Pearce (1992). Regarding the monitoring role, it is essential to have a higher proportion of independent members on the board. Iwu-Egwuonwu (2010) thinks that the independence of board members is critical to their ability to carry out the monitoring function and participate in strategic decisions making. Madhani (2017) claims that outside directors are considered independent board members if they have a limited role with the firm except for board responsibilities. However, Madhani (2017) thinks that the main shortcoming of agent theory is focusing on the role of board monitoring, overshadowing, for example, the board's role as advisor to management or its role in providing resources.

Abdullah and Valentine (2009) emphasize the most significant difference between agency and stewardship theories. According to stewardship theory, management is trustworthy, and the relationship between shareholders and management is based on trust. Hence the costs of monitoring are minimized. McGrath thinks that CEO can create a balanced relationship among the Board of Directors, the top management, and the owners (shareholders). Consequently, the

large ratio of inside directors on the board is favorable. Madhani (2017) thinks that since executive (inside) directors know the company better and have special knowledge, they can enhance the firm's performance better than outside directors.

According to the resource dependence theory, the members of the Board of Directors can provide critical resources to the company, and the board is considered a link to the external environment (Korac et al., 2001). Hermalin and Weisbach (1988) emphasize that the board providing resources is more critical than its monitoring role. The primary role of outside directors, under agency theory, is to achieve more effective monitoring of management, whereas, according to resource dependence theory, outside directors can provide independent advice (Charan, 1998). Moreover, as Pfeffer and Salancik (1978) claim, outside directors can help provide resources to the company through their expertise and contacts and provide a communication channel between the company and external organizations.

Elnahla and Squires (2020) think that stakeholder theory emphasizes the service role of the Board of Directors. She claims that the board members can be considered as the members of a wealth creating team, they act as corporate coordinators between stakeholders. Elnahla and Squires (2020, page 135) point out the similarities between stakeholder theory and resource dependency theory, she writes that "*Boards of directors enable firms to reduce their dependence on the external environment and to gain outside resources. Hence, boards and board members serve to bring external resources for the benefit of the firm*." Elnahla and Squires (2020) emphasize the role of human capital, which appears in Hillman & Dalziel (2003) and Tian, Haleblian, &Rajagopalan (2011). As Elnahla and Squires (2020, page 135) write: "*Board capital is the human capital, in the form of the individual experience, expertise and interests, and the social capital, in the form of access to useful information and resources through experiences and connections, that the director brings to the firm*."

Madhani (2017) illustrates the relationship among board demography, the effect of corporate process, and the corporate outcome by corporate governance theories with the Figures 7-9.

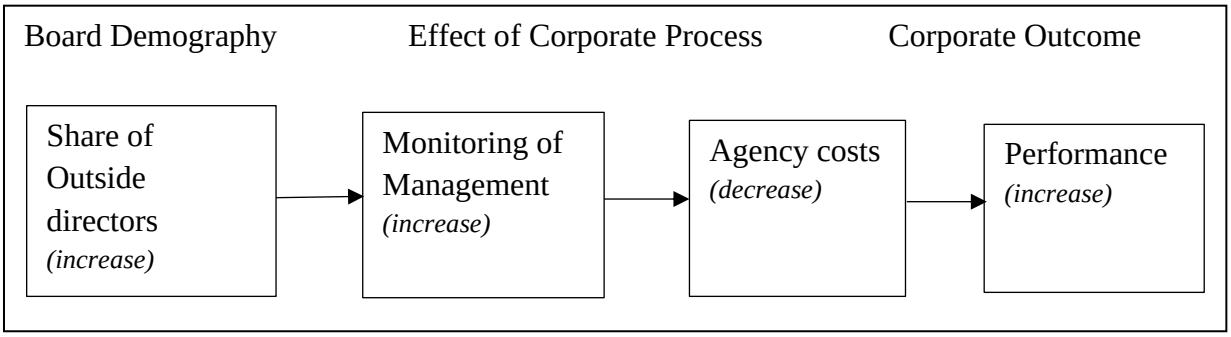

Figure 7 Board Demography and Corporate Governance by Agency Theory (Source:Madhani, 2017, page 6)

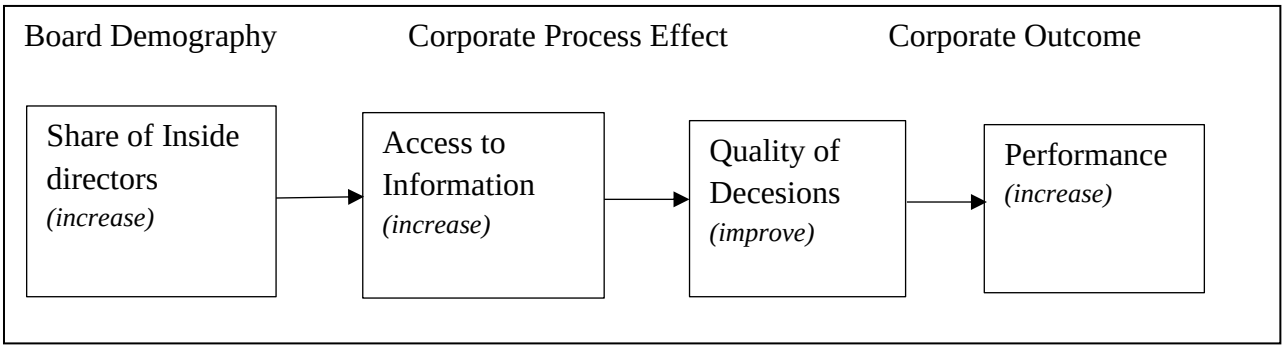

Figure 8 Board Demography and Corporate Governance by Stewardship Theory (Source:Madhani, 2017, page 8)

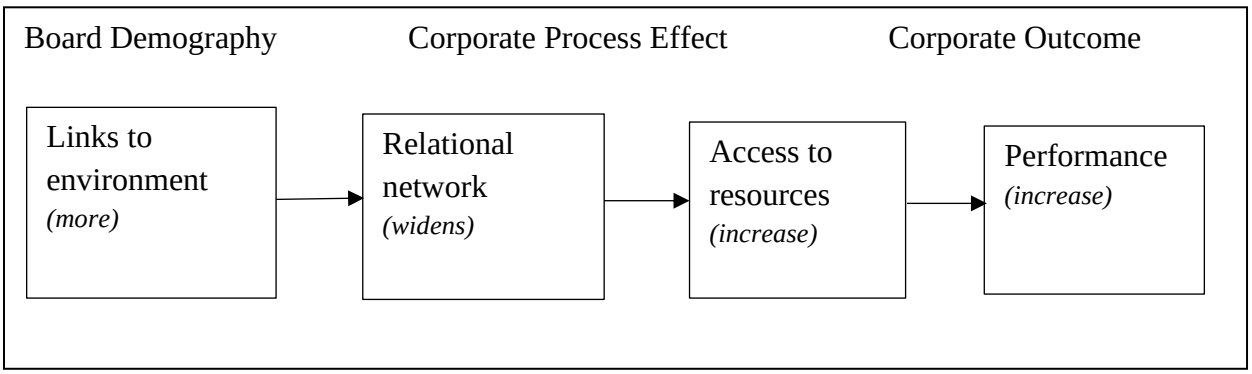

Figure 9 Board Demography and Corporate Governance by Resource-Dependence Theory (Source:Madhani, 2017, page 10)

2.4.2 The role of the Board of directors in the corporate governance mechanism

Based on multiple studies, Croci (2018) states that the two main functions of the Board are monitoring and advisory. Usually, studies emphasize the monitoring role of the Board, like Fama and Jensen (1983), who think independent directors should be in a better position to monitor a firm's management more effectively compared to non-independent (or executive) directors. Since independent directors are not connected to the company, they do not depend on it and want to build their reputation through their decisions. Although Bebchuck and Weisbach (2009) state that the directors must have an informational advantage over outsiders and shareholders also because only in this case would directors be able to give valuable advice to

top management. Cornelli et al. (2013) think that soft information plays a more prominent role in the board decision process than problematic information. Holström (2005) also emphasizes the importance of getting information so that the Board can achieve its monitoring role effectively. Croci (2018) writes that the board's most important role is to protect the interests of the shareholders through monitoring the management. The agency theory explains the importance of this monitoring role.

While the monitoring role of the board addresses the conflict between management and directors, the advisory role, which is sometimes presented also as a service role, highlights the cooperation between directors and management and how directors can be valuable assets for the managers in their decision-making process. In their advisory role, directors counsel managers on vital strategic decisions.

Usually, the main role of the Board is thought to be the monitoring role. "*The structure of the board should minimize the potential conflicts of interest among decision makers and residual risk bearers.*" (Dherment-Férère/Renneboog, 2010 p. 351). According to agency theory, the Board can reduce the transaction and agency costs which are associated with the separation of management and ownership. In the one-tiered governance structure, this monitoring or supervisory role can be accomplished by the nonexecutive or independent directors. In the two-tiered structure, the supervisory board plays this role.

Good corporate governance contributes to the more efficient operation of the company and proper governance mechanisms can protect the interests of the shareholders. Usually, shareholders cannot influence the management's decisions, shareholders usually are not experts, and they lack access to information. Governance mechanism is the structure, the system of incentives. The two main governance mechanism are the internal and external. As Banks (2004, p. 24) writes "*Internal governance is based on specific mechanisms and actions taken by individual firms to enforce control and accountability*." The Board is the corporate body which is the center of the internal corporate governance mechanism. The two main function of the board are the monitoring and advisory role. The management's renumeration structure and responsibilities system are also the part of the internal mechanism. Nowadays the existence of internal audit, compensation and nominating committees are obligatory at listed companies (Rezzae, 2010). Creating and promulgating a code of conduct, and other independent control groups (accounting, finance, risk management) are also the part of the internal corporate mechanism (Banks, 2004).

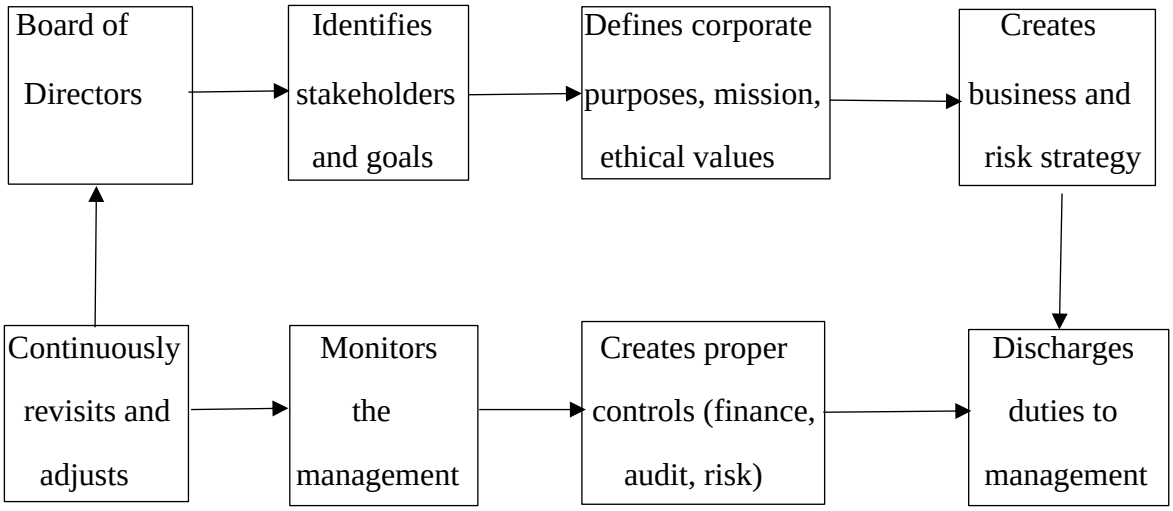

Figure 10 The internal governance process (Source: Banks, 2004, page 33, Figure 2.1)

Merendino (2013, page 50) writes "… *that it [the board] is the highest and the most important authority in the firm and the key institution within company. Hence, the board plays a fundamental role with respect to internal and external activities*…" Baker and Anderson (2010) emphasize that the board is responsible to hire and fire top executives, to design the firm's strategy and to assess and approve the most important strategic and financial plans. Regarding the financial plans, Ferreira (2010) refers on the role of Board in merger and acquisition situation in the change of capital structure. Beside that the Board is in the center of internal governance mechanism, it makes external activities also. The Board assists the links between the firm and its external environment (Ayuso/Argandoña, 2007). Focusing on the internal activities of the Board is the shareholder view, while focusing on external activities is the stakeholder view. Merendino (2013, page 51) writes that "*According shareholder view, the board is a fundamental body also because it has the role of monitoring, controlling and advising management*."

External governance mechanism means those external forces which supplement the internal mechanism. Figure 9 shows how Banks (2004) classifies these external forces.

Regulatory oversight implies all the supervisory and regulatory agencies whose tasks are to create frameworks to protect the interests of shareholders and stakeholders, such as Securities and Exchange Commissions and national banks. Banks (2004) writes that national legal and bankruptcy regimes are responsible for creating the framework of law, which corporate actions and behaviors to be included to help ensure that stakeholders are appropriately protected. The importance of capital markets asses means if a firm raises capital, the external financiers can impact this firm through the external corporate governance mechanism. Banks writes that a

transparent and regulated capital market can become an essential external governance mechanism through the following ways.

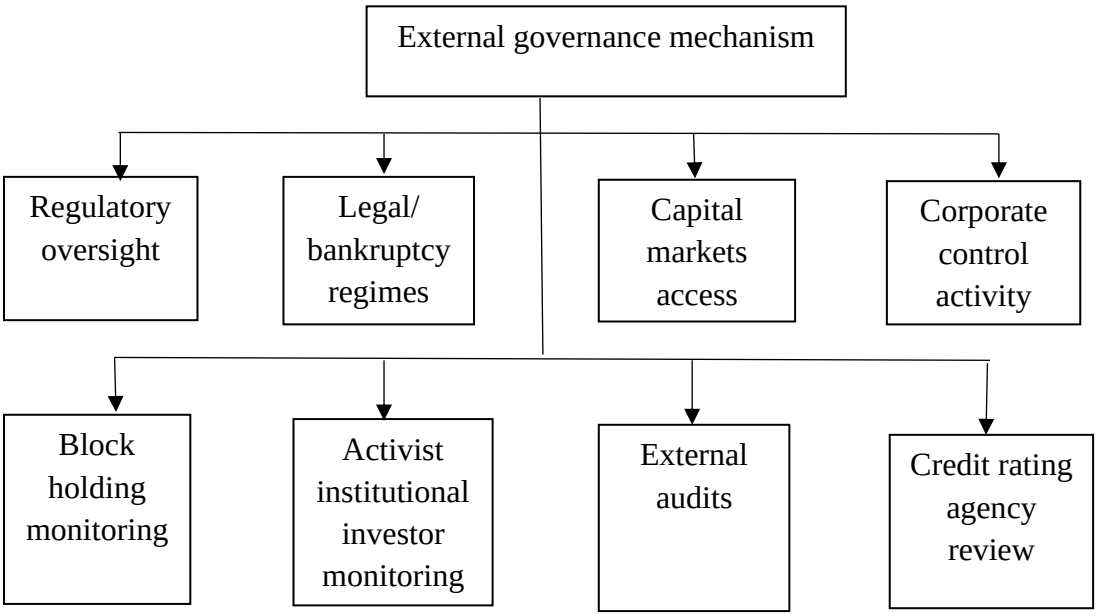

Figure 11 Elements of external governance mechanism (Source: Banks, 2004, page 55, Figure 3.1)

Capital markets supplies funds to firms; capital markets can differentiate between firms through allocating cheaper funds to better companies; capital markets make corporate control possible through scrutiny and discipline. Banks (2004, page 60) writes that "*In advanced systems the capital markets are typically supported by specific securities market regulations, set by financial regulators and enforced by listing exchanges, that require all public securities issuers to register their issues (generally by filing detailed disclosure statements), submit regular financial reports, prohibit insider trading/trading abuses, adhere to various governance practices and financial standards, and so on. Those unwilling to comply are generally denied access."* Finally, corporate control activity means the market for corporate control which can be realized through corporate merger, acquisition, and restructuring activities. These actions are proxy contests, corporate takeovers, and restructurings.

Tirole (2006) writes that the external mechanism also means monitoring corporations like the internal mechanism. The parties who can be involved in this governance mechanism are large shareholders, large creditors, investment banks, auditors, and rating agencies. Blockholders, activist institutional investors are non-executive shareholders, while large creditors, audit firms, rating agencies, or regulators are non-equity stakeholders.

Merchant and Van der Stede (2017) claim that many institutional and organizational arrangements (including regulations, laws, and norms) and processes have corporate governance effects, but these effects vary across countries. In Anglo-American countries, economies, equity markets are considered the primary governance mechanism. So, they are laws and regulations, boards of directors, external auditors, governance ratings, and takeover threats. However, in some Western European or Asian countries, concentrated ownership acts as a corporate governance mechanism. In Japan, this is the Keiretsu; in South Korea, the Chaebols; in India, the institutional investors. While in China, the state ownership. In Germany, the national banks, insurance companies, and labor unions have influential ownership. However, Scandinavian countries rely more on social norms and expectations, and Islamic countries rely on Sharia law.

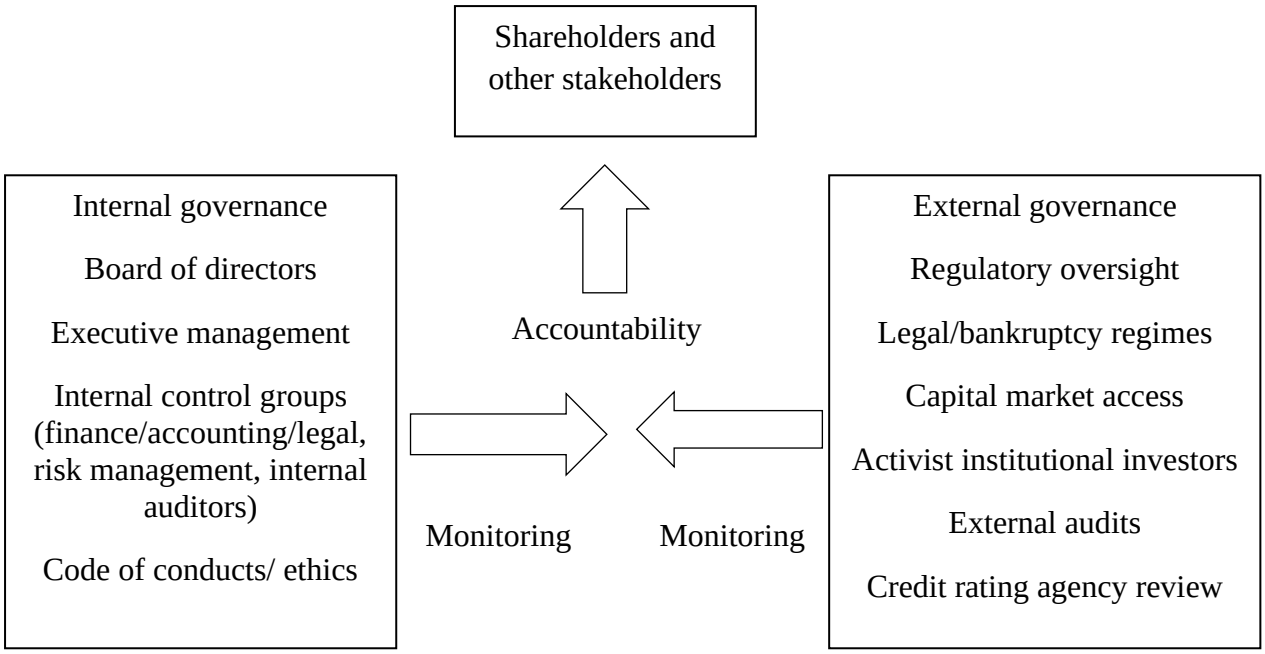

Figure 12 Summary of internal and external governance mechanisms (Source: Banks, 2004, page 25, Figure 1.3)

2.4.3 The main functions of the Board of Directors

Banks (2004) specifies the general role and function of the Board in detail. The primary function is representing and protecting the interests of the shareholders and stakeholders. This means that the Board takes an independent view of the actions and activities of the company and its executives. Besides its primary function, the Board is responsible for creating an ethical environment, codifying ethical codes, and ensuring them. Also, the responsibility of the Board is to establish and operate special committees such as audit, compensation, and nomination committees. Further functions are ensuring the adequacy of internal and external controls,

developing communications dialog and reporting links with internal control groups, controlling the general commercial affairs of the corporation, and overseeing the strategic and business performance goals of the corporation. The Board is such an independent body in the corporation that makes its expertise available to the company, like providing for appropriate crisis management planning, including business interruption, disaster recovery, and liquidity management, developing and implementing director and executive management succession plans and executive compensation plans, communicating regularly with key shareholders and regulators.

Bathula (2008) refers to Wheelen and Hunger (2004) summarized the essential tasks of the Board: monitoring, evaluating, influencing, initiating, and determining. Evaluating and influencing mean that the Board can examine management's proposals, decisions, and actions; gives advice or suggestions; overview the alternatives. In addition, they are initiating and determining that the Board specifies the mission and strategy of the firm. Although Bathula (2008) mentions that the most active boards only characterize these two functions.

Bathula (2008) refers to Wheelen and Hunger (2004) who proposed the board of directors' involvement as a continuum in strategic management process from low to high.

Table 5 Board of Directors' involvement in strategic management (Source: Bathula, 2008 p. 20)

←——DEGREE OF INVOLVEMENT IN STRATEGIC MANAGEMENT——→					
Low (Passive)					High (Active)
Phantom	Rubber stamp	Minimal Review	Nominal Participation	Active Participation	Catalyst
Never knows what to do if anything; no degree of involvement.	Permits officers to make all decisions. It votes as the officers recommend on action issues.	Formally reviews selected issues that officers bring to its attention.	Involved to a degree in the performance or review of selected key decisions, indicators, or programs of management.	Approves, questions, and makes final decisions on mission, strategy, policies, and objectives. Performs fiscal and management audits.	Takes the leading role in establishing and modifying the mission, objectives, strategy, and policies. It has a very active strategy committee.

In the empirical corporate governance studies the Board of Directors plays the central role. In such articles, they are looking for the answer what kind of impact can have the Board on the firm performance measures. One answer of this central lies in what Weisbach et al. (2008, page

1) mention: "… *studies look at differences across boards and ask whether these differences explain differences in the way firms function and how they perform. The board differences that one would most like to capture are differences in behaviour."* The other answer lies in the functions of the Board of Directors, and in its role in the corporate governance mechanism. The Board is most important corporate body in both the internal and external governance mechanism. Without the Board, the interests of all stakeholders cannot be protected.

CFA Institute summarizes what investors and shareholders should consider in relation to the board. The generally accepted view that the proportion of independent board members on the board of directors should be higher in the Anglo-American corporate governance structure. In German structure, this role is provided by the supervisory board. From investor perspective, another important aspect is whether the company's managers have the necessary qualities, qualifications. Other important aspects are the next:

- the board and its committees must have budgetary authority,
- all board members must be elected annually,
- the board must establish an audit committee composed of independent board members to oversee the audit of the company's financial reports,
- the company must have a committee of independent board members charged with setting executive remuneration and compensation,
- the company must have a nominations committee of independent board members that is responsible for nominating board members,
- the board must communicate with shareholders properly,
- the board must have sufficient diversity in terms of professional background and experience.

The board must represent the interests not only of shareholders but also of other stakeholders and balance the company's short-term operations with its long-term sustainable strategic outlook. The board is responsible for the overall strategy of the company, considering the company's core competencies and business model, but within the framework of a sustainable value creation process. According to the CFA Institute, "*to act in the best interests of the company and shareowners, board members need a combination of four things: independence, experience, resources, and accurate information about the company's financial and operating position*." (page 12)

2.5 Relationship between corporate governance and management control systems

Merchant and Van der Stede (2017, page 573) claim that "*Corporate governance systems and management control systems (MCSs) are inextricably linked*." However, they write that the corporate governance focus is broader than the MCS focus. From the perspective of top management, the MCS focuses on ensuring the correct behavior of employees in the organization. In contrast, corporate governance focuses on controlling the top management. they think that the link between corporate governance and management control system is defined by the change of corporate governance mechanism and practices, which impacts MCS practices and their effectiveness.

Management control was defined by Anthony (1965) as "*the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives*." A generally accepted definition of MCSs is that "*A management control systems (MCS) is a system which gathers and uses information to evaluate the performance of different organizational resources like human, physical, financial and also the organization as a whole considering the organizational strategies*." (Armesh et. al, 2010, page 1). MSCs provide useful information for managers to improve firm performance.

A management control system is considered a tool to help the company's management to achieve strategic goals and gain a competitive advantage. Firm strategies get implemented through management controls, organizational structure, human resources management, and culture. Management control systems involve monitoring and evaluating the performance of employees, so traditionally such a system aims to improve firm efficiency. However, Armesh et al. (2010) mention that this is not enough to create sustainable competitive advantages. Therefore, management control systems should also use managerial techniques that encourage employee collaboration and creativity in discovering and implementing new business opportunities. This is particularly true for high-tech sectors, for example. Silva et al. (2020) highlight the same as they mention that it is not enough to focus on traditional accounting indicators to achieve the corporate strategy.

Chhillar and Banerjee (2015, page 1) write that "*The management control philosophy and corporate governance both are related to the sharing of power among stakeholders and the protection of shareholders' interests*." They mention that corporate governance mechanism

includes oversight activities of the board of directors and audit committee, and management control includes management related control activities.

Aliyu et al. (2019) emphasize the mediating influence of management control systems using performance measurement as a proxy in the relationship between corporate governance and performance. They illustrate this relationship with the next figure.

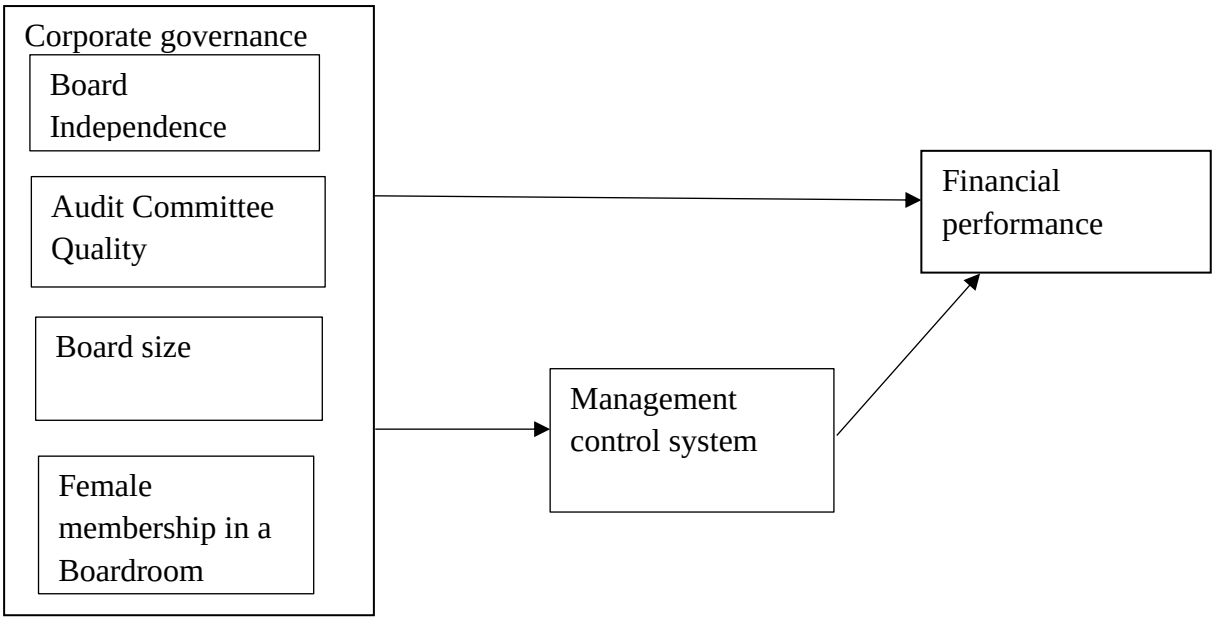

Figure 13 Relationship between corporate governance, management control system, and financial performance (Source: Aliyu et al, 2014, page 618, Figure 1)

Salvioni (2005) sees the management control system as a fundamental process for implementing governance actions. The management control system helps to maximize firm effectiveness, achieve goals in line with expectations, control consistency between targets and results, interpret any differences between targets and results, and prepare appropriate reports (management reporting). Salvioni (2005) emphasized the necessity of responsible governance, matching legal, economic, social, and environmental aspects. Salvioni (2005) mentions that "*Corporate governance is thus a complex activity evolving in parallel with change within internal and external contexts*." He illustrates this with Figure 14.

Salvioni (2005) emphasizes the importance of responsiveness to the management control system. However, the corporate governance system must be able to use the opportunities of a management control system. A management control system is part of the internal control system (internal auditing and management control). Salvioni (2005) illustrates the role of management control in corporate governance.

Hazzaa et al. (2020) claim that the internal control system is part of good corporate governance. Good corporate governance cannot exist without an internal control system. They think that an internal control system is such a process that influences the Board of Directors and the management. An internal control system has an impact on the corporate governance and financial performance of a company. Internal controls in corporate governance mechanisms make financial statements more trustworthy.

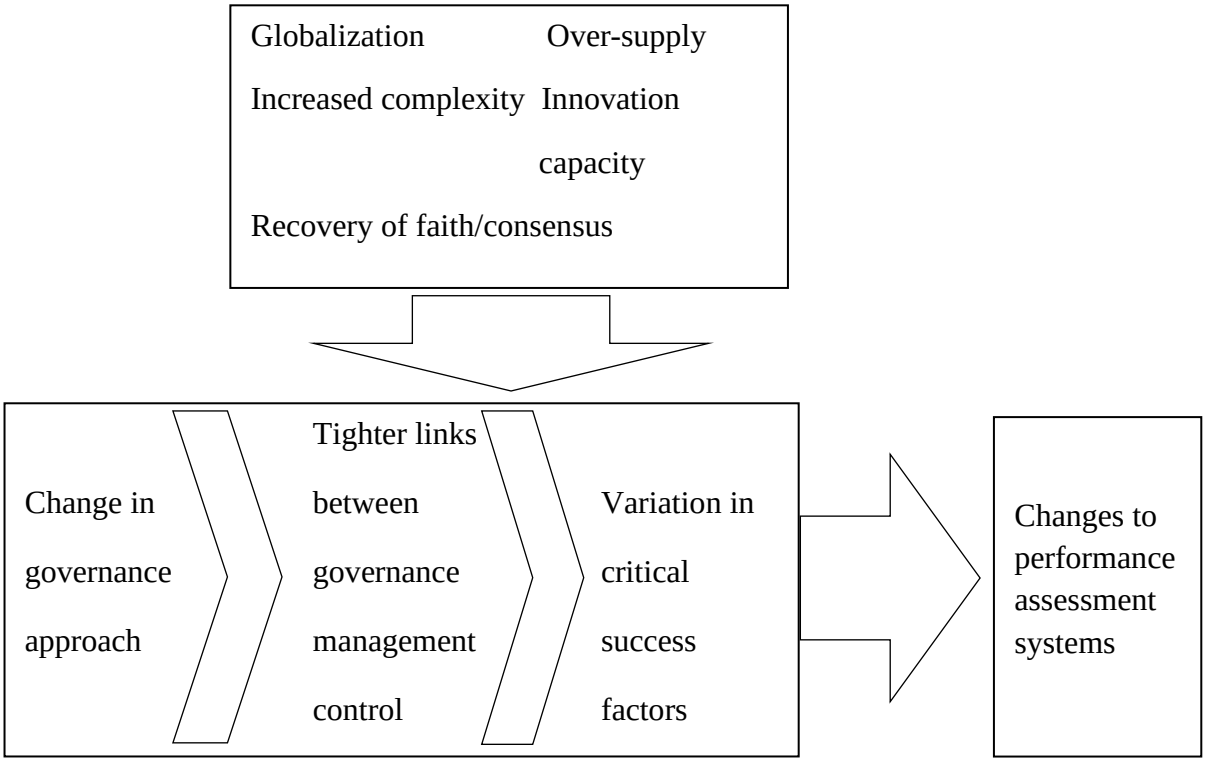

Figure 14 Impact of new outlooks on governance and control (Source: Salvioni, 2005, page 2, Figure 1)

Corporate Governance Institute summarizes the five principles of (good) corporate governance. These are responsibility, accountability, awareness, impartiality, any transparency. These qualities are also important in relation to both the Board of Directors and the internal control system.

Siska (2015) analyzes the concept of a management control system and its relation to performance measurement. Siska (2015) highlights that some researchers think management control is a broader term than management accounting or other organizational control because informal controls are also explicitly integrated into management control systems. Siska (2015) writes that the management control system (MCS) means those tools available to managers to govern a company, but MCS also includes cultural and social controls. Siska (2015) thinks that management control systems and performance measurement (or performance management are

regarded as synonyms because they have the same final objective, supporting to achievement company's goals. Siska (2015) illustrates the relationship between different controls in the following figure following Tessier and Otley (2012). The figure illustrates the revised framework of Simon's. Simons (1995) distinguishes negative and positive controls following the yin and yang Chinese philosophy. Simon thinks that positive and negative controls are such forces that coexist to create dynamic tensions through which effective control is achieved. Negative controls in this form are not considered inadequate controls. They are as important as positive controls.

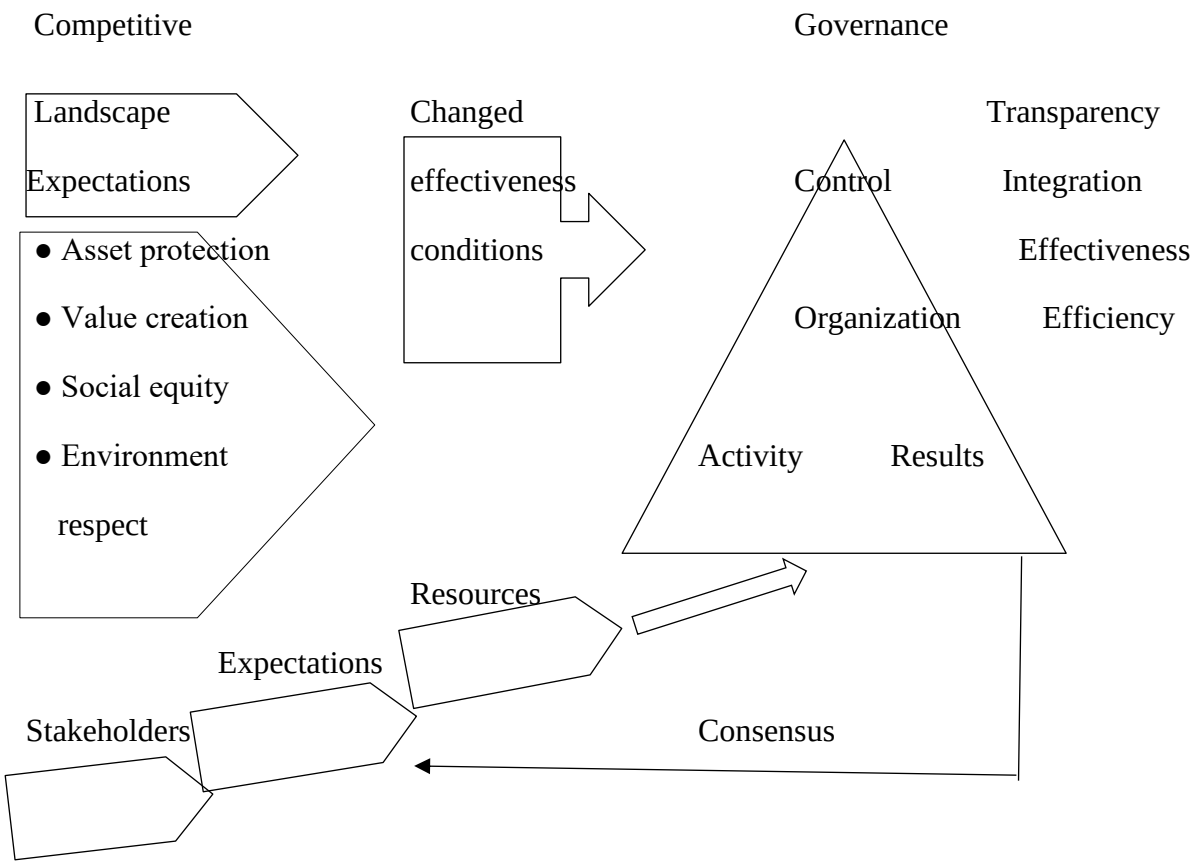

Figure 15 The management control role in corporate governance (Source: Salvioni, 2005, page 6, Figure 3)

To manage these positive and negative forces, Simons identifies four control levers. Belief systems and interactive controls are defined as positive controls, while boundary systems and diagnostic control systems are defined as negative controls. Through belief systems, the core values of a company are communicated. Interactive control systems are such formal information systems that managers use to involve themselves in the decision mechanism of the subordinates to focus on strategic uncertainties. Boundary systems indicate the areas of activity that are acceptable to organizational participants and include employees' codes of business conduct.

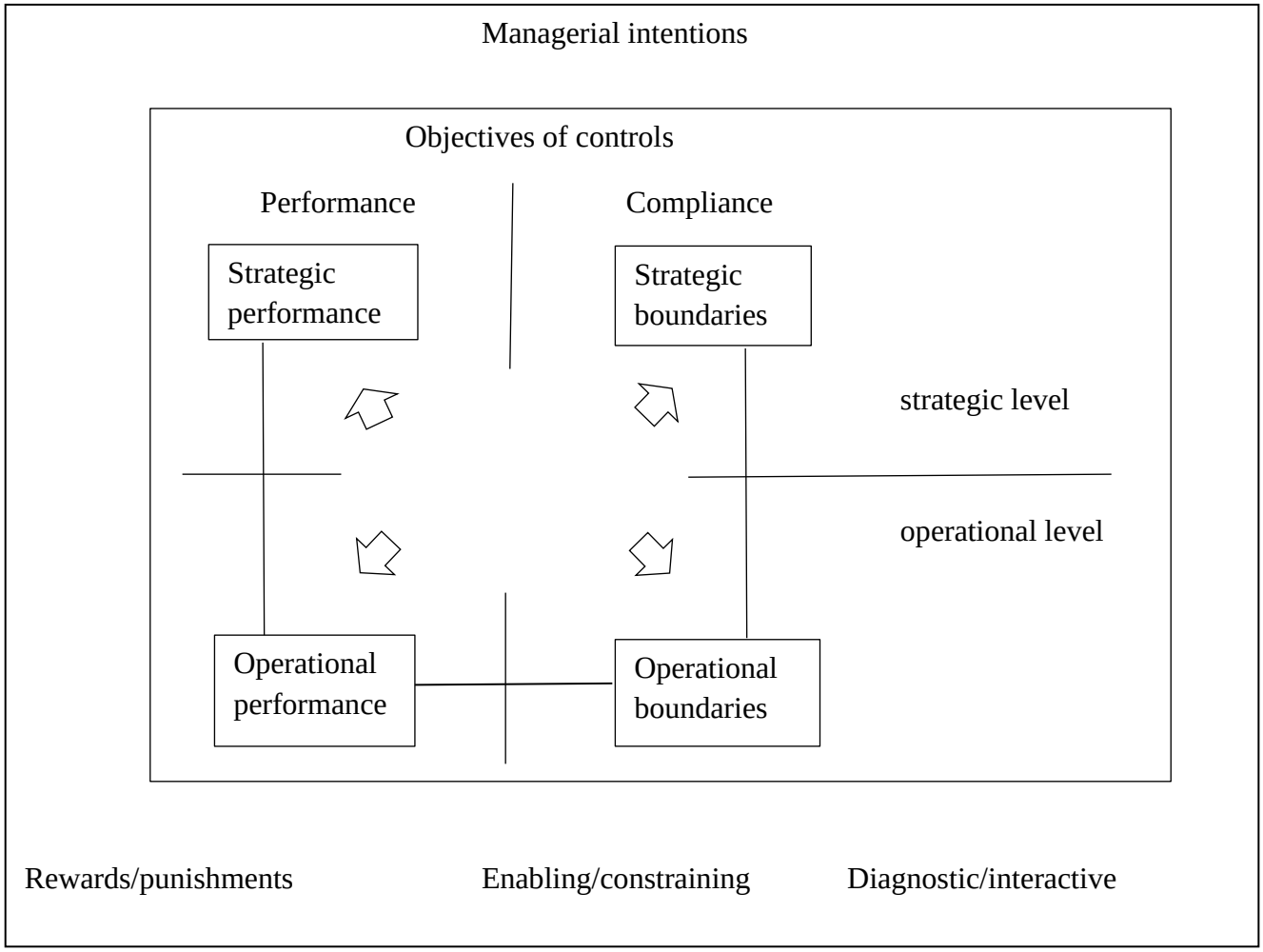

Figure 16 The revised version of Simons' framework (Source: Tessier and Otley, 2012, page 173, Figure 1)

Diagnostic controls systems are formal information systems used to monitor the organizational outcomes. Tessier and Otley (2012) highlight that their "*revised framework focuses on the dual role of controls and excludes evaluation of the quality of controls (good/bad)*" (page 174), "*uses the labels enabling and constraining to describe the dual role of controls*" (page 175), "*The revised framework explicitly takes into account the enabling and constraining roles of controls*." (page 175), "*The revised framework distinguishes between managerial intentions and employee perceptions*." (page 175), "*The revised framework accounts for the presentation*

of controls." (page 175), "*The revised framework uses the positive and negative labels to describe employee attitudes towards control and acknowledges the fact that these attitudes can be neutral*." (page 176), "*The revised framework distinguishes the two main objectives of controls (i.e. performance and compliance)*." (page 176), "*The revised framework acknowledges the fact that managers can decide to reward and/or punish performance and/or compliance*." (page 176), "*The revised framework accounts for strategic performance controls and interactive use of controls separately*." (page 177), *"The revised framework does not consider diagnostic and interactive controls as control systems in their own right, but rather as a description of how control systems are used*. " (page 178).

Tessier and Otley (2012) explain the reason for the revised framework to clarify Simon's earlier framework. Simons already introduced two groups of actors, managers (intention) and employees (perception) but only focused on managers. Tessier and Otley (2012) mention that managerial intentions include three levels of choice. The first types are the social and technical controls, the second are performance and compliance controls, and the third is interactive and diagnostic controls. The latter ones include rewards and punishments.

Willert et al. (2012) build on the framework of Ferreira and Otley (2012) to conduct empirical research among large Danish companies. Denmark may be of interest because similar to the Central and Eastern European region, a two-tier (so-called German) corporate governance structure is prevalent, but a one-tier structure is also allowed. As in Poland, a supervisory board is mandatory in a two-tier system. In addition, Denmark has a management board.

The authors study the basics of using the Management Control System based on 12 questions. The questions cover the vision and mission of the company, critical factors for corporate success, organizational/administrative structure, corporate strategy and plans, use of key performance indicators, corporate objectives, performance appraisal and reward system, information flow system, contextual factors affecting the company (environmental uncertainty, strategy, technology, organizational structure, size).

Based on the results of the responses, the authors identify the following as key factors: a thorough understanding of customers and the industry, customer relationships as the basis for success, formalization of corporate goals, values and direction in documents, translation of strategic goals into short-term action plans, a close link between budget systems and performance measurement systems, use of financial mainly indicators to measure performance,

the primary purpose of performance evaluation is to provide feedback, financial rewards are the most effective form, dissemination of relevant information through formal management information systems.

Danish MCS packages are designed to be strong and coherent and to enable companies to respond quickly to change. Danish senior managers place the most significant emphasis on short-term planning, followed by values and organizational culture. Today, senior managers in large Danish companies find that understanding their customers and the industry is the most critical factor for success. Based on this study, Willert et al. (2012) find that managers use organizational culture and values extensively to guide and direct subordinates' behavior. Values, purpose, and direction are often set out in formal documents. For some companies, it can be said that corporate values and policies are embedded in the organizational culture and that employees have adopted these values in their daily work. The organizational culture and corporate values developed by top management can be used to guide the behavior of subordinates.

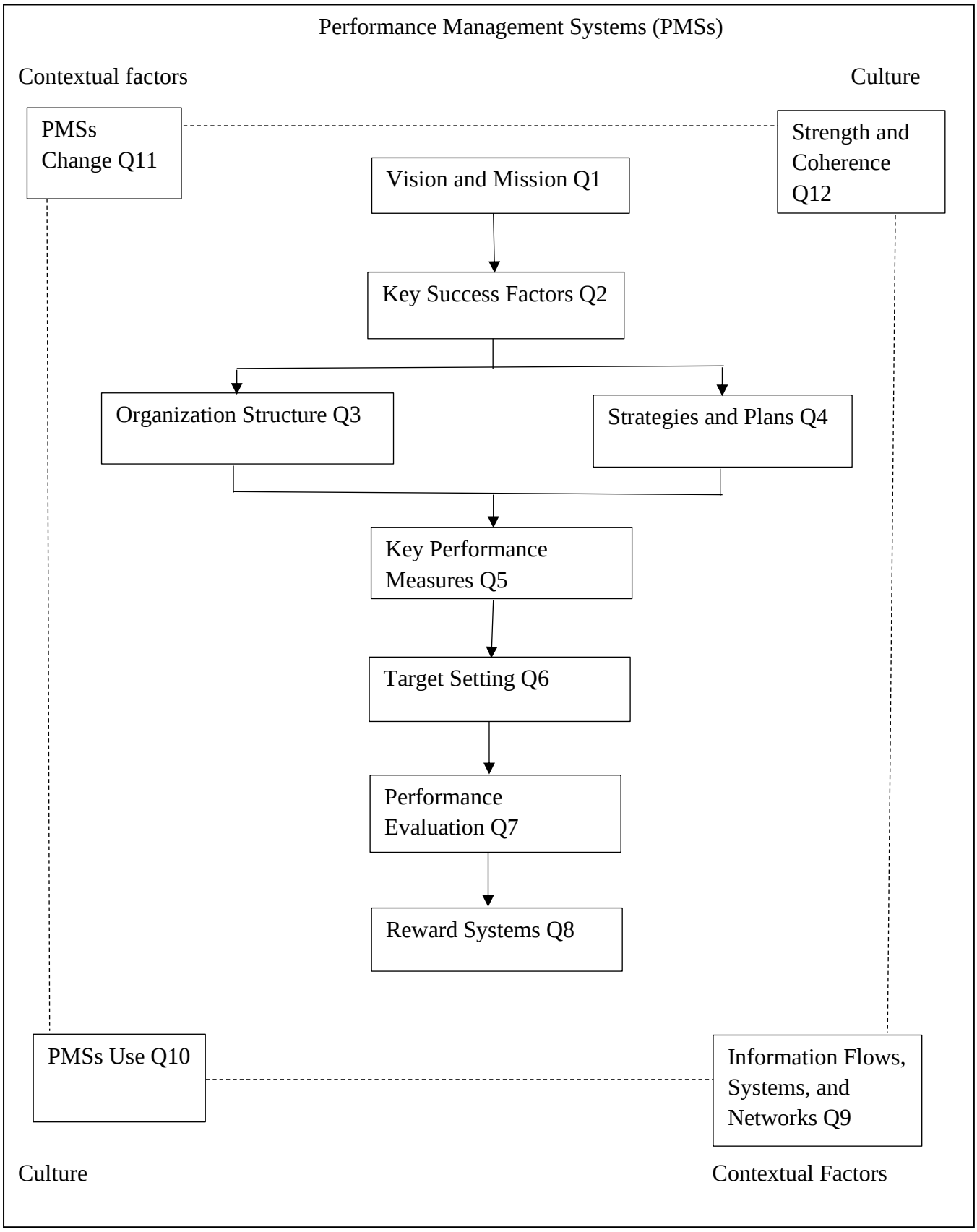

Figure 17 The performance management systems (PMSs) framework (Source: Willert et al., 2017, page 60, Figure 1)

3 Empirical approaches in corporate governance

In empirical studies, the relationship between board characteristics and firm financial performance is analyzed usually since the Board of Directors or shortly the board plays the most important role in the corporate governance mechanism. Bhagat and Jefferis (2002, page 9) present the econometrics of corporate governance studies. They write that "…. *an extensive theoretical and empirical literature in corporate finance considers the interrelationships between corporate governance, takeovers, management turnover, corporate performance, corporate capital structure, and corporate ownership structure*." Analyzing the relationship between corporate governance and firm financial performance, the popular research fields are the next: the impact of board size, board composition, board independence on performance. However, researchers emphasize the endogeneity problem when analyzing the relationship between board size, board composition and financial performance.

In empirical corporate governance studies, we are dealing with panel data. Panel data means that we observe the same cross section data, more precisely, the financial data and other corporate governance characteristics of more firms for several time periods. In corporate governance studies, the researchers observe N firms over T time periods, while T much lower than N. The data come from mostly financial statements, market quotations, and management reports. The main advantage of the panel regressions is the researcher can combine cross-sectional and longitudinal dimension data allowing the modelling of unobserved heterogeneity.

Cameron and Trivedi (2005) summarize the advantage of panel data: "A major advantage of panel data is increased precision in estimation." "A second attraction of panel data is the possibility of consistent estimation of the fixed effects model, which allows for unobserved individual heterogeneity that may be correlated with regressors." The unobserved heterogeneity can be called firm fixed effects or specific effects, if the researcher assumes that the firm is the basic unit of observation. "A third attraction of panel data is the possibility of learning more about the dynamics of individual behavior than is possible from a single cross section."

The advantages of panel data (source: aptech.com):

- Panel data can model the behavior of the common sample and the individual units also.
- Panel data contains more information, more variability, and more efficiency than pure time series data or cross-sectional data.

- Panel data can detect and measure statistical effects that pure time series or cross-sectional data can't.
- Panel data can minimize estimation biases that may arise from aggregating groups into a single time series.

The main advantage of panel data is that these models allow for heterogeneity across groups and introduce individual-specific effects. However, it should be noted that there are also unbalanced panels. Unbalanced panel datasets have missing values at some time observations for some individual units. Certain panel data models are only valid for balanced datasets. Also there exist homogeneous and heterogeneous panel data models. Heterogeneous models allow for any or all the model parameters to vary across individuals. Fixed effects and random effects models are heterogeneous panel data models.

Roberts and Whited (2011) claim that in empirical corporate governance studies, endogeneity is the most important issue. Endogeneity can be loosely defined as a correlation between the explanatory variables and the error term in a regression. The problem that endogeneity leads to biased and inconsistent parameter estimates which makes it impossible to draw the right conclusions. The three main sources of endogeneity are omitted variables, simultaneity, and measurement errors. Addressing the endogeneity problems means that we use certain econometrics techniques. These techniques can be broadly classified into two categories. The first categories include such techniques that rely on a clear exogenous source, as Roberts and Whites call, "… techniques that rely on a clear source of exogenous variation for identifying the coefficients of interest." The second category includes such techniques that rely on modeling assumptions. Instrumental variables, difference-in-difference, and regression discontinuity belong to the first category, while matching methods, panel data methods, and higher order moments estimators to the second.

Wintoki et al. (2012) claim that "Most empirical corporate finance researchers acknowledge at least two potential sources of endogeneity: unobservable heterogeneity and simultaneity." They emphasize that "… one source of endogeneity that is often ignored (explicitly or implicitly) arises from the possibility that current values of governance variables area function of past firm performance." They say that fixed-effects estimation improves the bias arising from unobservable heterogeneity but with the assumption of strong exogeneity. Wintoki et al. (2012) explain that this exogeneity condition assumes "current observations of the explanatory variable (e.g., board structure) are completely independent of past values of the dependent variable

(typically firm performance, value, or some other governance attribute". They think this assumption is not realistic. They emphasize the dynamic relation between boards and performance, which relation cannot be modeled with fixed-effects panel econometric techniques.

3.1 Pooled OLS estimation

In the single-equation model, if we would like to estimate a cross-sectional model, following Wooldridge (2002), the population model is the next:

$y = \beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \ldots + \beta_K \cdot x_k + u$,

where y, x_1, x_2, …, x_k are observable scalars (as Wooldridge writes we can observe them in a random sample of population), while u is the unobservable random disturbance or error term. We would like to estimate the β_0, β_1,…, β_k parameters. Wooldridge emphasizes that these parameters are constant in the estimation. Wooldridge also writes that the error term u can consist of omitted variables and measurement errors too.

In panel data model the population model is the next:

$y = \beta_0 + \beta_1 \cdot x_{1t} + \beta_2 \cdot x_{2t} + \ldots + \beta_K \cdot x_{kt} + u_{it}$, where t = 1, …, T.

Cameron and Trivedi (2005) mention that the general linear model is the next:

$y = \beta_{0t} + \beta_1 \cdot x_{1t} + \beta_2 \cdot x_{2t} + \ldots + \beta_K \cdot x_{kt} + u_{it}$

where the intercept and slope coefficients to vary over both individual and time. They write that pooled OLS model only estimates parameters consistent if the assumed model is the pooled model.

A pooled model is the next: $y_{it} = \alpha + \beta \cdot x_{it} + u_{it}$

In this model there are no unobservable individual-specific effect. It is possible to use time, sector-specific, or country dummies but dummies are unlikely to solve the problem of unobserved fixed effects in pooled model. The panel data can be treated as one large, pooled dataset. The model parameters, α and β, can be directly estimated using pooled ordinary least squares (pooled OLS).

Cameron and Trivedi (2005) call the pooled model as the most restrictive model since intercept does not vary over individual and time, and coefficients are constant over time. It is possible to

permit intercepts to vary across individuals and over time while slope parameters do not. The model is the next:

$y_{it} = \beta_i + \gamma_t + \beta_1 \cdot x_{1t} + \beta_2 \cdot x_{2t} + \ldots + \beta_K \cdot x_{kt} + u_{it}$, that can be written in the next form,

$y_{it} = \sum_{j=1}^{N} \alpha_j \cdot d_{j,it} + \sum_{s=2}^{T} \gamma_s \cdot d_{s,it} + \beta_1 \cdot x_{1t} + \beta_2 \cdot x_{2t} + \ldots + \beta_K \cdot x_{kt}$

The N individual dummies $d_{j,it}$ equal one if i=1 and equal zero otherwise, the (T-1) time dummies $d_{s,it}$ equal one if t=s and equal zero otherwise, and it is assumed that x_{it} does not include and intercept. Cameron and Trivedi (2005) write that if an intercept is included then one of the N individual dummies must be dropped. They focus on short panel when N is much bigger than T. In this case γ_s can be consistently estimated, they write that the (T − 1) time dummies are simply incorporated into the regressors x_{it}. They mention that the challenge is to estimate parameters β controlling for the N individual intercepts α_i.

Pooled OLS is inconsistent if the fixed effects model is the assumed. Cameron and Trivedi (2005) write that pooled OLS is appropriate if the constant-coefficients or random effects models are appropriate, but panel-corrected standard errors and t-statistics must be used for statistical inference. They write that the pooled cross-section time-series model or constant-coefficients model also called the population-averaged model. Since there is no explicit model of y_{it} conditional on individual effects because any individual effects have implicitly been averaged out. Greene (2003) mentions that in the panel data context for the pooled OLS or the population averaged model the assumption is that any latent heterogeneity has been averaged out.

Green (2003) summarizes the assumptions that are needed for OLS to consistently estimate β_j parameters.

1. Linearity: $y_i = x_{i1} \cdot \beta_1 + x_{i2} \cdot \beta_2 + \ldots + x_{iK} \cdot \beta_K + \varepsilon_i$, where ε_i refers disturbances.
2. Full rank: The data matrix is n x K and X matrix has full column rank.
3. The independent variables, the regressors are exogenous: E[x_{j1}, x_{j2}, …, x_{jK}]=0, where i, j = 1, …, n. There is no correlation between the independent variables and the disturbances.
4. Homoscedasticity and non-autocorrelation: ε_i have the same finite variance and disturbances do not correlate with each other.
5. Generated data are exogenous. Data generating mechanism-independent observations.

6. The disturbances are normally distributed.

Roberts and Whited (2011) highlight the key assumptions regarding endogeneity.

1. a random sample of observations on y and x_1, x_2, …, x_k,
2. a mean zero error term, E(u)=0, which is satisfied if an intercept is included among the regressors
3. no linear relationships among the explanatory variables (no perfect collinearity), Roberts andWhited (2011) mentions that most econometric software will recognize and address this problem,
4. an error term that is uncorrelated with each explanatory variable, cov(x_j, u)=0, for j=1,…k.

Greene (2003) mentions that the unobserved heterogeneity can induce autocorrelation among the disturbances, the OLS estimator in the generalized regression model may be consistent, but the conventional estimator of its asymptotic variance is likely to underestimate the true variance of the estimator.

Roberts and Whited (2011) mention that for unbiased estimation the fourth assumption must be replaced with 4.a. an error term with zero mean conditional on the explanatory variables, E(u|X)=0, where X represents the vector consists of x_1, x_2, …, x_k. They emphasize that it can't be empirically tested whether a variable is correlated with the regression error term because the error term is unobservable. They write: "Consequently, there is no way to statistically ensure that an endogeneity problem has been solved."

Omitted variables bias occurs when a variable instead of appearing among explanatory variables, this omitted variable appears in the error term, u. There is an endogeneity bias if zero covariance between explanatory variables and error term is not satisfied. When only one variable, say x_j, is correlated with the omitted variable, it is possible to understand the direction and magnitude of the asymptotic bias.

Simultaneity occurs when y (dependent or response variable) and one or more of the x's (regressors or explanatory variables) are determined in equilibrium so that it can plausibly be argued either that x_k causes y or that y causes x_k. Roberts and Whited (2011) write that unlike omitted variable bias, simultaneity bias is difficult to determine the sign because it depends on the relative magnitudes of different effects, which cannot be known as a priori.

Wooldridge (2016) writes that simultaneity arises when at least one of the explanatory variables is determined simultaneously along with y. If, say, x_k is determined partly as a function of y, then x_k and u are generally correlated. For example, if y is city murder rate and x_k is size of the police force, size of the police force is partly determined by the murder rate. Conceptually, this is a more difficult situation to analyze because we must be able to think of a situation where we could vary x_k exogenously, even though in the data that we collect y and x_k are generated simultaneously.

Roberts and Whited (2011) mention that most empirical studies use proxies for unobservable or difficult to quantify variables. Any discrepancy between the true variable of interest and the proxy leads to measurement error. Discrepancy arises because data collectors record variables incorrectly and/or conceptual difference between proxies and their unobservable counterparts. When variables are measured imperfectly, the measurement error becomes part of the regression error.

Wooldridge (2016) explains measurement error bias that if we would like to measure the (partial) effect of a variable, say x_k , but we can observe only an imperfect measure of it, say x_k. When we plugx_k in for x_k we necessarily put a measurement error into u in the y = β_0 + $\beta_1 \cdot x_1$ + $\beta_2 \cdot x_2$ + … + $\beta_K \cdot x_k$ + u equation. Depending on assumptions about how x_k and x_k are related, u and x_k may or may not be correlated.

From the sources of endogeneity, omitted variables are the most likely. This means that such variables that are simultaneously correlated with both the dependent (response) and independent variables (regressors) are omitted from the econometric equation to be estimated.

3.2 Instrumental variables

Stock and Watson (2003) writes that: "*Instrumental variables (IV) regression is a general way to obtain a consistent estimator of the unknown causal coefficients when the regressor, X, is correlated with the error term, u.*" (p. 427) For a better understanding of IV regression technique, we can think of regressor, x, as the variation in x has two parts, one part correlates with the error term for some reason, while the other part does not. If information would be available to isolate the uncorrelated part of the error term, it would be possible to focus on the variations of x that are uncorrelated with the error term. Stock and Watson (2003) claim that the IV regression does this when it uses additional variables (called instruments) to isolate the movements in X that are uncorrelated with the error term.

The invention of the instrumental variable regression method is not attributed to one person. Grootendorst (2007) mentions that although IV theory has been developed primarily by economists, the method originated in epidemiology. During the London cholera epidemic of 1853–54, a scientist, John Snow thought cholera has been spread through water. But instead of analyzing the relationship between water purity (x) and cholera incidence (y), Snow identified an instrument that strongly correlated with water purity but did not correlate with other determinants of cholera incidence. This instrument was the identity of the company supplying households with drinking water. Grootendorst (2007) writes back then there were two water supply companies. As Grootendorst (2007) write: "*One company, the Lambeth water company, drew water at a point in the Thames above the main sewage discharge; another, the Southwark and Vauxhall company, took water below the discharge. Hence the instrument z was strongly correlated with water purity x. The instrument was also uncorrelated with the unobserved determinants of cholera incidence (y)*." Analyzing the relationship between water purity (x) and cholera incidence would have been misleading because as Deaton (1997) writes, "*The people who drank impure water were also more likely to be poor, and to live in an environment contaminated in many ways, not least by the 'poison miasmas' that were then thought to be the cause of cholera*."

Although econometricians have different opinions, Stock and Watson (2003) refers to Philip G. Wright's 1928 book, The Tariff on Animal and Vegetable Oils in which the author proposed as a solution to the simultaneous causation problem in econometrics for the first time. Wright analyzed the agricultural supply and demand in the 1920s. Stock and Watson (2003) mention that in the appendix there were two derivations of "*the method of introducing external factors what we now call the instrumental variables estimator and uses IV regression to estimate the supply and demand elasticities for butter and flaxseed oil*." (p. 430)

To motivate the need for the method of instrumental variables, Wooldridge (2016) presents the technique in a Single-Equation Linear Model frame. The linear population is the same as before:
$y = \beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \ldots + \beta_K \cdot x_k + u$, (structural equation)

with assumptions E(u)=0, cov(x_j, u)=0, j=1,2,…,k-1, but cov(x_k, u)≠0. Wooldridge (2016) writes that x_1, x_2, …, x_{k-1} are exogenous but x_k is potentially endogenous in the population equation. It is simple to think that error term u contains an omitted variable that is uncorrelated with all explanatory variables except x_k.

Stock and Watson (2003) write that basically there are two types or variables, one correlates with the error term and the other does not. Variables correlated with the error term are called endogenous variables, while variables uncorrelated with the error term are called exogenous variables.

Following Wooldrige's markings let us consider a model that assumes an additive effect of the omitted variable is:

E(y|x_1, x_2, …, x_k, q) = $\beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \ldots + \beta_K \cdot x_k + \gamma \cdot q$, where q is the omitted factor but we do not observe q, and q is correlated with x_k. Wooldridge (2016) writes that the method of instrumental variables (IV) provides a general solution to the problem of an endogenous explanatory variable. To use IV approach, we need an observable variable, $z_1$that is not in the population equation but does not correlate with error term, u. cov(z_1, u)=0. This means that z_1 is exogenous in the population equation. Besides this, Wooldridge (2016) mentions that there is needed a second requirement involves the relationship between z_1, and the endogenous variable, x_k. A precise statement requires the linear projection of x_k onto all the exogenous variables:

$x_k = \delta_0 + \delta_1 \cdot x_1 + \delta_2 \cdot x_2 + \ldots + \delta_K \cdot x_k + \theta_1 \cdot z_1 + r_k$. (reduced-form equation)

The linear projection error, E(r_k)=0, r_k is uncorrelated with x_1, x_2, …, x_{k-1} and z_1. The key assumption on this linear projection is that the coefficient of z_1 is nonzero. $\theta_1 \neq 0$.

Wooldridge (2016) mentions that this condition is often loosely described as z_1 correlates with x_k but the condition $\theta_1 \neq 0$ means that z_1 partially correlated with x_k once the other exogenous variables x_1, x_2, …, x_{k-1} have been netted out. If there only one explanatory variable z_1 is in the earlier equation, then $x_k = \delta_0 + \theta_1 \cdot z_1 + r_k$. θ_1=cov(z_1, x_k)/Var(z_1) and cov(z_1, x_k) ≠0.

When z_1 satisfies these two conditions then it is said that z_1 an instrumental variable (IV) candidate for x_k.

Angrist and Krueger (2001) mention that valid instruments are typically derived from natural or random experiments. Valid instruments must be met two requirements: valid instruments are uncorrelated with the error term and valid instruments are highly correlated with the endogenous regressors even after controlling for the exogenous regressors.

From the structural equation and the reduced form for x_k, we obtain a reduced form for y.

y = $\alpha_0 + \alpha_1 \cdot x_1 + \alpha_2 \cdot x_2 + \ldots + \alpha_{k-1} \cdot x_{k-1} + \lambda_1 \cdot z_1$ + v,

where v = u + $\beta_K \cdot r_k$ is the reduced-form error, $\alpha_j = \beta_j + \beta_k \cdot \delta_j$ and $\lambda_1 = \beta_k . \theta_1$.

Wooldridge writes that by assumptions, v is uncorrelated with all explanatory variables in the earlier equation, and so OLS consistently estimates the reduced-form parameters α_j and λ_1. Roberts and Whited (2011) presents the estimation process of two-stage least squares (2SLS). If we consider the next equation with the assumptions:

y = $\beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \ldots + \beta_K \cdot x_k$ + u and E(u)=0, cov(x_j, u)=0, j=1,2,…,k-1.

Let x_k correlate with u but we have more than one instrumental variables for x_k. These are z_1, z_2, …, z_m with the assumption that cov(z_h, u)=0, h=1,2,…,m. This means that z_h are exogenous variables. If each of z_h's has some partial correlation with x_k then we have m different IV estimators. Wooldridge mentions that any linear combination of x_1, x_2, …, x_{k-1} ,z_1, z_2, …, z_m is uncorrelated with u.

The two-stage least squares (2SLS) estimator is the most efficient IV estimator to choose the best instrumental variable. Wooldridge (2016) defines the vector of exogenous variable, z ≡(1, x_1, x_2, …, x_{K-1}, z_1, z_2, …, z_M) that is a 1 X L vector where L = K + M. The 2SLS method finds that instrument, z, which is most highly correlates with x_K. The reduced form is the next:

$x_K = \delta_0 + \delta_1 \cdot x_1 + \ldots + \delta_{K-1} \cdot x_{K-1} + \theta_1 \cdot z_1 + \ldots + \theta_M \cdot z_M + r_K$.

By definition r_K has zero mean and is uncorrelated with each right-hand-side variable. So, any linear combination of z does not correlate with u. x_K^* is uncorrelated with u also.

$x_K^* \equiv \delta_0 + \delta_1 \cdot x_1 + \ldots + \delta_{K-1} \cdot x_{K-1} + \theta_1 \cdot z_1 + \ldots + \theta_M \cdot z_M$

Wooldridge (2016) writes that x_K^* is often interpreted as part of x_K and x_K is uncorrelated with u. Because δ_j and θ_j are population parameters, x_K^* is not an instrument we can use. But as long as we can make that assumption that there are no exact linear dependencies among exogenous variables, the parameters in the equation $x_K = \delta_0 + \delta_1 \cdot x_1 + \ldots + \delta_{K-1} \cdot x_{K-1} + \theta_1 \cdot z_1 + \ldots + \theta_M \cdot z_M + r_K$ can be estimated consistently by OLS.

Wooldridge (2016) summarizes how to estimate $\hat{\beta}$.

1. step: getting the fitted values $\hat{x}_k$ from the regression $x_K = \delta_0 + \delta_1 \cdot x_1 + \ldots + \delta_{K-1} \cdot x_{K-1} + \theta_1 \cdot z_1 + \ldots + \theta_M \cdot z_M$ that is called the first-stage regression,

As Roberts and Whited (2011) write that we estimate the predicted values, $\hat{x}_k$, by regressing the endogenous variable x_K on all of the exogenous variable controls (x_1+ … + x_{K-1}) and instruments (z_1+ … + z_M).

2. step: run the OLS regression, y = δ_0 + $\delta_1 \cdot x_1$ + … + $\delta_{K-1} \cdot x_{K-1}$ + $\theta_1 \cdot z_1$ + … + $\theta_M \cdot z_M$ that is called the second-stage regression. Roberts and Whited (2011) write that replacing the endogenous variable x_K with its predicted values from the first stage $\hat{x}_k$, and regressing the outcome variable y on all the control variables (x_1+ … + x_{K-1}) and $\hat{x}_k$.

The second-stage regression produces $\hat{\beta}_j$. This two-step procedure can be done all at once. Most software programs do exactly this, which is useful because the OLS standard errors in the second stage are incorrect.

Suppose that in the case of empirical research someone explains firm performance by female board ratio. In that case the last year average sectorial female board ratio can be a good instrument because it can be assumed that the last year average sectorial female board ratio correlates with the current women on the board ratio, and that the last year average sectorial female board ratio does not affect firm performance. However, if a sector is very small, averaged over a small number of firms, then there could in principle be a relationship and then this instrument may not be appropriate. Liu et al. (2014) also use this approach.

3.3 Fixed effects panel data estimators

Nowadays, fixed-effects regression is a standard econometric technique described in every econometrics book. Brüderl and Ludwig (2015, page 327) cite Gangl (2010) that "Fixed-effects *(FE) regression is a method that is especially useful in the context of causal inference*." Brüderl and Ludwig (2015, page 328) set examples of multi-level data where FE models have been used including "*Individuals nested within countries: Country fixed effects control for all country-level heterogeneity*" and "*Repeated observations within individuals: Individual fixed effects control for all person-level heterogeneity*."

Wooldridge (2016) presents that fixed effect, a_i, can be eliminated with first differencing method. But there is an alternative method that is called fixed effects transformation. Let us consider the next model:

$y_{it} = \beta_1 \cdot x_{it} + a_i + u_{it}$, t = 1, 2, …, T.

In this model, we can use more independent variable and, in this case, x_{it} is a 1 X K vector variables if there are number of K observable variables. The a_i represents the unobserved heterogeneity that is also called as individual effect or individual heterogeneity. The u_{it} are called the idiosyncratic errors or idiosyncratic disturbances because these change across t as well as across i. The variable a_i captures all unobserved, time-constant factors that affect y_{it} but a_i does not change over time.

Returning to the single-equation model approach, for each i, let average this equation over time and we get the next model:

$\bar{y}_i = \beta_1 \cdot \bar{x}_i + a_i + \bar{u}_i$

Subtracting the second equation from the first we get the next model:

$\ddot{y}_{it} = \beta_1 \cdot \ddot{x}_{it} + \ddot{u}_{it}$ where $\ddot{y}_{it} = y_{it} - \bar{y}_i$ is called the time-demeaned data.

The fixed effects transformation is also called the within transformation. The main difference between fixed effects and random effects framework that in random effects models the correlation between the observed explanatory variables and the unobserved effect is zero, Cov(x_{it}, a_i) = 0. Wooldridge (2016) writes that the fixed effects framework allows the arbitrary dependence between the unobserved effect (a_i) and the observed explanatory variables (x_{it}).

The important thing about the last equation is that the unobserved effect, a_i, has disappeared. This suggests that we should estimate this model by pooled OLS. A pooled OLS estimator that is based on the time-demeaned variables is called the fixed effects estimator or the within estimator. The latter name comes from the fact that OLS on the last equation uses the time variation in y and x within each cross-sectional observation.

Cameron and Trivedi (2005) begin their presentation of the fixed-effects panel regression method with the following equation: $y_{it} = \alpha_i + \beta \cdot x_{it} + \varepsilon_{it}$

The sign of the error term usually is ε_{it} or u_{it}. The α_i on that this is a heterogenous model. If α is constant, then this is a homogenous model. In a homogenous model the constant, α, is the same across groups and time while the coefficient, β, is constant across groups and time. Only the error term, ε_{it} differences across groups. In the heterogenous model, α_i is group specific.

Let us assume the next data generation process: $y_{it} = \beta \cdot x_{it} + \delta \cdot z_i + \varepsilon_{it}$, where x represents the observed characteristics (i.e.: firm age, firm size, and other financial data), z represents the

unobserved characteristics such as management quality or skills. The one-way fixed effects model includes unobservable time-specific or individual-specific effects, and these effects capture omitted variables. There is the assumption that individual-specific effects are correlated with the observed characteristics, x_{it}. Brüderl and Ludwig (2015) mention that the pooled OLS estimates for data generated by this process will be inconsistent. The individual-specific effects where the unobservable component, $\delta \cdot z_i$, acts like an individual-specific intercept, α_i. The intercept term, α_i, varies across individuals but is constant across time. The key feature of the fixed effects model is that y_i has a true, but unobservable, effect that must be estimated. Estimating the coefficient β with pooled OLS then the estimates will be inconsistent and biased. The fixed effects model requires the estimation of the model parameter β and individual α_i for each of the N groups in the panel. We can use one of three estimation techniques:

- Within-group estimation,

- First differences estimation,

- Least squares dummy variable (LSDV) estimation.

The first two of these techniques focuses on eliminating the individual effects before estimation. The LSDV method directly incorporates these effects using dummy variables.

The two-way individual effects model allows the presence of both time-specific effects and individual-specific effects. The two-way individual effects model can be represented by:

$y_{it} = \alpha + \beta \cdot x_{it} + \mu_i + \lambda_t + \varepsilon_{it}$,

where μ_i captures any unobservable individual-specific effects, λ_t captures any unobservable time-specific effects. The individual-specific effects, μ_i , do not vary with time, while the time-specific effects, λ_t, do not vary across individuals. If there are only two groups and two individuals this model is equivalent to the difference-in-difference model.

The two-way fixed effects model assumes that μ_i and λ_t are unobservable, fixed effects that must be estimated. The pooled OLS estimates, which ignore μ_i and λ_t, will be biased and inconsistent, while the one-way fixed effects estimates, which ignore λ_t, will be biased.

Like the one-way fixed effects model, this model could be estimated by including dummy variables. However, in the two-way fixed effects model dummy variables must be included for both the time periods and the groups.

Angrist and Pischke (2009) write that μ_i, the fixed effects and λ_t, the year effect, are also treated as a parameter to be estimated, moreover the unobserved individual effects are coefficients on dummies for each individual, while the year effects are coefficients on time dummies.

Angrist and Pischke (2009) claim that treating the omitted variables bias is a good solution to use longer regression. They explain that using more control variables in regression equation has a causal interpretation, while a shorter regression does not.

3.4 Dynamic Panel Data estimators

Dynamic panel data models are using the lags of the dependent variables. These lagged variables capture the autocorrelation between observations of the same dataset at different points in time. The dynamic panel data model adds dynamics to the panel data individual effects framework. For panel data, the withing (demeaning) or first difference transformations can address the unobserved heterogeneity. For dynamic panel models, it is the first differentiation that helps to remove unobserved heterogeneity.

These models contain one or more lagged of the dependent variables, allowing for the modeling of a partial adjustment mechanism. Baum (2006) mentions that a serious difficulty arises with the one-way fixed effects model in the context of a dynamic panel data (DPD) model particularly in the "small T, large N" context. He refers on Nickell who showed in his paper in Econometrica in 1981 that this difficulty arises because the demeaning process which subtracts the individual's mean value of y and each X from the respective variable creates a correlation between regressor and error. The correlation creates a bias in the estimate of the coefficient of the lagged dependent variable, which is not mitigated by increasing N, the number of individual units.

If we consider an individual effects model which includes an AR(1) term:

$y_{it} = \delta \cdot y_{i,t-1} + \beta \cdot x_{it} + \varepsilon_{it}$ and the error component includes one-way individual effects such that $\varepsilon_{it} = \mu_i + v_{it}$, where μ_i captures individual effects.

Introducing lagged dependent variables in the individual effects framework:

- Both y_{it} and $y_{i,t-1}$ are functions of μ_i, because μ_i is time-invariant. This implies that as a regressor, $y_{i,t-1}$ is correlated with the error term.
- Ordinary least squares (OLS) will lead to biased estimates because of the serial correlation.

Nickell (1981) recommended a solution to this problem by taking first differences of the original model. The first difference transformation removes both the constant term and the individual effect. But there is still correlation between the differenced lagged dependent variable, $y_{i,t-1}$, and the disturbance process, ε_{it} (which is now a first-order moving average process, or MA(1). Finally, Anderson and Hsiao created an approach after this the Anderson–Hsiao (AH) estimator was used.

Dynamic panel data models are most estimated using a generalized method of moments (GMM) framework proposed by Arellano and Bond (1991). The Arellano and Bond approach is based on the notion that the instrumental variables approach noted above does not exploit all of the information available in the sample. By doing so in a Generalized Method of Moments (GMM) context, we may construct more efficient estimates of the dynamic panel data model.

Baum writes that the Arellano and Bond approach, and its extension to the 'System GMM' context, is an estimator designed for situations with:

- 'small T, large N' panels: few time periods and many individual units,
- a linear functional relationship,
- one left-hand variable that is dynamic, depending on its own past realizations,
- right-hand variables that are not strictly exogenous: correlated with past and possibly current realizations of the error,
- fixed individual effects, implying unobserved heterogeneity, heteroskedasticity and autocorrelation within individual units' errors, but not across them

Baum (2006) writes that the Arellano–Bond estimator sets up a generalized method of moments (GMM) problem in which the model is specified as a system of equations, one per time period, where the instruments applicable to each equation differ (for instance, in later time periods, additional lagged values of the instruments are available).

The reason of using System GMM estimator is that a potential weakness in the Arellano–Bond DPD estimator was revealed in later work by Arellano and Bover (1995) and Blundell and Bond (1998). The lagged levels are often rather poor instruments for first differenced variables, especially if the variables are close to a random walk. Their modification of the estimator includes lagged levels as well as lagged differences. The original estimator is often entitled difference GMM, while the expanded estimator is commonly termed System GMM. The cost

of the System GMM estimator involves a set of additional restrictions on the initial conditions of the process generating y. This estimator is available in Stata as xtdpdsys.

The Stata presents Arellano–Bover/Blundell–Bond linear dynamic panel-data estimation in details. The Stata command, xtdpdsys fits a linear dynamic panel-data model where the unobserved panel-level effects are correlated with the lags of the dependent variable. This model is an extension of the Arellano–Bond estimator that accommodates large autoregressive parameters and a large ratio of the variance of the panel-level effect to the variance of idiosyncratic error. This is known as the Arellano–Bover/Blundell–Bond system estimator. This estimator is designed for datasets with many panels (N large) and few periods (T small). This method assumes that there is no autocorrelation in the idiosyncratic errors and requires that the panel-level effects be uncorrelated with the first difference of the first observation of the dependent variable.

The considered dynamic panel-data model is the next:

$y_{it} = \sum_{j=1}^{p} \alpha_j \cdot y_{i,t-j} + \beta_1 \cdot x_{it} + \beta_2 \cdot w_{it} + v_i + \varepsilon_{it}$, i = 1, 2, …, N and t = 1, …, T_i where

the α_j are p parameters to be estimated,

the x_{it} is a 1 X k_1 vector of strictly exogenous covariates,

the β_1 is a k_1 X 1 vector of parameters to be estimated,

the w_{it} is a 1 X k_2 vector of predetermined or endogenous covariates,

the β_2 is a k_2 X 1 vector of parameters to be estimated,

the v_i are the panel-level effects (which may be correlated with the covariates), and

the ε_{it} are i.i.d. over the whole sample with variance σ_ε^2.

The v_i and ε_{it} are assumed to be independent for each i over all t.

Wintoki et al. (2012) claim that using dynamical panel regression techniques the endogeneity problem can be addressed better because the panel GMM estimator the dynamic nature of the performance–governance relationship can be controlled. They think that most researchers identify the two potential sources of endogeneity, unobservable heterogeneity, and simultaneity, but another possible source of endogeneity is often ignored. That is the possibility

that current values of governance variables area function of past firm performance. Wintoki et al. (2012) argue that, although fixed-effects panel regression can correct for the bias arising from unobserved heterogeneity, it does so under a strong exogeneity assumption. This assumption is that current observations of the explanatory variable (e.g., board structure) are completely independent of past values of the dependent variable (typically firm performance, value, or some other governance attribute). Wintoki et al. (2012) present the system GMM estimator based on Arellano and Bover (1995) and Blundell and Bond (1998), and they claim that using the system GMM estimator efficient estimates can be obtained, while time-invariant unobserved heterogeneity, simultaneity, and the dynamic relationship between current values of the explanatory variables and past values of the dependent variable can be also controlled.

4 The impact of board size on firm financial performance[2]

4.1 Introduction

The aim of this chapter is to analyze the impact of board size on a firms' operational and market performance at the largest Eastern Central European listed non-financial, non-public utility firms. The current literature debates the effects of the size of the board. While the resource dependent theory supports a positive effect, the agency theory supports a negative impact on firm value. This question is rarely investigated in two-tiered corporate governance models. This paper estimates the effects of management board and supervisory board size, between 2007 and 2016. The author found that the effect of management board size depends heavily on the size of the observed company. The paper finds that in both the firm's fixed effects and GMM-type dynamic panel regression models, using Tobin's Q, market-to-book ratio, total shareholder value and ROA as firm performance measures, increase in management board size has a significant positive impact on firm performance; but in the case of larger firms, this effect is significantly negative. Moreover, the increase in the ratio of outside directors has a positive impact on the firm's performance in all dynamic panel regression models and this effect is even more significant in Tobin's Q and market-to-book ratio models. This can indicate the effective monitoring role of the supervisory board. The question that many researchers ask is, is there an optimal size of the management board and the supervisory board. The question is equally

[2] *Some of this chapter is based on the article Lakatos, Zsolt (2020): Do larger boards improve shareholder value creation? – Effects of the board size on the business performance in Eastern Central Europe*

important for business decision makers, shareholders, and stock exchanges, who regulate board structure in corporate governance.

Corporate governance has become a popular research field in management sciences in the last 30 years, although a single definition for corporate governance does not exist. According to Dobák and Steger (2003, p. 223), "Corporate governance from an overall perspective is the structuring of the control mechanisms, monitoring, and organisation of a company or group of companies in a manner that satisfies owners' objectives." A well-known definition of corporate governance comes from Shleifer and &Vishny (1997), who consider it as how investors get the managers to give them back their money.

The significance of corporate governance structure is the separation of ownership and control in public companies was described first by Berle and Means (1932). According to them, professional managers run the company because they have expertise, but the shareholders as the owners of the company, bear the risks. Therefore, a corporate unit must exist, that can protect the interests of the owners. This unit is called the Board of Directors. The modern corporate governance theory is based on the seminal study of Jensen and Meckling (1976) that forms the foundation of the agency theory.

In practice, two fundamental corporate governance models can be distinguished, the one-tiered and the two-tiered models. The Anglo-Saxon or Anglo American (Anglo-US) corporate governance structure is known as one-tiered, while the German and the Japanese model are called two-tiered. In the one-tiered structure, the Board of Directors represents the interests of the owners, and this unit consists of the managers of the company (insiders) and individuals who are independent of the company (outsiders). In the two-tiered structure, there are two boards. The first is called the Board of Directors or management board, and the other, the supervisory board. The first board consist of insiders, while the supervisory board consists of outsiders.

The crucial question is, how the interests of the owners can be protected. This process is called monitoring. According to Agrawal and Knoeber (2012), monitoring can be realized by large shareholders, the Board of Directors, and the market of corporate control. This latter is the shareholders' rights regarding takeover of the firm. The main roles of the Board of Directors are the monitoring of the management, rewarding or penalizing the managers and advising in the strategic decision-making process. Agrawal and Knoeber (2012), mention that the Board of

Directors is typically measured by two characteristics, its size (number of members) and its composition (proportion of members who are outsiders or independent of the management).

In corporate governance studies, the main question usually is identifying the connection between corporate governance characteristics and firms' financial performance. As Michelberger (2016, p. 85) writes: "Well governed firms should have a higher firm performance and value." He also (2016, p. 86) mentions, "Several studies … indicate that companies with good corporate governance have better long-term performance for shareholders or in terms of general business performance."

Researchers have been looking for the answers to whether there is an optimal size of corporate boards, and how corporate governance should improve to contribute better financial performance.

Lipton and Lorsch (1992) recommended measures for improving corporate governance. They thought that the source of failures is not incomplete legal regulations, but oversized boards. Large boards can cause weaker control mechanisms. Lipton and Lorsch thought the corporate boards are responsible for the ineffective companies' performance. Lipton and Lorsch thought the only way to improve firm performance is to improve the efficiency of the Board of Directors, and that board size is important.

Jensen (1993) agreed with Lipton and Lorsch, and, recommended that board size should not exceed eight people and high equity ownership by managers and board members. Nguyen et al. (2015) references both Lipton and Lorsch (1992) and Jensen (1993), in finding that the relation between board size and firm value is not uniformly decreasing. "When boards are relatively small, adding more directors can increase the firm's value because the latter bring their expertise and relationships that increase the firm's competitiveness" (Nguyen et al., 2015, p. 5).

Jensen (1993) listed four control forces which can influence managers' behaviour to improve firm performance and act in shareholders' interests, viz., capital markets or market for corporate control, the legal, political and regulatory system, product and factor market and an effective internal control system.

Although corporate governance has been studied for more than thirty years, how to improve it is still a crucial field of research. On October 18, 2018, over twenty prominent executives, representing some of America's largest corporations, pension funds and investment firms, came together to sign the Commonsense Principles 2.0. (Harvard Law School Forum on Corporate

Governance). Some of them are Warren Buffet, Jamie Dimon (Chairman and CEO of JPMorgan Chase) and Larry Fink (Chairman and CEO of BlackRock). These principles state, "While no one size fits all – boards need to be large enough to allow for a variety of perspectives, as well as to manage required board processes – they generally should be as small as practicable so as to promote an open dialogue among directors." (Commonsense Principles 2.0., p. 2)

The current study aims to clarify whether the size of corporate boards affects the business and market performance of the biggest Eastern Central European listed companies. The database used consists of the largest 300 listed companies in the region, with financial data for the period 2007-2016. This region is characterized by two-tiered corporate governance systems, in which there is a management board consisting of executive company directors, and a supervisory board comprising independent members. The management board is responsible for operational activities and making strategic decisions, and the supervisory board for monitoring the management board.

The relevance of this paper is the lack of similar research about the relation between corporate board size and firm performance in this region, with such a large panel database, considering both the relatively large number of companies and a current time interval. Corporate governance literature evidences a huge interest in this research topic over the past 30 years, and consequently, many international papers have been published, both in developed and developing countries.

This study is structured as follows. After reviewing the relevant literature in Chapter 2, the paper will introduce the database, the methodology set up and the hypothesis in Chapter 3. In Chapter 4, the author will discuss the results. The paper ends with the conclusions in Chapter 5.

4.2 Literature review

Various corporate governance theories consider the relation between the board and the management differently. Agency theory puts the emphasis on the conflict of interest between the board and the management (Fama, 1980; Jensen/Meckling, 1976; Shleifer/Vishny, 1997). The board represents the interests of the shareholders, and so the most important task is monitoring the management. The role of the board is maximizing shareholders' wealth, reducing agency costs, selecting, and rewarding CEO (Chief Executive Officer), evaluating CEO and company performance and making strategic decisions and achieving management control (Zahra/Pearce, 1989). On the other hand, according to resource dependency theory,

there is no such conflict of interest between the board and the management; the main role of the board is providing the resources for the firm (Zahra/Pearce, 1989). Resource dependency theory thinks that corporate boards are a cooperative mechanism to extract resources vital to company performance, boards are to serve a boundary spanning role and boards enhance organizational legitimacy (Zahra/Pearce, 1989).

According to Lipton and Lorsch (1992) and Jensen (1993), who represent agency theory, large boards are not favorable because they are associated with weaker monitoring and slow decision-making. Other representatives of resource dependence theory like Dalton et al. (1999), find large boards favorable, and they emphasize the importance of the role of the board's advice to the management. Goodstein et al. (1994), in a similar vein to Zahra and Pearce (1989), emphasized that board size reflects the firm's ability to extract resources from its environment. Goodstein et al. defined the three main tasks of the board. The first is that the board is an organizational unit that connects the company and its environment and provides critical resources. The second is that the board effects internal control and monitoring. The third is that the board makes corporate strategy.

In empirical studies, the authors usually found a negative relationship between board size and firm performance. Among US firms, Yermack (1996) found that board size has a significantly negative impact on firm performance, regardless of, if firm performance is proxied with Tobin's Q or ROA. He confirmed this negative impact in OLS and firm fixed effects econometric methods. With American data, this significantly negative impact has been confirmed by other authors also, such as Vafeas (1999) with Tobin's Q in OLS models, Cheng et al. (2008) with Tobin's Q and ROA in OLS models and Coles et al. (2008) with Tobin's Q also in OLS models.

In developed economies, most of the studies confirmed the negative relationship between board size and firm performance regardless of whether firm performance is measured with Tobin's Q or ROA. Bozec (2005) with the Canadian firm data, Conyon and Peck (1998) with the Danish, Dutch, French and Italian data, Bennendsen (2008) with Danish data, Eisenberg (1998) with Finnish data, Postma et al. (2001) with Dutch data, Loderer and Peyer (2002) with Swiss data, Beiner et al. (2004) also with Swiss firm data, Mak and Kusnadi (2005) and Haniffa and Hudaib (2006) with Malaysian data, and Mak and Kusnadi (2005) with Singapore firm data. Only Beiner et al. (2006) confirmed a significant positive impact of board size on firm performance using Tobin's Q in OLS model. Haniffa and Hudaib (2006) confirmed a significant positive relationship between board size and ROA, Loderer and Peyer (2002) only confirmed the positive relationship using ROA as firm performance.

Guest (2008) also confirmed the negative relationship between board size and firm performance with British data using ROA, Tobin's Q, and share return. Besides, Guest used interactive terms between board size and firm characteristics such as firm size or leverage, to separate his sample into small and large companies. The negative coefficient of the interactive term between board size and firm size indicates that increasing board size does not contribute to improving firm performance at large corporations.

Nguyen et al. (2015) with Australian data also confirmed the negative impact of board size on firm performance by using Tobin's Q in OLS and firm fixed effects models. They also confirmed the significant negative impact of board size on firm performance, which is proxied with operating performance measures as ROA and EBITDA, scaled by total assets on OLS models. And they found a significant positive relationship between board size and operating expenses scaled by total assets.

In the Eastern and Central European region Gugler et al. (2014) did a similar study. They found a significantly positive relation between board size and Tobin's Q in the sample of eleven Central and Eastern European countries in the OLS model. Moscu (2013) found an insignificant positive relation between board size and firm performance in the OLS model among Romanian listed companies. Firm performance has been proxied with ROA and ROE ratios. Ionascu et al. (2018) analyzed the relationship between women on boards and financial performance among Romanian companies listed on the BSE (Bucharest Stock Exchange) during 2012–2016. They analyzed the effects of the proportion of women on boards on firm performance and in their models, they used board size as a control variable. They measured firm performance with ROA and market to book value ratio. In the case of ROA in the OLS model, board size has been an insignificant negative relationship; in firm fixed effects model, an insignificant positive effect on firm performance. In the case of market to book value ratio, board size has an insignificant positive effect in the OLS, and the firm fixed effects models. Dobija and Kravchenko (2017) found an insignificant negative relation between board size and firm performance among Polish listed companies in the OLS models and proxied firm performance with ROA and ROE ratios.

Pintea et al. (2020) also examined the relationship between corporate governance and financial performance in Romania. The authors constructed corporate governance indicators based on governance structure, investor relations, management and board, and financial transparency. The authors used ROE, Tobin's Q, EVA (economic value added), and TSR as financial performance measures, and they used econometrics analysis. The authors did not find a

significant impact of corporate governance indicators on financial performance measures such as ROE, EVA, and TSR, but a significant positive relationship for Tobin's Q.

Aluchna (2009) studied whether good corporate governance matters among Polish firms. The author investigated the relationship between compliance with corporate governance best practices and corporate performance. The author used regression analysis. The author found that corporate governance best practice is associated with a lower return on investment for Polish firms and a statistically insignificant negative relationship between Tobin's Q and corporate governance.

Bohdanowicz (2014) analyzed the impact of ownership structure on supervisory board size and diversity for Polish firms. Among Polish firms, the two-tier governance structure is the generally accepted form. The author main findings are: *"... state ownership positively influences supervisory board diversity and managerial ownership is positively associated with supervisory board diversity*.", "*Moreover, financial investor ownership positively affects supervisory board size*."

Achim et al. (2015) examined the relationship between corporate governance and business performance for Romanian companies with econometric analysis. The authors found a positive correlation between corporate governance quality and the market value of companies measured by Tobin's Q. However, the authors mention they this positive relationship is only valid for the year 2011, although they analyzed the period between 2001 and 2011.

Grofcikova and Musa (2020) examined the impact of the board process on board and corporate performance for Slovakian firms. The authors conducted a questionnaire survey during 2019. 132 companies participated, 54% were joint stock companies, 36% were limited liability companies, and 10% were cooperatives. The authors made correlation analysis, binary logistic regression, and other relevant tests. The authors claim that "*The results of the correlation analysis between the selected CG process attributes and board performance attributes show that each of the board process attributes examined affects at least one board performance attribute at a statistically significant level. All significant correlations have a positive value*."

Przybylowski et al. (2013) examined the role of independent supervisory board members in Central and Eastern European countries. The sample consists of the 10 biggest companies from each of the countries: the Czech Republic, Hungary, Poland, and Russia. The authors found no evidence that independent directors contribute to improved financial performance, however, the claim that "*The presence of independent members positively correlates with ROE ratio,*

whereas it is negatively influenced by the ownership concentration in the company." At the same time, ownership structure influences the presence of the independent members of the boards, and the appointment of independent members depends primarily on the founders of the company. The authors also found that more shareholders (large free float) or institutional investors improve the supervisory board standards and its professionalism. The authors found no evidence that the independence of the supervisory board members would increase the effectiveness of the company but to lower agency costs and to increase the safety of company operations in the long run.

Bistrova and Lace (2012) examined corporate governance influence on firms' financial performance in CEE countries. The authors assume the hypothesis that good corporate governance positively influences firm financial performance. The authors developed a model based on 21 criteria which are grouped into 4 major categories: Supervisory Board, Management team, Investor Relations, and Information Transparency. The sample consists of 118 CEE companies from Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Poland, Slovakia, and Slovenia. The selected five financial measure: ROE, ROCF (return on operating cash flow), profit margin, equity ratio (total equity divided by total assets), asset turnover (total sales divided by average total assets) and using as dependent variables in regression equations. The regressors are total corporate governance rating, supervisory board, management team, investors relations, disclosure information. Regressors are corporate governance indicators which were based on the CG assessment model. The authors found that "*… the companies with the best CG ratings delivered below average profitability (Return on Equity, profit margin, operating cash flow to equity) and business efficiency (asset turnover)*." Moreover, the authors found that worst companies (companies with worst corporate governance indicators) outperformed the other firms with financial performance. Only for the equity ratio did companies with a better corporate governance indicator perform better. The authors think that these curious results can be explained if a company (e.g. telecoms, utilities) cannot offer huge growth it tries to improve corporate governance to attract investors. But the authors think another reason is rather plausible that is the possible risk of the earnings manipulations.

In the East-Central-European region, joint stock companies usually operate in a two-tiered corporate governance structure. For listed companies, the two-tiered structure is obligatory in the Czech and Slovak Republics, and in Poland. In Bulgaria, Hungary and Romania, the one-tiered structure is allowed. In this region, if a two-tiered structure is applied, there exists a management board and a supervisory board also. In these six countries the management board

is called differently, which is shown in Table 4. The management board is primary responsible for business management, while the supervisory board monitors the management board in the interests of shareholders. The management board consists of directors of the company; in Hungary and Poland, directors can have an employment agreement with the company; in Bulgaria and Romania, and in the Czech and Slovak Republics, it is not allowed. Table 4 shows the further corporate governance specialties in East-Central-Europe.

4.3 Data and methodology

4.3.1 Sample and descriptive statistics

The database includes data from 300 Bulgarian, Czech, Hungarian, Romanian, Polish and Slovakian listed companies, excluding the strongly regulated financial and utility sectors. Financial data have been downloaded from the Bloomberg monitor system, while information on corporate boards have been collected manually from annual reports. Financial data are year-end data (December 31), while the size of the board (number of directors) reflects the status as of January 1 in the given year. The dataset covers years 2007 to 2016. Theoretically, there should be 3000 firm-year observations available for each variable, but as Table 4 shows, a few observations are missing, especially in earlier years. This means that the sample is an unbalanced panel database. Missing data can worsen the significance levels of the variables. The main cause of the missing observations is unavailable data or lack of operation of the firm.

Table 6 Number of observations of board sizes and firm performance measures (Source: own edition)

Year	MBoardsize	SBoardsize	Tobin's	TSR	ROA	EBITDA
2016	300	300	291	300	291	289
2015	300	300	295	300	297	296
2014	300	300	295	300	297	297
2013	297	297	285	291	294	291
2012	287	287	276	279	291	287
2011	281	281	268	255	288	286
2010	255	255	238	240	276	275
2009	233	233	223	231	259	257
2008	214	212	207	207	235	214
2007	203	200	183	182	217	203

Descriptive statistics of the sample are presented in Table 5. The average management board size is 3.83 and the median is 3, while the average supervisory board size is 5.57 and the median is 5. Comparing these values with other studies, these board sizes are considered small on average. In the sample, the standard deviation of management board size is 1.886 and that of supervisory board size is 1.703. These variabilities can make regression results powerful. The outside director ratio denotes the supervisory board size divided by the sum of supervisory board size and management board size. This measure matches the ratio of outside or non-executive directors on the Board of Directors in the one-tiered corporate governance system.

The pairwise correlation among all the variables used in regression models are reported in Table 6. Market performance measures such as Tobin's Q and total shareholder return correlate negatively with management board size, but positively with outside director ratio. Operational performance measure like ROA correlates in the opposite direction. Firm size correlates moderately positively with management board size, but negatively with outside director ratio, while firm size correlates negatively with all performance measures. CAPEX and cash variables correlate positively with performance measures, but leverage correlates negatively and net fixed assets and leverage variables negatively.

Table 5 presents the statistical summary of the sample of the full database. Of the 300 companies, more than 70 percent are Polish. The average size of management board is the largest in Hungary with 6 members and the least in Poland, with 3.13 members. There is no big difference with respect to supervisory board size among the observed countries. Hungarian firms employ the most employees and their revenues are the highest on average, while the average of firms' market capitalization is the highest in the Czech Republic. The average Tobin's Q is the biggest among Polish companies and the average total shareholder return the largest among Bulgarian firms, while the average ROA is the biggest among Czech companies. Most companies are from the industrial sector, but the largest companies are from the energy sector, all of them oil and gas companies.

The pairwise correlation among all the variables used in regression models are reported in Table 6. Market performance measures as Tobin's Q and total shareholder return correlates negatively with management board size but positively with outside director ratio. Operational performance measure like ROA and EBITDA correlate in the opposite direction. Firm size correlates moderately positively with management board size but negatively with outside director ratio. Moreover, firm size correlates negatively with all performance measures. CAPEX and cash

variables correlate positively with performance measures but leverage correlates negatively but net fixed assets and leverage variables negatively.

Table 7 presents the summary statistical of the sample of my study. From the 300 companies most of the firms are Polish, more than 70 percent. The average size of management board is the largest in Hungary with 6 members and the least in Poland with 3.13 members. There is no big difference with respect to supervisory board size among the observed countries. Hungarian firms employ the most employees, and their revenues are the biggest on average. While the average of firms' market capitalization is the biggest in the Czech Republic. The average Tobin's Q is the biggest among Polish companies, the average total shareholder return is the largest among Bulgarian firms, while with respect to EBITDA, which is EBITDA scaled by total assets, the Czech companies have the biggest averages. By years, observation refer on board sizes. We can see that there are not available data from all the companies and only data for the last three years is available for all firms. Most companies are from the industrial sector, but the largest companies are from energy sector. They are oil and gas companies.

Table 8 shows the corporate governance specialties in East-Central-Europe

Representativity of the database

The database, the sample, does not represent the whole population but the visible part of the economy. The aim is to understand the functioning of the boards of large companies, which is why the 300 largest companies in the CEE region have been chosen. The selection criterion was market capitalization in the summer of 2017. The corporate governance model differs for listed and unlisted companies, so the results cannot be generalized to small and unlisted companies. The reasons for focusing on listed companies are, on the one hand, the data available and, on the other hand, the separation of control and ownership is more pronounced in the case of listed public companies. However, in this sense, the sample can be considered an entire population. It is believed that the observed population has economic relevance.

Table 7 Descriptive statistics (Source: own edition)

Variables	Obs	Mean	St. Dev.	Min	Max	25th pctle	Median	75th pctle
Management Board size	2668	3.834	1.886	1.000	13.000	3.000	3.000	5.000
Log Mgmt Board size	2668	1.226	0.496	0.000	2.565	1.099	1.099	1.609
Supervisory Board size	2663	5.573	1.703	1.000	15.000	5.000	5.000	6.000
Outside director ratio	2660	0.603	0.113	0.250	0.889	5.000	0.625	7.000
Firm size	2754	4.463	1.666	-4.871	9.702	3.389	4.351	5.397
Tobin's Q	2561	1.456	1.514	0.210	43.133	0.879	1.097	1.503
TSR	2585	0.194	1.524	-0.999	66.923	-0.213	0.045	0.369
ROA	2748	0.041	0.138	-2.073	2.822	0.012	0.041	0.080
EBITDA	2730	0.108	0.121	-1.670	1.608	0.058	0.098	0.149
Age	2561	9.233	5.464	1.000	23.000	4.000	9.000	14.000
Volatility	2585	0.285	7.330	0.000	341.181	0.021	0.027	0.035
One-tiered management	2665	0.143	0.350	0.000	1.000	0.000	0.000	0.000
Minority	2754	0.027	0.085	-0.790	1.401	0.000	0.000	0.020
Cash	2754	0.085	0.103	0.000	0.992	0.019	0.048	0.113
Leverage	2708	0.139	0.129	0.000	1.401	0.046	0.108	0.195
CAPEX	2635	0.062	0.068	0.000	0.829	0.020	0.042	0.080
Net Fixed Assets	2745	0.364	0.227	0.000	0.971	0.171	0.360	0.525

This tables presents the main variables of the paper.

Management Boardsize denotes the number of directors at management board. Log Mgmt Boardsize denotes the natural logarithm of Management Boardsize. Supervisory Boardsize denotes the number of directors at supervisory board. SBoard members percentage denotes the ratio between supervisory board size and the sum of management and supervisory board size. Firmsize denotes the natural logarithm of total assets. Tobin-Q is proxied by the market value of equity plus total liabilities plus preferred equities, scaled by total assets.

Table 8 Correlation between the main variables (Source: own edition)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Board size	1.0000																			
2. Log Board size	0.9475*	1.0000																		
3. Log Board size*Firm size	0.8384*	0.8263*	1.0000																	
4. Outside director ratio	-0.7285*	-0.7993*	-0.5775*	1.0000																
5. Log Board size*Outside director	0.7833*	0.8870*	0.7552*	-0.4909*	1.0000															
6. Firm size	0.4307*	0.4128*	0.8171*	-0.1968*	0.4227*	1.0000														
7. Net Fixed Assets	0.1057*	0.0933*	0.1329*	-0.0429*	0.1026*	0.1567*	1.0000													
8. Leverage	0.0148	0.0047	0.1056*	0.0189	0.0153	0.1844*	0.2804*	1.0000												
9. CAPEX	0.0086	0.0115	-0.0061	0.0252	0.0463*	-0.0776*	0.3557*	0.1603*	1.0000											
10. One-tiered management	0.3117*	0.3080*	0.0928*	-0.3721*	0.1859*	-0.0896*	0.2274*	-0.0591*	-0.0164	1.0000										
11. Minority	0.0874*	0.0538*	0.1275*	-0.0787*	-0.0032	0.1636*	-0.0366	0.0167	-0.0681*	-0.0497*	1.0000									
12. Age	0.2085*	0.1764*	0.2381*	-0.1339*	0.1290*	0.2450*	0.0536*	-0.0480*	-0.1401*	0.0929*	0.0854*	1.0000								
13. Volatility	-0.0338	-0.0443*	-0.0262	0.0365	-0.0454*	0.0089	0.0001	0.0179	-0.0045	-0.0142	0.0290	0.0440*	1.0000							
14. Log Board size*Leverage	0.3978*	0.4103*	0.4409*	-0.3118*	0.3711*	0.3326*	0.2760*	-0.8460*	-0.1303*	0.0539*	0.0385	0.0110	-0.0089	1.0000						
15.Log Board size*Cash lag1	0.2984*	0.3144*	0.1821*	-0.2742*	0.2563*	-0.0122	-0.2316*	-0.1714*	0.0210	0.0298	0.0106	0.0280	-0.0233	-0.0455*	1.0000					
16.Cash lag1	-0.0044	-0.0080	-0.0775*	-0.0203	-0.0051	-0.1724*	-0.2747*	-0.1881*	-0.0427*	-0.0422*	-0.0168	-0.0641*	-0.0161	-0.1562*	0.8828*	1.0000				
17. Tobin's Q	-0.0740*	-0.0623*	-0.1736*	0.0493*	-0.0409*	-0.2833*	-0.2192*	-0.1158*	-0.1059*	-0.0833*	-0.1025*	-0.1727*	-0.0104	-0.1064*	0.2678*	0.3355*	1.0000			
18. Market-to-book-value ratio	-0.0372	-0.0228	-0.1175*	0.0233	-0.0008	-0.2283*	-0.1860*	-0.0138	0.0970*	0.0821*	-0.1117*	-0.1164*	-0.0126	-0.0119	0.2128*	0.2567*	0.8479*	1.0000		
19. Total shareholder return	-0.0394*	-0.0364	-0.0583*	0.0227	-0.0397*	-0.0594*	-0.0454*	-0.0227	-0.0280	0.0226	0.0005	0.0018	0.0202	-0.0339	0.0255	0.0458*	0.2580*	0.2125*	1.0000	
20. ROA	0.0087	0.0063	-0.0015	-0.0134	-0.0011	-0.0413*	-0.1238*	-0.1443*	0.0807*	-0.0335	-0.0336	-0.0227	-0.0025	-0.1215*	0.1900*	0.2098*	0.2409*	0.1563*	0.1991*	1.0000

This table presents the Pearson product moment correlation between main financial and corporate governance variables at 5% significance level.

TSR denotes total shareholder return that equals the annual percentage change of share price plus dividend yield. ROA is Net Income scaled by Total Assets. Age is the number of years since the firm was first listed on Stock Exchange. Volatility is the annual volatility of the daily effective yield of share price. One-tier management is a dummy variable which value is one if a firm uses one-tier corporate governance system in a given year. Minority denotes minority noncontrolling interests divided by total shareholder equity. Cash denotes Cash and Cash Near Items scaled by Total Assets. Leverage denotes total debts divided by total assets. CAPEX denotes capital expenditures scaled by total assets. Net Fixed Assets denotes gross fixed assets minus accumulated depreciation scaled by total assets. Firmsize is proxied by Total Assets.

Table 9 Summary statistics (Source: own edition)

	Obs	M Board size	S Board size	Tobin's Q	TSR	ROA	EBITDA	Employee	Market cap	Revenues
Bulgaria	29	4.71	4.53	1.24	0.42	0.04	0.09	387	74.6	97.4
Czech Republic	8	4.80	5.47	1.27	0.11	0.06	0.15	2018	913.7	809.3
Hungary	14	6.08	5.64	1.40	0.12	0.02	0.11	3774	800.2	1412.9
Poland	214	3.31	5.78	1.55	0.17	0.04	0.11	2090	278.8	424.1
Romania	30	5.18	5.29	1.09	0.20	0.04	0.09	1655	256.6	359.4
Slovakia	5	4.44	4.75	1.07	0.06	0.05	0.11	1249	446.3	922.0
2007	203	3.90	5.57	2.02	0.42	0.07	0.13	1773	582.1	426.7
2008	214	3.98	5.50	1.20	-0.56	0.05	0.14	1940	247.7	504.8
2009	233	3.88	5.59	1.33	0.58	0.01	0.09	1975	298.0	353.7
2010	255	3.87	5.66	1.45	0.24	0.05	0.10	2022	336.4	413.9
2011	281	3.83	5.54	1.30	-0.19	0.05	0.11	1998	248.1	477.5
2012	287	3.83	5.55	1.25	0.14	0.02	0.09	1936	290.8	507.1
2013	297	3.76	5.64	1.48	0.54	0.04	0.10	1907	285.8	483.1
2014	300	3.78	5.59	1.55	0.24	0.04	0.11	1977	255.9	477.9
2015	300	3.78	5.54	1.52	0.21	0.05	0.10	1969	272.1	458.5
2016	300	3.82	5.55	1.54	0.23	0.04	0.10	2015	311.4	428.0
Basic Materials	24	3.81	5.81	1.31	0.20	0.03	0.12	3183	485.9	485.9
Communications	18	4.06	6.48	1.59	0.23	0.05	0.15	2895	841.0	841.0
Consumer Cyclical	52	3.41	5.26	1.38	0.19	0.04	0.10	1384	154.8	154.8
Consumer Non-cyclical	59	4.16	5.49	1.73	0.16	0.04	0.10	1435	202.2	202.2
Diversified	10	4.36	4.05	0.82	0.22	0.02	0.07	490	47.4	47.4
Energy	15	5.10	6.79	1.06	0.13	0.03	0.10	9732	1932.2	1932.2
Industrial	99	3.54	5.61	1.31	0.20	0.04	0.10	1142	92.4	92.4
Technology	23	4.04	5.28	2.25	0.25	0.08	0.15	1205	131.9	131.9

Obs denotes the number of observations. Observations per year refer on the number of board size members. The other values are averages.

Table 10 Corporate governance specialities in East-Central-Europe (Source: own edition)

	Bulgaria	Czech Republic and Slovakia	Poland	Hungary	Romania
Who manages the firm	Board of Directors or Management Board	Board of Directors	Management Board	Board of Directors or Management Board	Board of Directors or Management Board
Supervisory board	mandatory in two-tier structure				
Main task of supervisory board	monitoring the company management or management board				
Main tasks of management board and the Board of Directors	managing the company, operative management, constitute firm strategy				
Supervisory board number	minimum 3	minimum 3 Czech R.: three multipliers	minimum 3	minimum 3 maximum 15	minimum 3 maximum 7
Management board number	minimum 1	minimum 1	minimum 1	minimum 3 maximum 11	minimum 1
Task of board of directors in one-tier structure	managing the company, operative management, constitute firm strategy				
Supervisory board independency	Members are independent individualities and firm employees but one third should be independent	Members are independent individualities	Members are independent individualities	Members are independent individualities	Members are independent individualities and firm employees

4.3.2 Model specification

In regression models, the dependent variables are the three most popular firm market performance measures and one firm operational performance measure used by other authors. They are Tobin's Q, market-to-book value ratio (MB ratio), total shareholder return (TSR) and ROA. Tobin's Q is used as a proxy of firm value and is calculated as Chung and Pruitt (1994) did, MB ratio and TSR reflect the judgment of the market, while ROA expresses the firm's operational effectiveness. Tobin's Q denotes the ratio of market value of equity plus total debts plus minority interests plus preferred equities, scaled by total assets. MB ratio denotes the ratio of the market value of equity and book value of equity. TSR is the sum of the annual yield of the share prices plus the dividend yield. Dividend yield is the ratio of the dividend paid divided by the market value of equity in the previous year. ROA denotes the net income scaled by total assets.

Table 11 Correlation matrix of the dependent variables (Source: own edition)

	TSR	Tobin's Q	MB ratio	ROA	ROE
TSR	1.0000				
Tobin's Q	0.2580*	1.0000			
MB ratio	0.2125*	0.8479*	1.0000		
ROA	0.1991*	0.2409*	0.1563*	1.0000	
ROE	0.1223*	0.2165*	0.1787*	0.7278*	1.0000

Although some authors warned against the problems of using Tobin's as a firm performance measure (Bartlett & Partnoy, 2018; Dybvig &Warachka, 2010), Tobin's Q is by far the most popular market performance measure. The most popular market-based measurement is Tobin's Q, the second is MB ratio and the third is annual stock return, while the most popular accounting-based measurement is ROA, followed by ROE (Al-Matari et al. 2014).

Table 9 shows the pair-wise correlation between the performance measures. Since ROA is considered the best operational measure (Toit, 2013; Hagel et al, 2013) and the correlation between Tobin's Q and ROA is the highest, in this sense, Tobin's Q is still considered the best market performance measure.

The paper follows the same technique as Yermack (1996) and Guest (2009) did. Yermack took the natural logarithm of the board size, and he justified this that he assumed convex association between board size and firm market value. In regression models the two main independent variables are the natural logarithm of management board size and outside director ratio. The

first plays similar role like board of directors[3] and the other like outside director ratio in one-tiered corporate governance studies.

As in all similar studies, control variables are being used to isolate the effect of board size on firm value. With these variables it can be controlled potential firm characteristics effects. Leverage denotes long-term liabilities divided by total assets. According to empirical facts, larger firms are older and have higher debts than younger and smaller firms. Nguyen et al. (2015) mentioned the tax saving advantage of higher debts, while according to Jensen (1986), higher debt can impose stricter discipline on management. A further control variable is net fixed assets scaled by total assets. Using this variable can be justified as Nguyen et al. (2015) claims that: "Higher fixed asset ratio implies higher operating leverage. By using higher operating leverage firms may be able to leverage their underlying profitability and thus increase their market value" (Nguyen et al., 2015, p:7).

Controlling growth opportunities, a variable called CAPEX is being used which denotes capital expenditures scaled by total assets. Nguyen et al. claim that: "Higher levels of capital expenditures or investments should produce higher cash flow in future years" (Nguyen et al., 2015, p: 7). A further control variable is being used is called one-tiered management, which equals one if corporate governance structure is one-tiered at a firm in a given year. Another control variable is being used is called minority, which denotes minority noncontrolling interests divided by total shareholder equity. The last control variable is cash which denotes cash plus cash near items scaled by total assets.

Besides these mentioned control variables, four interactive terms are being used, as Guest (2009) did. Using interactive terms is based on Coles et al. (2008) who argues that the impact of board size on performance will differ for different types of firms. The first interactive variable is management board size multiplied by firm size. The second interactive variable is management board size multiplied by the outside director ratio. The first and second interactive terms both indicate large firms, and the second term shows the effectiveness of supervisory board.

The third interactive variable is management board size multiplied by leverage. Besides, this variable indicates large companies, with this interactive term, it can be controlled the leverage

[3] Board of directors consist of executive and non-executive or independent directors. Their proportion is called as outside director ratio and it is important that board of directors can play its monitoring role over firm management effectively.

effect. Nguyen et al. (2015) mentioned that highly levered firms require greater expertise to access external resources. On the other side as Guest (2009) mentioned, for large, old and highly levered firms large board size may be an optimal value maximising outcome. The last interactive term is management board size multiplied by the first lag of the variable called cash. With the fourth one interactive term it can be controlled the effect of large cash.

The main econometric models are the next:

$$\begin{aligned}&\text{Firm\_performance}_{it} = \text{const} + \beta_1 \cdot \text{LogMBoardsize}_{it} + \\ &+ \beta_2 \cdot \text{SBoard members percentage}_{it} + \sum_i \beta_i \cdot \text{Control variables}_{it} + \\ &+ \sum_i \gamma_i \cdot \text{Interactive terms}_{it_i} + \alpha_i + \delta_t + \varepsilon_{it}\end{aligned} \quad (1)$$

α_i: individual, firm or unobserved effects, time-invariant heterogeneity

δ_t: time dummies

ε_{it}: idiosyncratic error terms

Two kind of regression models are used: pooled OLS regressions with sector dummies[4] and year dummies, and firm fixed effects panel-regression with year dummies. Pooling of data means that in this regression model each firm observation is treated as a separate observation without considering that it may come from the same firm. Controlling for heteroskedasticity in pooled OLS regression models robust standard errors are used. But one important OLS model assumption can not be met because the error terms are correlated across time. Using firm fixed effects panel-regression model it is possible to control for the unobserved firm specific characteristics because this regression modelling technique allows unobserved variables to be correlated with the error term. So, the endogeneity problem, which is related to omitted variables, can be solved.

F-test indicates whether the results of firm fixed effects models are correct. F-test indicates the joint significance of the fixed effects intercepts. The null hypothesis is that all of the fixed effects are zero. If the null hypothesis is rejected then firm fixed effects technique is need to be used to get correct results. Stata version 13 has been used to run econometric models.

[4] The firms are operating in eight different sectors in the sample. They are basic materials, communications, consumer cyclical, consumer non-cyclical, diversified, energy, industrial and technology.

The fixed effects models are always chosen based on theoretical considerations, even the Hausman-test would not be significant and in this case the random effects modell would be better theoretically.

4.4 Hypotheses

To set up hypothesis, the mean and median values of Tobin's Q, TSR, ROA and EBITDA have been plotted against the size of management board and supervisory board. This represents Figure 11− Figure 14.

The figures show the same as can be seen from the pairwise correlation values. There is a negative relation between management board size and market performance measures and a positive relation between management board size and operational performance measures.

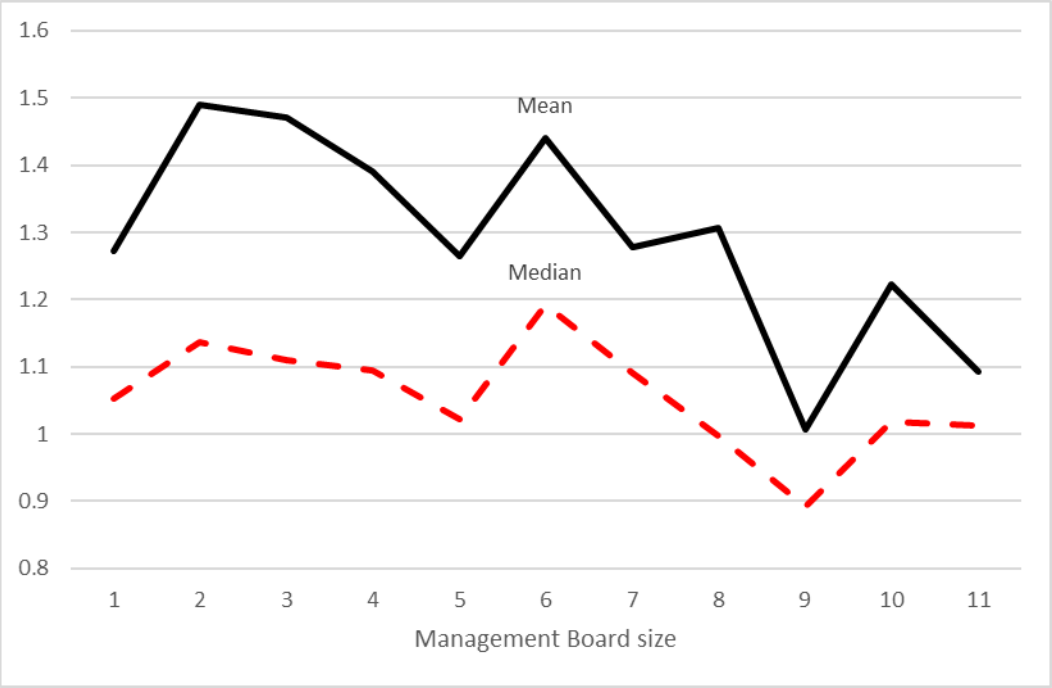

Figure 18 Mean and median values of Tobin-Q according to the size of management board (Source: own edition)

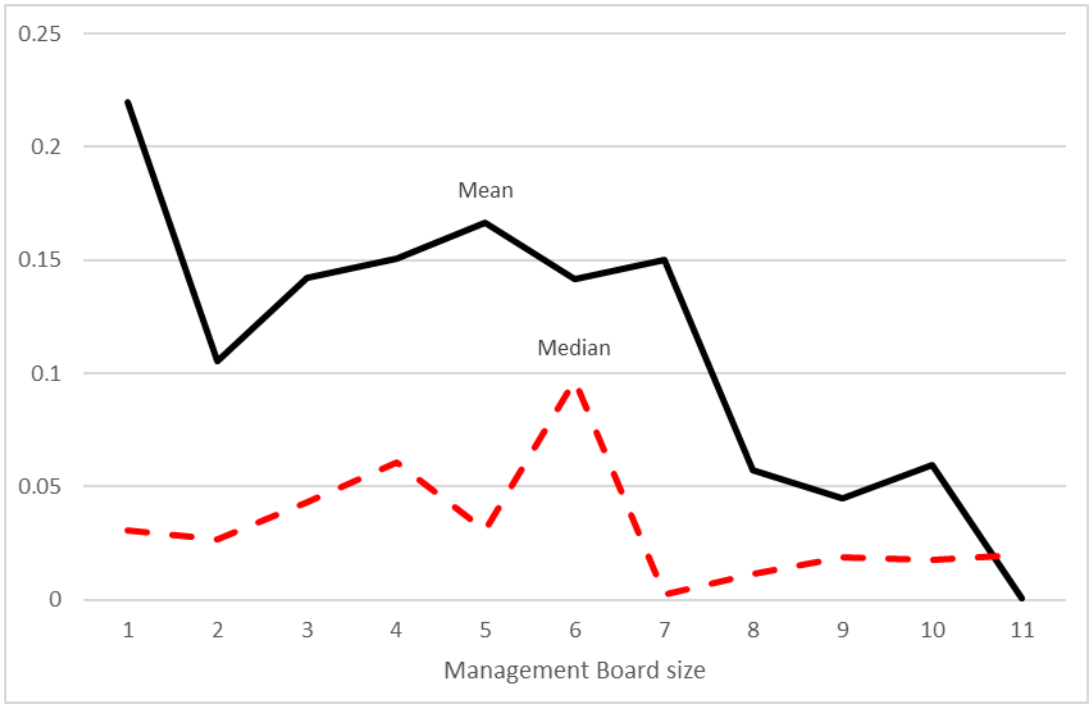

Figure 19 Mean and median values of TSR according to the size of management board (Source: own edition)

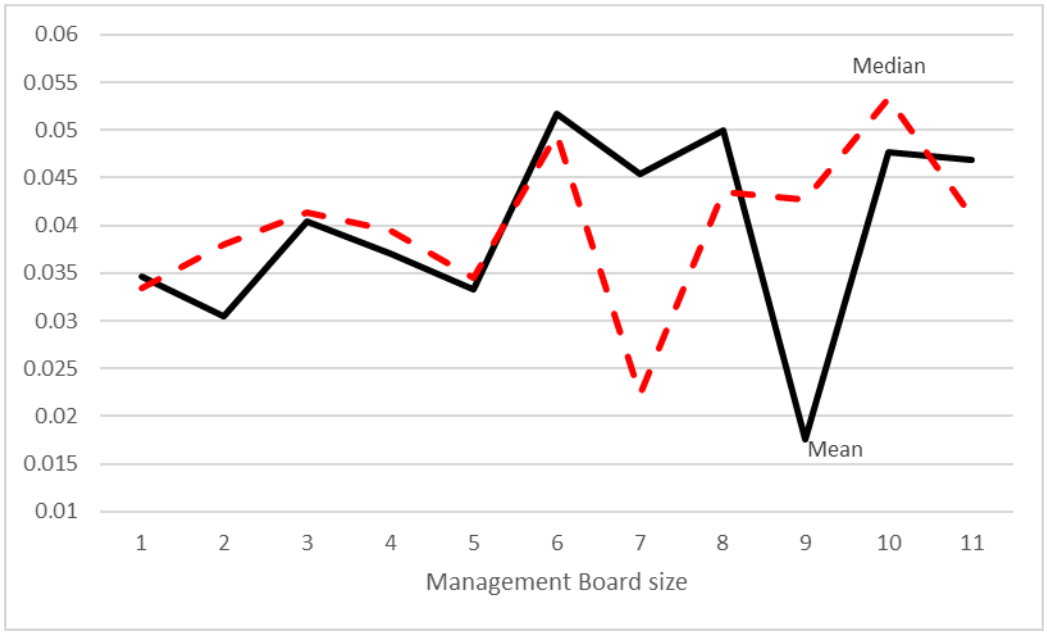

Figure 20 Mean and median values of ROA according to the size of management board (Source: own edition)

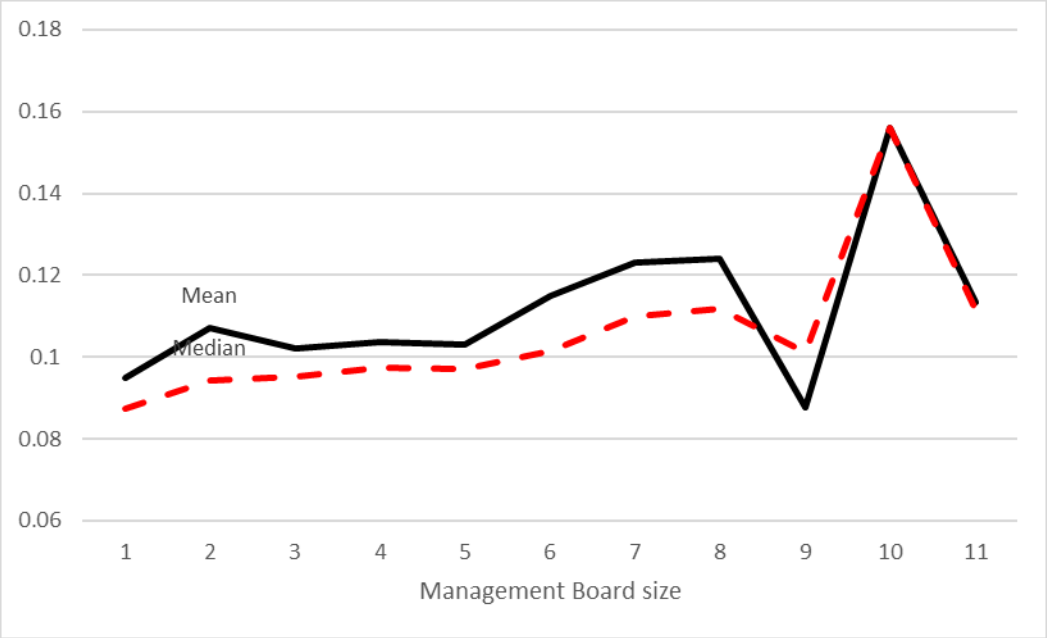

Figure 21 Mean and median values of EBITDA according to the size of management board (Source: own edition)

Based on the figures the following hypotheses can be expected.

H1: Based on Figures 1-2, a negative relation between management board size and firm market performance measures can be expected.

H2: Based on Figure 3, a positive relation between management board size and firm operational performance measures can be expected.

Based on pairwise correlation, the following hypotheses can be expected.

H3: Based on pairwise correlation, a positive relation between outside director ratio and firm market performance measures can be expected.

H4: Based on pairwise correlation, a negative relation between outside director ratio and firm operational performance measures can be expected.

H5: Based on the study of Guest (2008), using board size multiplied by firm size interactive term, board size has a positive impact on firm performance, but this interactive term has a negative impact on firm performance.

The primary research question is: How board size affects financial performance?

However, the study tries to answer for the next two research questions also: How the outside director ratio affects financial performance? How does large cash affect management board?

4.5 Empirical results

4.5.1 Fixed effects regression for the full database

Table 10 shows the most frequent signs of the significant variables in fixed effects regression models by firm performance measures. Non-significant signs are in brackets. This means that if Tobin's Q is used as a firm performance measure, the variable Log Board size has a significant positive impact on firm performance in most of the models, except in Model 2, where this effect is negative and not significant. According to Table 7, there are only three variables which have the same impact on firm performance in each of the firm performance measures: Log Board size, Log Board size*Firm size and Log Board size*Cash lag1.

Table 12 Signs of independent variables (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size	+	+	(+)	(+)
Log Board size*Firm size	-	-	-	-
Outside director ratio	-	-	(-)	(+)
Log Board size*Outside director	(-)	(-)	(+)	(-)
Firm size	-	-	-	(+)
Net Fixed Assets	(-)	(-)	-	-
Leverage	-	+	+	-
CAPEX	+	+	(+)	+
One-tiered management	(+)	(+)	(+)	-
Minority	(-)	(+)	(+)	+
Age	-	-	(-)	-
Volatility	(+)	(+)	(+)	(-)
Log Board size*Leverage	(-)	(-)	(-)	(+)
Log Board size*Cash lag1	+	+	(+)	(+)
Cash lag1	-	-	(-)	(+)
F-test	***	***	***	***
Hausman-test	***	***	***	***

In fixed effects models, using Tobin's Q, Market-to-book ratio, total shareholder return or ROA as firm performance measure, management board size has a significant positive impact on firm performance, while the interaction term between board size and firm size has a significant negative impact on firm performance. This confirms Hypothesis H5 and the results of Guest (2009). In the two-tiered corporate governance structure, the management board usually consists of directors who are managing the company. They are experts in different fields, including the CEO, the Chief Financial Officer, the Chief Operating Officer, the Chief Technology Officer, or the Chief Human Resources Officer. So, it can be reasonably assumed that if more experts run a firm, the firm can benefit from this.

Table 13 Fixed effects panel regression models, dependent variable: Tobin's Q (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.112**	-0.00846	0.407***	0.645**	0.437***	0.359**
	(0.0464)	(0.0756)	(0.157)	(0.295)	(0.158)	(0.169)
Log Board size*Firm size			-0.0868***	-0.0944***	-0.0778***	-0.0859***
			(0.0288)	(0.0299)	(0.0294)	(0.0297)
Outside director ratio		-0.716**	-0.663**	-0.292	-0.622*	-0.533
		(0.335)	(0.335)	(0.513)	(0.336)	(0.339)
Log Board size*Outside dir.r.				-0.279		
				(0.293)		
Firm size	-0.248***	-0.249***	-0.143***	-0.135***	-0.162***	-0.127**
	(0.0355)	(0.0355)	(0.0500)	(0.0506)	(0.0515)	(0.0517)
Net Fixed Assets	-0.248*	-0.202	-0.190	-0.185	-0.191	-0.0237
	(0.149)	(0.150)	(0.149)	(0.149)	(0.149)	(0.155)
Leverage	-0.504***	-0.511***	-0.534***	-0.533***	-0.0346	-0.501***
	(0.154)	(0.154)	(0.153)	(0.153)	(0.350)	(0.153)
CAPEX	1.164***	1.163***	1.159***	1.158***	1.162***	0.748***
	(0.261)	(0.260)	(0.260)	(0.260)	(0.260)	(0.271)
One-tiered management	0.216	0.225	0.207	0.182	0.214	0.205
	(0.178)	(0.177)	(0.177)	(0.179)	(0.177)	(0.177)
Minority	-0.233	-0.234	-0.214	-0.221	-0.203	-0.295
	(0.209)	(0.208)	(0.208)	(0.208)	(0.208)	(0.202)
Age	-0.0581***	-0.0572***	-0.0569***	-0.0567***	-0.0568***	0.0335***
	(0.00599)	(0.00598)	(0.00597)	(0.00597)	(0.00597)	(0.00616)
Volatility	0.000192	0.000196	0.000114	0.000185	0.000134	-0.000189
	(0.00155)	(0.00155)	(0.00155)	(0.00155)	(0.00154)	(0.00149)
Log Board size*Leverage					-0.405	
					(0.255)	
Log Board size*Cash lag1						0.936***
						(0.352)
Cash lag1						-0.384
						(0.473)
Constant	3.315***	3.874***	3.357***	3.047***	3.334***	1.957***
	(0.176)	(0.328)	(0.369)	(0.492)	(0.369)	(0.384)
Observations	2,281	2,278	2,278	2,278	2,278	2,118
R-squared	0.179	0.180	0.184	0.184	0.185	0.093
Number of Index	297	297	297	297	297	295
F-test	25.26***	23.96***	23.27***	22.15***	22.25***	9.24***
Hausman -test	43.68***	46.34**	61.48***	64.60***	63.96***	92.38***

Standard errors in parentheses and corrected for clustering at firm level. ***, **, * indicate significance at the 1%, 5% and 10% level. Year fixed effects are not reported.

These are consistent with the results of other researchers such as Jensen (1993; cited by Nguyen et al. 2015: 5), who claimed that 'when boards are relatively small, adding more directors can increase a firm's value because the latter bring their expertise and relationships that increase a firm's competitiveness.' The significant negative sign of the interaction term indicates that for large firms, increasing board size has a negative impact on firm performance. This result is the same as Guest's. Operations of larger firms are more complex, involving more directors, but it is not effective to increase the size of the management board.

The positive significant effect of the interaction term between board size and the first lag of cash indicates the positive effect of bank monitoring and the disciplining impact of large excess cash. In the case of TSR and ROA, this effect is also positive, but not significant.

According to the fixed effects regressions, the outside director ratio has a negative impact on firm market performance and a positive impact on operative performance. This result does not support the corporate governance assumption that an increase in the share of independent members in corporate boards has a positive impact on firm performance. In the two-tiered corporate governance structure, the supervisory board monitors the management board.

Firm size has significant negative impact on firm performance except on ROA, and firm age has a negative impact on firm performance. Furthermore, firm size, leverage and firm age have significant negative impacts on firm performance, while CAPEX, which refers to investment opportunities, has significant positive impact. Using the Market-to-book ratio as a firm performance measure, the impacts are similar except for the effect of leverage. Using TSR as the firm performance measure, the variables have fewer significant effects, but the three main independent variables have a similar impact on firm performance as in the case of the Tobin's Q and MB models. The main difference is that only the interaction term between board size and firm size has a significant impact on firm performance.

Both the F-test and Hausman-test for all fixed effects models are significant at one percent which means that all fixed effects models are the appropriate instead of pooled OLS and random effects model respectively.

Table 14 Fixed effects panel regression models, dependent variable: ROA (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.00204	0.000386	0.0369	0.0472	0.0333	0.0387
	(0.00681)	(0.0111)	(0.0231)	(0.0434)	(0.0232)	(0.0260)
Log Board size*Firm size			-0.00763*	-0.00796*	-0.00889**	-0.00631
			(0.00422)	(0.00439)	(0.00431)	(0.00458)
Outside director ratio		0.00920	0.0139	0.0299	0.00888	0.0485
		(0.0495)	(0.0496)	(0.0756)	(0.0497)	(0.0530)
Log Board size*Outside dir.				-0.0121		
				(0.0431)		
Firm size	0.000868	0.000937	0.0101	0.0105	0.0129*	0.00279
	(0.00513)	(0.00514)	(0.00724)	(0.00734)	(0.00747)	(0.00785)
Net Fixed Assets	-0.210***	-0.209***	-0.208***	-0.208***	-0.208***	-0.217***
	(0.0218)	(0.0219)	(0.0219)	(0.0219)	(0.0219)	(0.0240)
Leverage	-0.0365	-0.0375*	-0.0397*	-0.0396*	-0.107**	-0.0194
	(0.0224)	(0.0225)	(0.0225)	(0.0225)	(0.0513)	(0.0237)
CAPEX	0.176***	0.177***	0.177***	0.177***	0.176***	0.167***
	(0.0382)	(0.0383)	(0.0383)	(0.0383)	(0.0383)	(0.0421)
One-tiered management	-0.0785***	-0.0790***	-0.0801***	-0.0813***	-0.0808***	-0.0557**
	(0.0256)	(0.0257)	(0.0256)	(0.0260)	(0.0256)	(0.0267)
Minority	0.0560*	0.0557*	0.0576*	0.0573*	0.0562*	0.0567*
	(0.0308)	(0.0308)	(0.0308)	(0.0308)	(0.0308)	(0.0316)
Age	-0.00256***	-0.00253***	-0.00249***	-0.00248***	-0.00250***	0.000476
	(0.000882)	(0.000884)	(0.000884)	(0.000884)	(0.000884)	(0.000957)
Volatility	-8.74e-06	-8.89e-06	-1.59e-05	-1.29e-05	-1.87e-05	-1.63e-05
	(0.000229)	(0.000229)	(0.000229)	(0.000229)	(0.000229)	(0.000232)
Log Board size*Leverage					0.0542	
					(0.0373)	
Log Board size*Cash lag 1						0.0579
						(0.0547)
Cash lag1						0.00567
						(0.0735)
Constant	0.149***	0.140***	0.0949*	0.0815	0.0974*	0.0505
	(0.0255)	(0.0482)	(0.0542)	(0.0724)	(0.0542)	(0.0593)
Observations	2,299	2,296	2,296	2,296	2,296	2,132
R-squared	0.075	0.075	0.077	0.077	0.077	0.074
Number of Index	297	297	297	297	297	295
F-test	9.46***	8.92***	8.63***	8.20***	8.31***	7.26***
Hausman test	82.82***	86.63***	87.62***	87.56***	87.63***	97.33***

Table 15 Fixed effects panel regression models, dependent variable: Market-to-book ratio (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.303***	0.0364	0.728*	0.845	0.768**	0.331
	(0.113)	(0.184)	(0.383)	(0.720)	(0.385)	(0.423)
Log Board size*Firm size			-0.144**	-0.148**	-0.131*	-0.112
			(0.0701)	(0.0727)	(0.0715)	(0.0744)
Outside director ratio		-1.434*	-1.355*	-1.172	-1.299	-1.354
		(0.814)	(0.814)	(1.254)	(0.816)	(0.852)
Log Board size*Outside dir.r.				-0.136		
				(0.711)		
Firm size	-0.764***	-0.759***	-0.581***	-0.578***	-0.608***	-0.602***
	(0.0871)	(0.0870)	(0.122)	(0.124)	(0.126)	(0.129)
Net Fixed Assets	-0.209	-0.159	-0.149	-0.147	-0.145	0.200
	(0.361)	(0.362)	(0.361)	(0.362)	(0.361)	(0.386)
Leverage	1.119***	1.126***	1.088***	1.089***	1.780**	1.099***
	(0.383)	(0.382)	(0.382)	(0.382)	(0.846)	(0.396)
CAPEX	1.932***	1.915***	1.908***	1.907***	1.914***	1.220*
	(0.634)	(0.633)	(0.632)	(0.632)	(0.632)	(0.681)
One-tiered management	0.416	0.460	0.432	0.418	0.442	0.533
	(0.431)	(0.430)	(0.430)	(0.436)	(0.430)	(0.439)
Minority	0.0403	0.00732	-0.000137	-0.000710	0.0200	0.0271
	(0.599)	(0.597)	(0.597)	(0.597)	(0.597)	(0.607)
Age	-0.0844***	-0.0817***	-0.0810***	-0.0809***	-0.0809***	0.0930***
	(0.0144)	(0.0144)	(0.0144)	(0.0144)	(0.0144)	(0.0154)
Volatility	0.000233	0.000227	8.46e-05	0.000119	0.000114	-0.000311
	(0.00373)	(0.00372)	(0.00372)	(0.00373)	(0.00372)	(0.00369)
Log Board size*Leverage					-0.573	
					(0.625)	
Log Board size*Cash lag1						2.372***
						(0.878)
Cash lag1						-2.099*
						(1.182)
Constant	6.101***	7.214***	6.361***	6.208***	6.321***	4.257***
Observations	2,260	2,257	2,257	2,257	2,257	2,098
R-squared	0.129	0.127	0.129	0.129	0.129	0.075
Number of Index	296	296	296	296	296	294
F-test	16.99***	15.73***	15.15***	14.39***	14.43***	7.21***
Hausman test	48.90***	54.58***	69.19***	72.33***	69.55***	86.29***

Table 16 Fixed effects panel regression models, dependent variable: Total shareholder return (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.303***	0.0364	0.728*	0.845	0.768**	0.331
	(0.113)	(0.184)	(0.383)	(0.720)	(0.385)	(0.423)
Log Board size*Firm size			-0.144**	-0.148**	-0.131*	-0.112
			(0.0701)	(0.0727)	(0.0715)	(0.0744)
Outside director ratio		-1.434*	-1.355*	-1.172	-1.299	-1.354
		(0.814)	(0.814)	(1.254)	(0.816)	(0.852)
Log Board size*Outside dir.r.				-0.136		
				(0.711)		
Firm size	-0.764***	-0.759***	-0.581***	-0.578***	-0.608***	-0.602***
	(0.0871)	(0.0870)	(0.122)	(0.124)	(0.126)	(0.129)
Net Fixed Assets	-0.209	-0.159	-0.149	-0.147	-0.145	0.200
	(0.361)	(0.362)	(0.361)	(0.362)	(0.361)	(0.386)
Leverage	1.119***	1.126***	1.088***	1.089***	1.780**	1.099***
	(0.383)	(0.382)	(0.382)	(0.382)	(0.846)	(0.396)
CAPEX	1.932***	1.915***	1.908***	1.907***	1.914***	1.220*
	(0.634)	(0.633)	(0.632)	(0.632)	(0.632)	(0.681)
One-tiered management	0.416	0.460	0.432	0.418	0.442	0.533
	(0.431)	(0.430)	(0.430)	(0.436)	(0.430)	(0.439)
Minority	0.0403	0.00732	-0.000137	-0.000710	0.0200	0.0271
	(0.599)	(0.597)	(0.597)	(0.597)	(0.597)	(0.607)
Age	-0.0844***	-0.0817***	-0.0810***	-0.0809***	-0.0809***	0.0930***
	(0.0144)	(0.0144)	(0.0144)	(0.0144)	(0.0144)	(0.0154)
Volatility	0.000233	0.000227	8.46e-05	0.000119	0.000114	-0.000311
	(0.00373)	(0.00372)	(0.00372)	(0.00373)	(0.00372)	(0.00369)
Log Board size*Leverage					-0.573	
					(0.625)	
Log Board size*Cash lag1						2.372***
						(0.878)
Cash lag1						-2.099*
						(1.182)
Constant	6.101***	7.214***	6.361***	6.208***	6.321***	4.257***
Observations	2,260	2,257	2,257	2,257	2,257	2,098
R-squared	0.129	0.127	0.129	0.129	0.129	0.075
Number of Index	296	296	296	296	296	294
F-test	16.99***	15.73***	15.15***	14.39***	14.43***	7.21***
Hausman test	48.90***	54.58***	69.19***	72.33***	69.55***	86.29***

4.5.2 Fixed effects regression for countries

All fixed effects regression models are repeated for all the six countries. Table 17 - Table 22 show the signs of the regression coefficients. The signs are signs of regression coefficients, the brackets indicate non-significant coefficients. If a variable occurs in more than one regression model, the signs refer to the most typical signs. Table 52 - Table 75 show the detailed results in the appendix.

Table 17 Signs of independent variables for Bulgaria (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size without interaction terms	+	+	(+)	(+)
Log Board size	(-)	(-)	-	(-)
Log Board size*Firm size	(+)	(+)	+	(+)
Outside director ratio	+	+	-	(+)
Log Board size*Outside director	(+)	(+)	+	-
Firm size	-	-	-	(-)
Net Fixed Assets	(-)	(+)	(-)	-
Leverage	(-)	(-)	(-)	-
CAPEX	(+)	(+)	(-)	(+)
One-tiered management	(+)	(-)	(+)	(+)
Minority	(-)	-	(+)	-
Age	-	-	-	(-)
Volatility	+	+	+	(-)
Log Board size*Leverage	(-)	(+)	-	(+)
Log Board size*Cash lag1	+	(+)	(-)	(+)
Cash lag1	-	-	(+)	(-)
F-test	***	***		*
Hausman-test	***	***		

Repeating the fixed-effect regression models for Bulgaria, Table 17 shows the results. The most interesting result for Bulgaria is that the sign of Log Board size changes from positive to negative when the interaction term, Log Board size*Firm size, occurs in the regression equation. For all financial performance measurements, Log Board size has a positive effect, but if Log Board size*Firm size is included in the regression, the effect is negative while the sign of log Board size*Firm size is positive. This means that for larger firms, a larger board size has a positive impact on the firm financial performance. This is the opposite of what is observed for the full database. The increasing external[5] director ratio has a positive impact on firm financial performance except for TSR, and in the case of larger firms, the increasing size of the supervisory board with the firm size also has positive impact except for ROA. The

[5] In the regression models, the outside director ratio is the name of the regressor that refers to the external director.

regression variables such as Firm size, Net fixed assets, Leverage, Minority, Age, and Cash lag 1 have negative impact on financial performance, while the others variable positive impact. The positive sign of the variable Log Board size*Cash lag1 refers on the disciplining effect of larger cash on the management board. According to the F-test and Hausman-test, the Tobin's Q and market-to-book-value ratio models are the appropriate models. Overall, it can be concluded that larger management and supervisory boards are the most appropriate for Bulgarian companies.

Table 18 Signs of independent variables for the Czech Republic (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size without interaction term	-	(-)	-	(+)
Log Board size	(-)	(-)	(+)/(-)	(-)
Log Board size*Firm size	(+)	(+)	(-)	+
Outside director ratio	+	+	+	+
Log Board size*Outside director	(-)	(-)	(+)	-
Firm size	-	-	(-)	-
Net Fixed Assets	(+)	(-)	(-)	(+)
Leverage	+	+	-	(+)
CAPEX	+	(+)	(-)	+
One-tiered management	NO	NO	NO	NO
Minority	+	+	(+)	(+)
Age	(-)	-	(-)	(+)
Volatility	(-)	-	(-)	(+)
Log Board size*Leverage	(+)	(+)	(-)	(+)
Log Board size*Cash lag1	(+)	(-)	(+)	(+)
Cash lag1	(+)	(+)	(-)	(-)
F-test	***	***	**	**
Hausman-test	***	***		***

Table 18 shows the results for the Czech Republic. According to the results, board size has a negative impact on firm financial performance. But like for Bulgarian firms, the signs of the interaction term, Log Board size*Firm size, is positive which means that for larger firms, a larger board size has a positive impact on the firm financial performance. This could be interpreted as meaning that only a sufficiently large size board has a positive effect on firm financial performance. But this is not true for the TSR indicator, the stock market does not reward boards that are too large. External director ratio has positive impact on firm financial performance but it is not beneficial if the size of the supervisory board increases with the firm size. Also, for the Czech Republic, the signs of the coefficients of the main explanatory variables are opposite to those observed for the whole database. The variable called one-tiered management is omitted because for Czech companies there are only two-tiered corporate

governance structure exists. These results indicate that larger cash can have a disciplining effect on the management board. For the Czech companies the positive sign of the variable Log Board size*Cash lag1 refers on the disciplining effect of larger cash on the management board also. According to the F-test and Hausman-test, all models are the appropriate models. Although the Hausman-test for the TSR models is not significance. Overall, it can be concluded that the larger management board, but the smaller supervisory boards are the most appropriate for Czech companies.

Table 19 Signs of independent variables for Hungary (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size without interaction term	(+/-)	(+/-)	(-)	(+)
Log Board size	(-)	-	(-)	-
Log Board size*Firm size	(+)	(+)	(+)	+
Outside director ratio	(-)	-	(-)	(+)
Log Board size*Outside director	(+)	+	(+)	(+)
Firm size	-	-	(+)	-
Net Fixed Assets	(+)	+	(-)	(-)
Leverage	(+)	+	(+)	(+)
CAPEX	(+)	(+)	(+)	(-)
One-tiered management	+	+	(-)	-
Minority	(+)	-	(+)	(+)
Age	(-)	(-)	(-)	(-)
Volatility	(+)	(+)	+	(-)
Log Board size*Leverage	(+)	(+)	(+)	(+)
Log Board size*Cash lag1	(-)	(-)	(+)	(+)
Cash lag1	(+)	(+)	(-)	(+)
F-test	***	***	***	***
Hausman-test	***	***		***

For the Hungarian firms, Log Board size has a positive impact on financial performance, but for larger companies but for larger companies, a larger board size is preferable. This is the opposite result observed for the full database, but the same as for Bulgarian and Czech firms. External director ratio has a negative impact on financial performance except ROA but it is advantageous if the size of the supervisory board increases with the size of the company.

Like the Czech firms, the F-test and Hausman-test are significant at one percent which means all models are the appropriate models except the Hausman-test for TSR.

Table 20 Signs of independent variables for Poland (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size without interaction term	+/(-)	+/(-)	(-)	(-)
Log Board size	(+)	(+)	+	(+)
Log Board size*Firm size	-	-	-	-
Outside director ratio	-	-	(-)	(-)
Log Board size*Outside director	(-)	(-)	(+)	(+)
Firm size	-	-	(-)	+
Net Fixed Assets	(-)	(+)	-	-
Leverage	-	+	+	-
CAPEX	+	+	(+)	+
One-tiered management	NO	NO	NO	NO
Minority	(-)	(+)	(+/-)	+
Age	-	-	+	-
Volatility	(+)	(+/-)	(+)	(-)
Log Board size*Leverage	-	(-)	(-)	(+)
Log Board size*Cash lag1	+	+	(+)	(+)
Cash lag1	(-)	(-)	(-)	(-)
F-test	***	***	***	***
Hausman-test	***	***	***	***

For Polish firms, the sign of the most explanatory variable is equal to the sign of the variables in the full database. This can be explained by the fact that Polish companies have the largest share in the sample. For Tobin's Q such as dependent variable, form the 2278 observations 1705 observations are from Polish firms which is almost 75 percent. The F-test and Hausman-test are significant at one percent which means all models are the appropriate models. For Polish firms, the conclusions are like those for the whole database, the increasing Board size has a positive effect on financial performance, but a large increase in Board size in proportion to firm size does not have a positive effect.

Table 21 Signs of independent variables for Romania (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size without interaction term	(+)	(+)	(-)	(+)
Log Board size	(+/-)	(-)	(-)	(+)
Log Board size*Firm size	(+)	(+)	(+)	(-)
Outside director ratio	(+)	(+)	(+)	(+)
Log Board size*Outside director	(+)	(+)	(+)	(-)
Firm size	(+)	(+)	(-)	(+)

Net Fixed Assets	(-)	(-)	(-)	(-)
Leverage	(+)	(-)	(+)	+
CAPEX	(-)	(-)	(+)	(+)
One-tiered management	(+)	(+)	(+)	(+)
Minority	(-)	(-)	(+)	(+)
Age	(-)	-	(-)	(-)
Volatility	(+)	(+)	(+)	+
Log Board size*Leverage	(-)	(-)	(+)	(+)
Log Board size*Cash lag1	(+)	(+)	(-)	(-)
Cash lag1	(-)	(-)	(+)	(+)
F-test			***	***
Hausman-test				***

For Romanian companies, according to the F-test only two model, TSR and ROA as dependent variable, are significant. More precisely, the regression coefficients are significantly different from zero. And the Hausman test confirms that the fixed effects model is a better than the random effects model but only for ROA models. However, it can also be said that the number of observations for Romanian firms is low, which may have contributed to these results. In most models, the regression coefficients are not significant, which can be explained by the low number of observations, in the tests. The signs of the regression coefficients suggest that Romanian firms are more likely to have large management boards and supervisory boards

Table 22 Signs of independent variables for Slovakia (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Log Board size without interaction term	(+)	(+)	(+)	+
Log Board size	(+)	(-)	(-)	(-)
Log Board size*Firm size	(+)	(+)	(-)	(+)
Outside director ratio	(+)	(+)	(-)	(+/-)
Log Board size*Outside director	(+)	(+)	(+)	+
Firm size	(-)	(+/-)	(+)	(+)
Net Fixed Assets	(-)	-	(+)	(+/-)
Leverage	(-)	(+)	(-)	(-)
CAPEX	(+/-)	(+)	(+)	(+)
One-tiered management	NO	NO	NO	NO
Minority	(-)	(+)	(-)	(+)
Age	(-)	(-)	(+)	(+)
Volatility	(-)	(+)	(-)	(-)
Log Board size*Leverage	(-)	(-)	+	(-)
Log Board size*Cash lag1	(+)	(+)	(-)	(+)
Cash lag1	(-)	(-)	(+)	(-)
F-test		***		
Hausman-test				

For Romanian companies, according to the F-test only one model, market-to-book-value ratio as dependent variable, is significant. More precisely, the regression coefficients are significantly different from zero. And the Hausman test does not confirm that any fixed effects model would be better model than the random effects models. But the signs of the regression coefficients suggest the same as for Romanian firms, with large management boards and supervisory boards are favorable.

Table 23 Summary for fixed effects models (Source: own edition)

	Full	Bulgaria	Czech	Hungary	Poland	Romania	Slovakia
Log Board size without interaction term	+	+	(-)/-	(+)/(-)	(-)	(+)	(+)/+
Log Board size	+/(+)	(-)	(-)	(-)/-	(+)/+	(+)/(-)	(-)
Log Board size*Firm size	-	(+)	(+)/+	(+)/+	-	(+)	(+)
Outside director ratio	-/(-)	+/(+)	+	(-)/-	-/(-)	(+)	(+)
Log Board size*Outside director	(-)	(+)/+	(-)/-	(+)/+	(+)/(-)	(+)	(+)/+
Log Board size*Cash lag1	+/(+)	(+)/+	(+)	(+)/(-)	+/(+)	(+)/(-)	(+)

The Table 23 shows the most typical signs of the fixed effects regressions models. Brackets indicate when the effect is not significant. For full database and Bulgaria, board size has significant positive impact on financial performance, but if board size, and the interaction term between board size and firm size are included together in a regression models, the effects are not clear. For the entire database, board size has rather significant positive impact on financial performance, but the negative sign of the interaction term indicates that for larger firms the increasing board size is not favorable. The same effect is observed for only Polish firms while for Bulgarian, Czech, Hungarian, and Slovak firms the effect is the opposite. This means that larger management boards are favorable. This is true for companies in all countries except Poland. For full database, outside director ratio has rather significant negative impact on financial performance, and this effect can be observed for Hungarian and Polish firms also. However, for Bulgarian, Czech, Romanian, and Slovak companies, this effect is the opposite. For the whole database, it seems that larger supervisory boards are not favorable, this is indicated the negative sign of the interactive term between board size and outside director ratio. The same negative effect is true for Czech firms also, for Bulgarian, Hungarian, Romanian,

and Slovak firms this effect is positive or significant positive. For these four countries, the larger supervisory boards are favorable. For Polish firms this effect is not clear. The (+)/(-) signs together indicates that the effect is not clear. This may be due to the low number of observations for certain countries and models. The disciplining effect of larger cash can be observed for almost all countries. The positive sign of the interaction term between management board size and cash is true for Bulgarian, Czech, Polish, and Slovak companies. For Hungarian and Romanian firms this effect is not clear.

4.6 Dynamic panel regression

4.6.1 Dynamic panel regression results for the full database

Results from the dynamic panel regression models are similar to the fixed effects results: the same three variables have the same impact on firm performance in each firm performance measure.

In these models, the management board has a significant positive impact on firm market and operational performance, while the interaction term between management board size and firm size has a significant negative impact. The external director ratio has a significant positive impact on firm performance in case of Tobin's Q and the Market-to-book ratio and positive in case of total shareholder return and ROA. The effects of variables in the models with Tobin's Q and MB are the same. Firm size, CAPEX and one-tiered management have a significant positive impact on firm performance, and so does firm age. The first lag of cash has a significant negative impact, while the management board size multiplied by firm size interaction term has a significant positive impact on firm performance. The negative sign of the first lag of TSR explains the phenomenon of the negative autocorrelation of share returns (Table 8).

Table 24 Signs of the independent variables (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	+	+	-	+
Log Board size	+	+	+	+
Log Board size*Firm size	-	-	-	-
Outside director ratio	+	+	(+)	(+)
Log Board size*Outside director	(-)	(-)	(-)	(+)
Firm size	-	-	-	+
Net Fixed Assets	(-)	(-)	(+)	-
Leverage	(-)	(-)	+	-
CAPEX	-	-	-	+
One-tiered management	-	-	(+)	-

Minority	(-)	(-)	(-)	+
Age	+	+	+	(-)
Volatility	(-)	(-)	(+)	(+)
Log Board size*Leverage	(-)	(-)	+	+
Log Board size*Cash lag1	+	+	(+)	(+)
Cash lag1	-	-	(-)	(-)

Comparing fixed effect models to dynamic panel regression models, it can be determined that management board size has a significant positive impact on firm performance, but if this variable is interacted with firm size, this effect is significantly negative. The impact of firm size on firm performance is the same in fixed effect and in dynamic panel regression models. Firm size has a significant negative impact on market performance, but positive impact on operational performance. However, firm age has a different effect: according to the dynamic regression models, it has a significant positive impact on market performance, the fixed effects models show a negative effect.

Testing the hypotheses, H1 is not supported, but H2 is. Controlling individual firm characteristics in firm fixed effects or in dynamic panel regression models, the impact of management board size on firm market performance is the opposite as the pairwise correlations would indicate. In the case of firm operational measures, this individual firm characteristic does not matter. H3 is only supported in the dynamic regression models, but H4 is rejected. Moreover, the outside director ratio has a positive impact on firm operational performance according to both regression techniques. H5 is supported by both regression techniques.

Table 25 – 28 show the results of the GMM type dynamical regression models for the full database.

Table 25 GMM-type dynamic panel regression models, dependent variable: Tobin's Q (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.235***	0.235***	0.235***	0.234***	0.234***	0.233***
	(0.0207)	(0.0207)	(0.0207)	(0.0207)	(0.0208)	(0.0208)
Log Board size	-0.0114	0.157	0.645***	0.919**	0.650***	0.521**
	(0.0635)	(0.106)	(0.224)	(0.436)	(0.225)	(0.227)
Log Board size*Firm size			-0.105**	-0.117**	-0.101**	-0.103**
			(0.0423)	(0.0455)	(0.0430)	(0.0422)
Outside director ratio		0.868**	0.895**	1.300*	0.906**	0.903**
		(0.438)	(0.438)	(0.703)	(0.439)	(0.438)
Log Board size*Outside dir.r.				-0.297		
				(0.404)		
Firm size	-0.618***	-0.617***	-0.491***	-0.479***	-0.496***	-0.491***
	(0.0408)	(0.0409)	(0.0650)	(0.0671)	(0.0661)	(0.0654)
Net Fixed Assets	-0.0311	-0.0255	-0.0180	-0.0203	-0.0241	-0.0565
	(0.211)	(0.211)	(0.211)	(0.211)	(0.211)	(0.211)
Leverage	-0.159	-0.171	-0.184	-0.182	-0.0346	-0.193
	(0.195)	(0.195)	(0.195)	(0.195)	(0.443)	(0.195)
CAPEX	-0.824**	-0.814**	-0.813**	-0.813**	-0.808**	-0.793**
	(0.325)	(0.325)	(0.325)	(0.325)	(0.325)	(0.330)
One-tiered management	-0.607***	-0.593***	-0.614***	-0.647***	-0.613***	-0.566***
	(0.199)	(0.199)	(0.199)	(0.204)	(0.199)	(0.199)
Minority	-0.112	-0.110	-0.0923	-0.0978	-0.0897	-0.0974
	(0.255)	(0.255)	(0.255)	(0.255)	(0.255)	(0.256)
Age	0.0387***	0.0388***	0.0390***	0.0392***	0.0390***	0.0379***
	(0.00516)	(0.00517)	(0.00516)	(0.00517)	(0.00516)	(0.00517)
Volatility	-0.000340	-0.000378	-0.000403	-0.000372	-0.000381	-0.000446
	(0.00153)	(0.00153)	(0.00153)	(0.00153)	(0.00153)	(0.00153)
Log Board size*Leverage					-0.126	
					(0.336)	
Log Board size*Cash lag1						1.506***
						(0.454)
Cash lag1						-1.530**
						(0.602)
Constant	3.694***	2.949***	2.380***	2.026***	2.375***	2.512***
	(0.197)	(0.425)	(0.485)	(0.684)	(0.485)	(0.487)
Observations	2,098	2,098	2,098	2,098	2,098	2,098
Number of Index	294	294	294	294	294	294
Wald Chi-squared	675.48***	679.32***	685.59***	685.62***	685.65***	701.60***

Standard errors in parentheses and corrected for clustering at firm level. ***, **, * indicate significance at the 1%, 5% and 10% level. Year fixed effects are not reported.

Table 26 GMM-type dynamic panel regression models, dependent variable: Market-to-Book ratio (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.274***	0.273***	0.274***	0.277***	0.280***	0.269***
	(0.0244)	(0.0244)	(0.0243)	(0.0247)	(0.0246)	(0.0247)
Log Board size	0.0301***	0.0506***	0.144***	0.0908	0.134***	0.137***
	(0.0108)	(0.0181)	(0.0375)	(0.0745)	(0.0376)	(0.0380)
Log Board size*Firm size			-0.0201***	-0.0175**	-0.0220***	-0.0200***
			(0.00703)	(0.00756)	(0.00714)	(0.00701)
Outside director ratio		0.111	0.120	0.0419	0.110	0.119
		(0.0781)	(0.0781)	(0.124)	(0.0782)	(0.0781)
Log Board size*Outside dir.r.				0.0571		
				(0.0703)		
Firm size	0.0107	0.0104	0.0345***	0.0316***	0.0395***	0.0337***
	(0.00810)	(0.00811)	(0.0117)	(0.0121)	(0.0121)	(0.0117)
Net Fixed Assets	-0.200***	-0.202***	-0.200***	-0.198***	-0.203***	-0.202***
	(0.0361)	(0.0361)	(0.0361)	(0.0362)	(0.0360)	(0.0363)
Leverage	-0.0750**	-0.0746**	-0.0794**	-0.0794**	-0.231***	-0.0774**
	(0.0330)	(0.0330)	(0.0330)	(0.0330)	(0.0768)	(0.0330)
CAPEX	0.146***	0.147***	0.146***	0.147***	0.153***	0.150***
	(0.0543)	(0.0543)	(0.0543)	(0.0543)	(0.0542)	(0.0551)
One-tiered management	-0.0735*	-0.0775*	-0.0735*	-0.0707*	-0.0776*	-0.0749*
	(0.0415)	(0.0417)	(0.0417)	(0.0421)	(0.0417)	(0.0416)
Minority	0.0961**	0.0949**	0.0999**	0.101**	0.0945**	0.100**
	(0.0451)	(0.0451)	(0.0451)	(0.0451)	(0.0451)	(0.0450)
Age	-2.03e-05	3.64e-05	2.28e-05	2.50e-05	-6.82e-05	-2.46e-05
	(0.000993)	(0.000994)	(0.000992)	(0.000994)	(0.000994)	(0.000994)
Volatility	9.53e-05	8.78e-05	8.36e-05	8.82e-05	9.32e-05	8.07e-05
	(0.000267)	(0.000267)	(0.000267)	(0.000267)	(0.000266)	(0.000266)
Log Board size*Leverage					0.125**	
					(0.0569)	
Log Board size*Cash lag1						0.0851
						(0.0777)
Cash lag1						-0.0912
						(0.103)
Constant	0.0191	-0.0713	-0.184**	-0.114	-0.174**	-0.171**
	(0.0356)	(0.0727)	(0.0833)	(0.118)	(0.0833)	(0.0840)
Observations	2,130	2,128	2,128	2,128	2,128	2,128
Number of Index	295	295	295	295	295	295
Wald Chi-squared test	206.96***	208.83***	216.39***	215.95***	220.30***	217.04***

Table 27 GMM-type dynamic panel regression models, dependent variable: TSR)Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of TSR	-0.0700***	-0.0706***	-0.0736***	-0.0739***	-0.0716***	-0.0717***
	(0.0194)	(0.0194)	(0.0194)	(0.0194)	(0.0195)	(0.0195)
Log Board size	-0.0744	-0.0257	1.092***	1.496**	1.027***	1.039***
	(0.0930)	(0.154)	(0.319)	(0.651)	(0.321)	(0.329)
Log Board size*Firm size			-0.238***	-0.256***	-0.252***	-0.228***
			(0.0595)	(0.0651)	(0.0604)	(0.0603)
Outside director ratio		0.261	0.328	0.929	0.232	0.450
		(0.653)	(0.652)	(1.056)	(0.655)	(0.659)
Log Board size*Outside dir.r.				-0.434		
				(0.599)		
Firm size	-0.0744	-0.0760	0.203**	0.223**	0.224**	0.188**
	(0.0542)	(0.0543)	(0.0887)	(0.0937)	(0.0899)	(0.0904)
Net Fixed Assets	0.183	0.178	0.247	0.242	0.243	0.218
	(0.286)	(0.286)	(0.286)	(0.286)	(0.286)	(0.290)
Leverage	0.543*	0.542*	0.506*	0.509*	-0.423	0.495*
	(0.281)	(0.281)	(0.281)	(0.281)	(0.629)	(0.283)
CAPEX	-1.878***	-1.878***	-1.873***	-1.865***	-1.842***	-1.887***
	(0.477)	(0.477)	(0.476)	(0.476)	(0.477)	(0.490)
One-tiered management	0.191	0.205	0.133	0.0656	0.113	0.208
	(0.275)	(0.275)	(0.275)	(0.287)	(0.275)	(0.280)
Minority	-0.189	-0.195	-0.158	-0.166	-0.184	-0.156
	(0.371)	(0.371)	(0.370)	(0.370)	(0.371)	(0.376)
Age	0.0106	0.0106	0.0134*	0.0138*	0.0137*	0.0115
	(0.00749)	(0.00748)	(0.00749)	(0.00752)	(0.00750)	(0.00757)
Volatility	0.00115	0.00112	0.000987	0.00108	0.000984	0.000972
	(0.00222)	(0.00222)	(0.00222)	(0.00222)	(0.00222)	(0.00222)
Log Board size*Leverage					0.771*	
					(0.466)	
Log Board size*Cash lag1						0.407
						(0.696)
Cash lag1						-0.762
						(0.943)
Constant	0.424*	0.214	-1.102*	-1.641	-0.979	-1.053
	(0.236)	(0.576)	(0.667)	(1.008)	(0.671)	(0.683)
Observations	2,069	2,069	2,069	2,069	2,069	2,048
Number of Index	297	297	297	297	297	295
Wald Chi-squared test	37.32***	37.64***	54.11***	54.46***	56.34***	53.70***

Table 28 GMM-type dynamic panel regression models, dependent variable: ROA (Source: own edition)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.274***	0.273***	0.274***	0.277***	0.280***	0.269***
	(0.0244)	(0.0244)	(0.0243)	(0.0247)	(0.0246)	(0.0247)
Log Board size	0.0301***	0.0506***	0.144***	0.0908	0.134***	0.137***
	(0.0108)	(0.0181)	(0.0375)	(0.0745)	(0.0376)	(0.0380)
Log Board size*Firm size			-0.0201***	-0.0175**	-0.0220***	-0.0200***
			(0.00703)	(0.00756)	(0.00714)	(0.00701)
Outside director ratio		0.111	0.120	0.0419	0.110	0.119
		(0.0781)	(0.0781)	(0.124)	(0.0782)	(0.0781)
Log Board size*Outside dir.r.				0.0571		
				(0.0703)		
Firm size	0.0107	0.0104	0.0345***	0.0316***	0.0395***	0.0337***
	(0.00810)	(0.00811)	(0.0117)	(0.0121)	(0.0121)	(0.0117)
Net Fixed Assets	-0.200***	-0.202***	-0.200***	-0.198***	-0.203***	-0.202***
	(0.0361)	(0.0361)	(0.0361)	(0.0362)	(0.0360)	(0.0363)
Leverage	-0.0750**	-0.0746**	-0.0794**	-0.0794**	-0.231***	-0.0774**
	(0.0330)	(0.0330)	(0.0330)	(0.0330)	(0.0768)	(0.0330)
CAPEX	0.146***	0.147***	0.146***	0.147***	0.153***	0.150***
	(0.0543)	(0.0543)	(0.0543)	(0.0543)	(0.0542)	(0.0551)
One-tiered management	-0.0735*	-0.0775*	-0.0735*	-0.0707*	-0.0776*	-0.0749*
	(0.0415)	(0.0417)	(0.0417)	(0.0421)	(0.0417)	(0.0416)
Minority	0.0961**	0.0949**	0.0999**	0.101**	0.0945**	0.100**
	(0.0451)	(0.0451)	(0.0451)	(0.0451)	(0.0451)	(0.0450)
Age	-2.03e-05	3.64e-05	2.28e-05	2.50e-05	-6.82e-05	-2.46e-05
	(0.000993)	(0.000994)	(0.000992)	(0.000994)	(0.000994)	(0.000994)
Volatility	9.53e-05	8.78e-05	8.36e-05	8.82e-05	9.32e-05	8.07e-05
	(0.000267)	(0.000267)	(0.000267)	(0.000267)	(0.000266)	(0.000266)
Log Board size*Leverage					0.125**	
					(0.0569)	
Log Board size*Cash lag1						0.0851
						(0.0777)
Cash lag1						-0.0912
						(0.103)
Constant	0.0191	-0.0713	-0.184**	-0.114	-0.174**	-0.171**
	(0.0356)	(0.0727)	(0.0833)	(0.118)	(0.0833)	(0.0840)
Observations	2,130	2,128	2,128	2,128	2,128	2,128
Number of Index	295	295	295	295	295	295
Wald chi-squared	206.96***	208.83***	216.39***	215.95***	220.30***	217.04***

4.6.2 Dynamical panel regression for countries

As in the case of fixed-effects panel regression models, all regressions are repeated for dynamic panel regressions for all the six countries. Table 29 - Table 34 show the signs of the regression coefficients. The signs are signs of regression coefficients, the brackets indicate non-significant coefficients. If a variable occurs in more than one regression model, the signs refer to the most typical signs. Table 76 - Table 99 show the detailed results in the appendix.

Table 29 Signs of the independent variables for Bulgaria (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	+	+	-	+
Log Board size without interaction term	(+)	(+)	+	(-)
Log Board size	+	+	(+)	-
Log Board size*Firm size	-	-	(-)	+
Outside director ratio	(+)	(+)	+/(+)	(+)
Log Board size*Outside director	(-)	(+)	(+)	(-)
Firm size	-/+	(+)/-	(+)/(-)	-
Net Fixed Assets	-	-	(-)	-
Leverage	(+)	(+)	(-)	-
CAPEX	+	+	(-)	(+)
One-tiered management	(-)	(-)	(-)	(-)
Minority	(-)	-	(+)	-
Age	(+)	(+)	+	(+)
Volatility	(+)	(+)	+	(-)
Log Board size*Leverage	+	+	(-)	(-)
Log Board size*Cash lag1	(+)	(+)	(-)	(-)
Cash lag1	(-)	(-)	(+)	(+)
Wald chi-squared	***	***	***	**/***

For Bulgarian companies, the results are similar to the results of the full database. For Tobin's Q, market-to-book-value ratio, and total shareholder return as dependent variable, board size has a positive impact on financial performance but for larger firms, the increasing size of the board has a negative impact. If the size of the company increases the increase in board size is not necessary. It can be said that the market does not reward boards that are too large. However, in the case of ROA, the larger boards are preferable. The increasing proportion of external directors is also beneficial. For Bulgarian firms, when log Board size and the interaction term, log Board size*Firm size, are included together in a regression model, Board size has a significant positive impact on financial performance, while the interaction term is negative. This is true for the Tobin's and the market-to-book-value ratio models. According to these results, it is beneficial when the board size increases but for large firms, a board that grows

with the firm size is no longer. However, in the case of ROA this effect is the opposite. According to the Wald chi-squared results, all models are appropriate.

Table 30 Signs of the independent variables for the Czech Republic (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	+	+	-	+
Log Board size without interaction term	(-)	(-)	-	(+)
Log Board size	(+)	(+)	+	(+)
Log Board size*Firm size	(-)	(-)/-	-	(+)
Outside director ratio	(+)	+	(+)	(+)
Log Board size*Outside director	(-)	-	(-)	(-)/-
Firm size	(+)	+	+	-
Net Fixed Assets	-	-	(-)	-
Leverage	+	+	(+)	(-)
CAPEX	(-)	(-)	(+)	(+)
One-tiered management	NO	NO	NO	NO
Minority	(+)	+	(-)/(+)	(-)
Age	(+)	(+)	(+)	(+)
Volatility	(-)	-	(+)	(+)
Log Board size*Leverage	(-)	(-)	(-)	(-)
Log Board size*Cash lag1	(+)	(-)	+	(+)
Cash lag1	(-)	(+)	-	-
Wald chi-squared	***	***	***	***

For Czech companies, according to the Wald chi-squared results, all models are appropriate, but the variables of Log Board size and Log Board size*Firm size are only significant for TSR. When log Board size and the interaction term, log Board size*Firm size, are included together in a regression model, Board size has a significant positive impact on financial performance, while the interactive a negative one but for ROA this effect is the opposite. This effect is the same for Bulgarian firms.

Table 31 Signs of the independent variables for the Hungary (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	+	+	(-)	(+)
Log Board size without interaction term	(+)	(+)	(-)	(+)/(-)
Log Board size	(-)	(-)	(+)	(-)
Log Board size*Firm size	(+)	(+)	(-)	+
Outside director ratio	(-)	(+)/(-)	-/(-)	+
Log Board size*Outside director	(+)	(+)	(+)	(+)
Firm size	-	-	(+)/(-)	-
Net Fixed Assets	+	+	(+)	(-)
Leverage	(-)	(-)	(-)	(+)
CAPEX	(-)	(-)	(+)	(+)

One-tiered management	(-)	(-)	(-)	-
Minority	(-)	(+)	+	(+)
Age	+	+	(+)	(-)
Volatility	-/(-)	-	(-)	(-)
Log Board size*Leverage	(+)	+	(-)	(-)
Log Board size*Cash lag1	(-)	-	(+)	(+)
Cash lag1	+	+	(-)	(-)
Wald chi-squared	***	***	***	***

For Hungarian firms, board size has a positive impact on firm performance but if board size and the interactive term, board size times firm size, are included together in the regression model, the positive sign of the coefficient of the interaction term suggest that for larger firms, larger board are favourable. Although this is not true for total shareholder return. The positive sign of the coefficient of the Log Board size*Outside director variable suggests that increasing outside director ratio is beneficial if it increases with the size of the company. For Hungarian companies, according to the Wald chi-squared results, all models are appropriate.

Table 32 Signs of the independent variables for the Poland (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	+	+	-	+
Log Board size without interaction term	(+)	+/(+)	(-)	+
Log Board size	+	+/(+)	+	+
Log Board size*Firm size	-	-	-	-
Outside director ratio	(+)	(-)	(-)	(+)
Log Board size*Outside director	(-)	(+)	(+)	(+)
Firm size	-	-	+	+
Net Fixed Assets	(+)	-	+	-
Leverage	(-)	+	+	-
CAPEX	-	-	-	+
One-tiered management	NO	NO	NO	NO
Minority	(-)	(-)	(-)	+
Age	+	+	(-)	(-)
Volatility	(-)	(-)	(+)	(+)
Log Board size*Leverage	(-)	(+)	+	(+)
Log Board size*Cash lag1	+	+	(-)	(+)
Cash lag1	-	-	(-)	(-)
Wald chi-squared	***	***	***	***

For polish firms, most regression coefficients have the same sign as in the full database. Board size has a positive impact on financial performance, but the negative sign of the Log Board size*Firm size interaction term suggests that for larger firms, the increasing board size has a negative impact. For Polish firms, these effects are significant. The sign of the external director ratio variable is not significant in either model, but the positive sign of the Log Board

size*Outside director interactive term suggests that that increasing outside director ratio is beneficial if it increases with the size of the company.

Table 33 Signs of the independent variables for the Romania (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	+	+	(-)	+
Log Board size without interaction term	(-)	(+)	+	+
Log Board size	(-)	(-)	(+)	+
Log Board size*Firm size	(+)	(+)	(-)	-
Outside director ratio	(+)	(-)	(+)	(-)
Log Board size*Outside director	(-)	(+)	(-)	(-)
Firm size	(-)	(-)	(+)	+
Net Fixed Assets	(+)	(-)	(-)	-
Leverage	(+)	(-)	(+)	+
CAPEX	(-)	(-)	(+)	+
One-tiered management	(+)	-/(-)	(+)	(-)
Minority	(+)	(-)	(-)	(+)
Age	(-)	(+)	(+)	(+)
Volatility	(-)	(-)	(-)	+
Log Board size*Leverage	(+)	(-)	(-)	(+)
Log Board size*Cash lag1	+	(+)	(-)	(-)
Cash lag1	-	(-)	(+)	(+)
Wald chi-squared	***	**		***

For Romanian firms, the effects of regression variables are not clear. Board size has a positive impact on financial performance using market-to-book-value ratio, TSR, or ROA as dependent variable. However, if Log Board size and the interaction term, Log Board size*Firm size, are included together in a regression model, for Tobin' Q and MB ratio board size has a negative impact on financial performance, but this turns positive if board size increases with firm size. But for TSR and ROA models, these effects are the opposite. The same can be said for the outside director variable. Increasing external director ratio has a positive impact on financial performance for Tobin' Q and TSR models, but negative for MB ratio and ROA models. The sign of the Log Board size*Outside director interaction term is rather negative. This means that for larger firms the increasing supervisory board is not favourable. According to the Wald chi-square results, all models are appropriate except TSR model.

Table 34 Signs of the independent variables for the Slovakia (Source: own edition)

	Tobin's Q	MB	TSR	ROA
Lag 1 of dependent variables	(+)	-	(-)	(+)
Log Board size without interaction term	(-)	(+)	(-)	(-)
Log Board size	(+)	(+)	(-)	(-)
Log Board size*Firm size	(-)	(-)	(+)	(+)
Outside director ratio	(+)/(-)	(-)	(+)/(-)	(-)
Log Board size*Outside director	(+)	(-)	(-)	(-)
Firm size	(+)	(+)	(-)	(+)/(-)
Net Fixed Assets	(+)	(+)	(+)	(-)
Leverage	(-)	(+)	(-)	(+)
CAPEX	(-)	(-)	(+)	(+)
One-tiered management	NO	NO	NO	NO
Minority	(+)	+	(-)	(-)
Age	(+)	(-)	+	(+)
Volatility	(+)/(-)	(+)	(-)	(-)
Log Board size*Leverage	+	(-)	+	(-)
Log Board size*Cash lag1	(+)	(+)	(-)	(+)
Cash lag1	(-)	(+)	(+)	(-)
Wald chi-squared		***	**	

For Slovak firms, similar findings can be made as for Romanian firms, the effects of regression variables are not clear. Board size rather has a negative impact on financial performance but when Log Board size and the interaction term, Log Board size*Firm size, are included together in a regression model, for Tobin' Q and MB ratio board size has positive impact on financial performance, but this turns negative if board size increases with firm size. But for TSR and ROA models, these effects are the opposite. The same can be said for the external director variable but it seems that outside director ratio rather has a negative impact on financial performance, and it is not beneficiary if the outside director ratio increases with firm size. The too large supervisory board is not favourable.

Table 35 Summary for GMM models (Source: own edition)

	Full	Bulgaria	Czech	Hungary	Poland	Romania	Slovakia
Log Board size without interaction term	+/(-)	(+)	(-)	(+)	(+)	+	(-)
Log Board size	+	+	(+)	(-)	+	(+)/(-)	(+)/(-)
Log Board size*Firm size	-	-	(-)	(+)	-	(+)/(-)	(+)/(-)

Outside director ratio	+	(+)	(+)	(-)	(+)/(-)	(+)/(-)	(-)
Log Board size*Outside director	(-)	(+)/(-)	(-)	(+)	(+)	(+)/(-)	(-)
Log Board size*Cash lag1	+/(+)	(+)/(-)	(+)	(+)/-	+	+/(-)	(+)

The Table 35 shows the most typical signs of the regressions coefficients is all models. For the full database board size has a significant positive impact on financial performance. Brackets indicate when the effect is not significant. More precisely, for market-to-book-value ratio and ROA as dependent variable, Log Board size without interaction term has significant positive impact, for TSR model negative, while for Tobin' Q this effect is not clear. When Log Board size and the interaction term, Log Board size*Firm size are included together is a regression model, board size has significant positive impact on financial performance, but this effect is significant negative which means for larger firms the increasing board size is not beneficiary. Outside director ratio also has significant positive impact for financial performance but for larger firms, the increasing outside director ratio, the increasing supervisory board size also not favourable. The positive effect of board size is observed for Bulgarian, Hungarian, Polish, and Romanian firms but significant effect only for Romanian firms. For Bulgarian, Czech, Polish firms this effect is still positive if the interaction term, Log Board size*Firm size, is also included in the regression model. The significant positive effect is true for Bulgarian and Polish companies. Outside director ratio has positive impact on financial performance, for Hungarian and Polish firms Log Board size*Outside director interactive term has positive impact. This mean that for Bulgarian and Czech firms rather smaller supervisory boards are favourable but for Hungarian and Polish firms rather larger. The disciplining effect of larger cash can be observed for almost all countries. The positive sign of the interaction term between management board size and cash is true for Czech, Polish, and Slovak companies. For the full database this effect is positive, for Tobin's Q model is even significant also. These results indicate that larger cash can have a disciplining effect on the management board. The (+)/(-) signs together indicates that the effect is not clear. This may be due to the low number of observations for certain countries and models.

4.7 Conclusions

The paper has analyzed the relationship between corporate governance characteristics and firm performance measures. In two-tiered corporate governance systems, there are two boards, the management board, consisting of the directors or top managers of the company, and the supervisory board, comprising individuals independent from the company. The management board is responsible for operating activities and strategic decision-making, and the supervisory board for monitoring the management board. Therefore, it can be a credible assumption that the sizes of these boards can have an impact on firm performance. Based on the results, the management board has a significant positive impact on both market and operational performance measures, but this effect is limited, which is shown by the significant negative sign of the interaction term between board size and firm size. Firm performance cannot be improved if management board size increases along with firm size. The external director ratio also has a positive impact on a firm's performance measures in dynamic regression models and this effect is significant for Tobin's Q and the market-to-book value ratio. The interaction term between management board size and cash has the same effect on firm performance as the external director ratio. These results indicate that larger cash can have a disciplining effect on the management board.

Comparing the results of fixed effects and dynamical panel regression models for the entire database, the sign of these five variables is the same except outside director ratio. In fixed effects models, the most typical signs of outside director ratio are negative, while in dynamical panel regression models, these signs are significantly positive. According to these results, for the complete database, it can be claimed that management board size has a significant positive impact on financial performance but for larger firms increasing the management board size is not favorable. External director ratio has a significant positive impact on financial performance, but for larger firms with increasing external director ratio and the larger supervisory board are not favorable. The disciplining effect of more considerable cash is also confirmed with fixed and dynamical panel regression models.

Comparing fixed-effect and dynamic panel regression results for countries for Bulgaria and Poland, the management board size has a significant positive impact on financial performance, but for larger firms increasing board size has a significant negative impact. For the Czech Republic, the effects are similar but not significant. For Hungary, the effects are the opposite, and the larger management boards positively impact financial performance. For Bulgaria and Poland, the outside director ratio has a positive impact on financial performance, and for larger

firms, the increasing outside director ratio also has a positive impact. Larger supervisory boards are preferable, and this is true for Hungary too. The smaller supervisory boards are favorable for the Czech Republic and Slovakia. However, for Romania and Slovakia, the results could be more precise. The disciplining effect of more significant cash is confirmed with fixed and dynamical panel regression models for the six CEE countries.

5 The impact of board composition on firm financial performance[6]

5.1 Introduction

This chapter is based on our (Havran/Primecz/Lakatos, 2020) study investigates the impacts of corporate board gender diversity on firm performance in six Central and Eastern European post socialist EU member countries (Poland, Czech Republic, Slovakia, Hungary, Romania, and Bulgaria). We discuss the post socialist legacy and its impact on gender order in organizations. We find that the higher gender diversity of management boards enhances firm performance despite the fact that the numbers of female top managers do not reach the critical mass on the boards. By exploring the drivers of the placements in the management board, we also find that glass cliff is an existing phenomenon in the region.

Public discussions about women in management and particularly about women on corporate boards have intensified. Popular management publications often cover the issue of female leadership and women on corporate boards. Companies introduce diversity policies; women are encouraged to apply for managerial positions. Important market actors, for example consultants (McKinsey 2012, 2016) and non-profit organizations (Catalyst Inc. 2006) argue for more women in management. Based on practical evidence, the European Union urges its member states to introduce quota regulations in their national legislation (Mensi-Klarbach/Seierstad 2020). The academic debate about this issue has not been settled, and it would seem that the solution depends upon the regional context. With collecting and evaluating the regional board membership data of top listed companies first, our study proposes a statistical-based macro-perspective research to draw attention to the major cases of corporate

[6] *Some part of this chapter is based on Havran, Dániel – Primecz, Henriett – Lakatos, Zsolt (2020): Does female presence on corporate boards impact firm performance? Evidence from Central Eastern Europe that has been published in Journal of East European Management Studies (JEEMS) - Special Issue, 1. Edition*

board gender diversity in six Central and Eastern European countries (Poland, Czech Republic, Slovakia, Hungary, Romania, and Bulgaria).

Central and Eastern Europe is unique in terms of women in management and female employment. After the Second World War, these countries were under socialist regime, and as part of the ideology, equality between the genders was on the agenda from the late 1940s. Socialist countries were planned economies, and top corporate leaders were appointed by political leaders, while ideology (so-called Marxist feminism, Calás/Smircich 1996, 2006) influenced the selection of corporate leaders and gender relations. Beyond this, policies were introduced to avoid unemployment through a planned economy, which in practice meant that everybody, including women, was employed, and consequently women had a higher proportion of economic participation compared to their Western counterparts (Frey 1997).

While sociology literature (Gradskova/Asztalos-Morell 2018) in Central-Eastern Europe has extended research on this unconventional line of development of gender relations, organizational scholars and management practitioners have less information and understanding of the gender process and their consequences. Gender research and education is largely separate from business schools in the region, while cross-fertilization of ideas is less frequent as in Western business schools. At the same time, we cannot assume that changes in gender relations follow the same patterns as in the West, since histories differed, and gender relations were significantly affected by these differences. In agreement with Rybnikova (2018), gender literature in CEE is relatively silent about organizational and management consequences of the unique gender relations, and Fodor, Glass and Nagy (2018) are one of the exceptions who provide detailed and comprehensive analysis of the organizational consequences of legacy of socialist render regime.

It is highlighted by Fodor et al. (2018) that Hungarian businesswomen, who became relatively successful female leaders of multinational corporations operating in the region, are less aware of the historical roots of gender equality than they are informed about women supporting initiatives derived from the headquarters. These gender equalizing endeavours, that are built on transnational business feminism, are considered to be more advanced than local gender relations. While it is true that women and men who are active in contemporary businesses might be more aware of gender relations, as the debate on gender issues are more present in business schools and business world deriving from the West, this ahistorical account on gender issues should be supplemented with facts and insights.

Sociological research (Gradskova/Asztalos-Morell 2018) has proved that equality between the genders in socialist countries had controversial consequences. The forced emancipation described above was partly successful, as Fodor (2004) proves in her study that experienced and educated women were available in a management elite pool when the market economy started to operate in these countries around 1990. Fodor (2004) also stresses that women might have better career prospects in the region than in many Western countries. Gal and Kligman (2000) point out that the forced top-down process to involve women in management had a backlash on women's issues, and re-familisation (Saxonberg/Sirovátka 2006) took place, which means that traditional gender roles (men as breadwinners and women as carers) returned, and dominant ideology in these countries questioned women's active participation in leadership roles. The socialist state guaranteed both women's right to participate in the employment market fully and the reproductive rights of women by a long and relatively generous maternity leave scheme (Gradskova/Asztalos-Morell 2018). In parallel with high female participation in the labour market, child caring institutes (day care, kindergarten etc.) were introduced widely in these countries. This accepted duality has been questioned by the transformed new market economy, where employers – in the name of efficiency – pushed men and women to long working hours, and work–life balance issues became central, mainly for women, who remained the main care giver even in the socialist period and after, as well (Nagy 2018; Fodor et al. 2018). Furthermore, restoration of separate gender roles became desirable in public discourse (Nagy, Primecz and Munkácsi 2016).

Despite the socialist legacy, as a result of various forces of globalization, a new trend has appeared since the millennium: female employment among the (top and middle level) managers has increased in the CEE region. The higher number of female middle managers may create a greater chance for them to be selected for corporate boards. According to Figure 15, the trends in female participation on CEE corporate boards shows a slight increase between 2007 and 2016, which can be explained by the rising number of firms employing at least one woman on the board. However, in the firms where a female presence already existed, the presence did not become stronger.

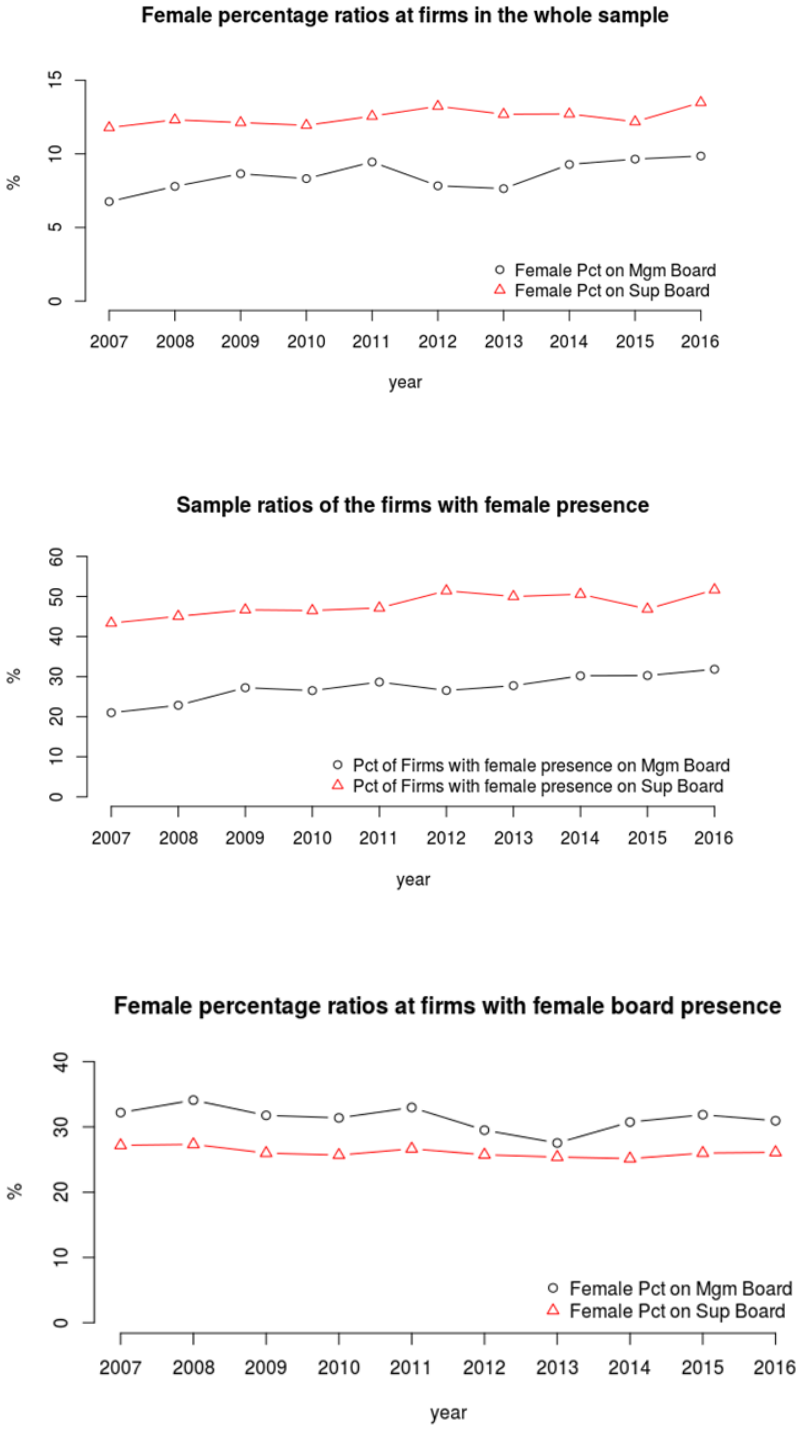

Figure22 Female presence on the management and supervisory boards (Source: own edition)

To evaluate the impacts of the introduced trends, we evoke women in management literature that builds on two distinct arguments about why more women are necessary for leadership positions. The ethical and political imperative that it is right, just, and fair to include men and women in workplaces at different levels emphasizes the social side of the issue. Mensi-Klarbach (2012) reveals that in contrast to the *moral case* approach, which optimizes societal

wellness, *business case* expects economic advantages from including women in management. Our study investigates if there is a business case in this region or not.

Meritocracy is one important pillar of business case approach. At the same time, Kanter (1977) warned us that the system might seem to be meritocratic when a few women succeed, and the perception of the system is fair, while larger proportion of women fails than men. The token situation (0–15%) is controversial; it provides high visibility to tokens; it magnifies the contrast between tokens and dominant group; and finally, it pushes the tokens towards assimilation. It was clear to the authors while designing this study, that if CEE boards show characters of tokenized female roles, measuring the significance of business case would be difficult. Despite this preliminary concern, we have decided to learn more about the CEE context and evaluate any effects we find to foster discussions about the roles of CEE female directors.

Our approach for analyzing the business case is originated mainly from the financial and corporate governance literature and employs data analysis for measuring the possible effects. Hence, the focus of this study is much more about the statistical evidence on present trends. Our academic contribution is that we empirically explore the business impacts of the female top management employment presence and detect the most significant moderating factors of the female directorial appointments in the region using data of six CEE countries. To measure the business effects of the female board membership in the region, we apply panel model estimates to measure the relationship between the ratio of female top managers on the corporate management / supervisory boards and firm performance, measured by the return on assets and Tobin's Q ratios. We find that female presence on the executive board may raise the operative and the market performance, despite the fact that the number of women directors is below the critical mass. However, the effect is not very strong statistically, the economic impact is rather positive than negative for the female executives, and neutral for the female supervisors.

Besides measuring the financial impacts, we also shed light on evidence concerning the selection mechanisms of female directors, which helps understanding the role and number of female managers better. Women's presence on corporate boards shows neutral or positive effect, although women supervisory board members do not positively discriminate other women. We also investigate if women are more often appointed when the economic performance of the companies are decreasing, which is called glass cliff in literature (Ryan/Haslam 2007). We found that it exists at the executive directors but is not relevant for supervisory boards. It means that women might be appointed to executive boards when the

overall performance of the company is decreasing. At the supervisory committees, network effect seems to be important: there is a higher chance for female members when the ratio of female directors is higher in the industry.

5.2 Hypothesis development

We build our hypothesis development on literature reviews and suggestions provided by Terjesen, Sealy and Singh (2009) and Kirch (2018). We highlight resource dependency, institutional and agency theories that argue why gender diversity is beneficial in the related literature.

According to the resource dependency theory (Pfeffer/Salancik 1978), female executive leaders may bring new approaches into communication and business networks or they may provide other advantages for corporations. According to the institutional theory developed by Bilimora (2000), a female board presence signals that a firm recognizes the high performance of its female employees. Beyond this indication of institutional quality, it also means that the selection of managers is less biased with respect to gender, inducing a better quality of the board. The agency theory (Fama/Jensen 1983) applied by Aguilera, Filatotchev, Gospel and Jackson (2008) states that gender diversity of directors may better facilitate the resolution of conflicts between the management board and the shareholders.

Overall, without judging the competing arguments, we presuppose the positive effects of gender diversity in the region.

Hypothesis 1 The greater the firm's proportion of female directors on its management board, the better its performance.

To moderate the investigated effects in Hypotheses 1, we address some challenges which relates to the tokenism, and means that the relationship between operation performance and number of female board members should not be linear, if there is any. While visibility might be considered as advantageous for female managers, it also puts high performance pressure on women in token position, they are not considered as individuals (in contrast to men, who are higher in numbers), but rather representatives of women, and consequently any mistake is evaluated as a failure of female managers. The performance on spotlight does not allow token women to correct mistakes without attracting attention which is possible for any members of the dominant group. Rather, they are evaluated at each step. Due to high visibility, contrast is often discussed: the dominant groups become more aware of their similarities, and the token

women's dissimilarity is often highlighted. The process frequently leads to a consensus where the common characteristics of the dominant group become the norm for the whole group. This norm expectation is paradoxically very difficult, if not impossible, to be reached by the token persons, as it was exactly defined in contrast with them. This pushes token women to assimilation. In order to succeed in a group, they have to prove their belongingness and their entitlement to be part of the group, and eventually they either become similar to the dominant group or they fall out from the group. With all these sacrifices, token women rarely show solidarity towards other women, who had not gone through this process. Assimilated token women start to expect other women to perform similar characteristics as the dominant group developed in contrast with the tokens. Kanter (1979) clearly shows that this vicious circle remains active when there is only one or two women in the group, and the only way to break away from it is to increase the number of women. This helps members of the minority group not to be token positions anymore, and being numerous, they can be evaluated on individual basis, not only on group characteristics. The best, though, is the balanced group, where men and women are between 40–60% and critical mass is often defined as 30–35%.

In case of supervisory boards, we cannot talk about the major influence of daily operations. However, female top managers may monitor differently from their male peers. Applying the agency theory to this question, once women in the supervisory board demonstrate that they are more efficient in monitoring activities, diversity reduces agency issues, and stronger corporate governance may lead to higher performance (Adams/Ferreira 2009). The authors report less attendance problems by directors on boards with a higher gender diversity ratio. Women may monitor better because they may perform caring tasks better for the processes and the people of the companies by their gender self-schema developed from childhood (Konrad et al., 2000). Another possible explanation comes from the social networks induced by the homophily (McPherson et al., 2001). While board members seek connections with similar ones, female directors may come from outside their social network, and independent female members may bring a greater level of control. Thus, we suspect gender diversity may facilitate the monitoring process thereby also possibly promoting firm performance.

Hypothesis 2 The greater a firm's proportion of female directors on its supervisory board, the better its performance.

Recalling Figure 1 which showed the low female percentage ratios in the region, the question is whether women's voices are enough to influence decision-making. Thus, during the

investigation of Hypotheses 1 and 2, we take into account that the possible impacts can be difficult to measure because of the insufficient number of females on the boards and to test the effects of exactly one, two or three women participating on the board.

Hypothesis 3 The possibility of a new female (management/supervisory) director appointment is higher if

a) the firm's performance was previously weaker; and/or
b) the firm's gender diversity on its boards is higher; and/or
c) the sectorial average of the gender diversity of the boards is higher.

The three arguments may explain a) glass cliff, b) homophily, c) network effects. According to the last, the members of female manager minorities invite each other to participate in their own boards.

5.3 Data and Methodology

The evidence for the impact of the female presence is often contradictory and heavily dependent on the societal and corporate characters of the observed countries. The literature focuses on the operational and the market performance.

The return on assets (ROA) as an accountant-based ratio is the most important measure of corporate operative profitability. Several studies report positive impacts of board gender diversity on ROA, such as Carter et al. (2010) for the US, Liu, Wei and Xie (2014) for Chinese firms, Oostveen, Dam and Hermes (2014) for 19 European states, and Terjesen, Couto and Francisco (2015) for a global sample with 47 countries. Ciavarella (2017) documents a positive relationship in the case of the executive boards in a sample of the five largest European countries (Italy, France, Germany, Spain, UK) between 2006 and 2016. Dang and Nguyen (2016) for France, Karayel and Dogan (2016) for Turkey confirm this positive role played by gender diversity. However, others do not find significant impacts for Spanish firms (Gallego-Alvarez/Garczía-Sánchez/Rodríguez-Dominguez (2010)), and for Indonesian listed firms (Darmadi 2013). Among the scant evidence of the non-listed firms, Daunfeldt and Rudholm (2012) report negative effects on ROA after two years on Swedish data. Alternative performance measures, such as return on equity (ROE) and return on sales (ROS) are usually applied for robustness checks (positive impact on ROE was found by Lückerath and Rovers (2013), Karayel and Dogan (2016), Ayuso, Rodriguez, Garcia and Ariño (2007)).

Tobin's Q measures best reflect the market opinion about the future outlook for firms. Consequently, numerous papers have elaborated the effect of female participation on corporate boards on Tobin's Q. However, the results are contradictory, primarily depending on the observed countries. Many of the studies revealed negative effects on Tobin's Q, for US firms (Adams/Ferreira 2009; Carter et al. 2010), for the UK firms (Shehata/Salhin/Moataz 2017) or for Norwegian corporations (Ahren/ Dittmar 2012; Voß 2015). Further findings support this view, such as Dang and Nguyen (2016) for French, Darmadi (2013) for Indonesian, and Abdullah (2014) for Malaysian listed companies. However, on a European (Oostveen/Dam/Hermes 2014) or a global level (Terjesen/Couto/ Francisco 2015), evidence exists on the positive effects of board gender diversity. In Spain (Campbell/Mínguez-Vera 2008; Gallego-Alvarez et al. 2010), and in India (Jackling/Johl 2009), the relationship also seems to be positive. Numerous authors find an insignificant correlation in other European countries (Ciavarella 2017; Marinova/Plantenga/Remery 2015; Rose 2007).

The studies listed before do not cover the CEE region. All of the examined countries are post socialist market economies with standalone public stock exchanges. Poland, Slovakia, the Czech Republic, and Hungary have been members of the European Union since 2004, while Romania and Bulgaria joined the EU in 2007. Following 1990, the countries mostly established two-tier corporate governance structures, influenced by the German corporate governance model. In general, management boards (consisting of insider, executive directors) are responsible for day-to-day operations, while supervisory boards (usually, but not always necessarily formed by a group of affiliated outsiders) oversee these activities and support the strategy development. Table 80 summarizes the main characters of the corporate governance systems in the six countries.

Table 36 Main characters of the corporate governance systems in the six CEE countries (Source: own edition)

Country	Governance system	Nomination of the executive directors: influence of the supervisory board	Independent member of the supervisory board	Source
Poland	two-tier	yes (strong influence)	at least one member	Bobeł and Weremczuk, 2017
Slovakia	two-tier	usually no (but it is possible)	at least one member	Cechova and Kolenič, 2017
Czech Republic	two-tier	usually no (but it is possible)	not necessary	Rentsch and Vajdík, 2012
Hungary	majorly two-tier	no (but small influence)	one member suggested	Budapest Stock Exchange, 2012
Romania	both	no (but small influence)	not necessary	Tofan, Bercu and Cigu, 2015
Bulgaria	both	yes	at least one member	Katzarsky and Georgiev, 2017

Because the majority of the companies in the region operate under a two-tier corporate governance system, we start with the investigation of the management board that directly leads the company and consider the one-tier executive board as a management board despite having independent members.

We obtain the financial data of the largest 294 non-public utility and non-financial listed firms in the exchanges of the six CEE countries from the Bloomberg data provider. We omit the public utility and financial sectors because financial companies have different balance sheets

related to the business sector, and profits in the public utility industry are under state regulation. Due to the low availability of the collected board information in the region, the composition of public board data is gathered manually from the annual financial reports of the companies, which came to at least EUR 3 million of Total Asset on their balance sheet in 2016. Furthermore, 90 percent of the selected firms have over EUR 16 million market capitalization and 275 have information available on board member diversity for at least three consecutive years. The firm data consists of 2,216 firm-year observations and covers a decade shortly after the EU accession of these countries, from 2007 to 2016.

Table 81 provides insights into the board gender diversity characteristics according to years, countries, and sectors (two-digit categories of the Bloomberg Industrial Classification Systems). The ratios are calculated for supervisory and management bodies. For firms using the one-tier system, we substitute the missing management and supervisory board data with the board of directors' data. Altogether 173 firm-year observations, namely 13 Bulgarian and 16 Romanian firms and one Hungarian firm are under this procedure. Because Poland has the largest population and the most developed stock market, a group of the 222 Polish firms represents the highest proportion in the sample. With respect to the countries, the average female ratios on the supervisory board (WOSB) vary from 8.4% to 22.4%, while the average proportion of the female members in the management body (WOMB) is generally lower at between 5.6% and 12.1%. Although it is not indicated in the table, we note that the average ratio of women on supervisory boards is 3%, while the management board ratio is 22.9% for the five Romanian firms using a two-tier system. These rates come down to 20% and 12.9% for the twelve dual board corporations in Bulgaria. We detect sectorial differences of women membership ratios as well, the diversified firms employ female directors in the highest ratios, and the lowest ratios are in the energy sector. The average female presence increased during this period in both boards.

The Table 37 summarizes the main characters in country, sector and year breakdown. Details are calculated as arithmetic average of observations. Variable N stands for the number of the observed firms. Variable WOSB and WOMB are abbreviations of Women on Supervisory Board and Women on Management Board. ROA denotes percentage of the Profit after taxes over Total Assets. Employee is the number of employees at a given firm, M. Cap. is Market Capitalization and Turnover means Total Sales Revenue in million euros.

Table 37 Summary statistics (Source: own edition)

	Category	N	WOSB	WOMB	ROA	Employee	M. Cap	Turnover
Country	Bulgaria	25	0.198	0.153	4.3	511.3	85.8	125.6
	Czech Rep.	8	0.084	0.056	6.4	2204.3	1010	933.3
	Hungary	13	0.167	0.114	3.3	4533.6	914.6	1702.7
	Poland	222	0.120	0.077	5	2342.6	297.3	486.4
	Romania	21	0.071	0.121	3.5	2507.4	423.3	602.6
	Slovakia	5	0.224	0.102	4.3	1387	420	1022.2
Sector	Basic Materials	20	0.127	0.083	4.6	4225.1	623.5	764.4
	Communications	19	0.129	0.044	6.3	3330.4	883.4	655.9
	Consumer, Cyclical	52	0.142	0.085	4.5	1581.8	171.5	219.2
	Consumer, Non-cyclical	61	0.125	0.134	4.6	1743.2	219.6	261
	Diversified	8	0.304	0.191	2.6	543.9	56.7	95.7
	Energy	16	0.098	0.093	3	10278.2	2048.5	4972.6
	Industrial	94	0.104	0.061	4.3	1275.5	99.7	152.5
	Technology	24	0.120	0.063	9.4	1602.8	151.5	191.2
Year	2007	143	0.118	0.065	8.3	2535.6	700.2	616.1
	2008	162	0.123	0.076	5.4	2473.4	304.8	686.1
	2009	180	0.121	0.086	2.5	2553.1	358.5	478.4
	2010	200	0.119	0.083	5.1	2399.1	390.4	539.2
	2011	227	0.126	0.094	5.7	2450.8	287	594
	2012	245	0.132	0.078	2.8	2256.8	324.7	599.5

Category	N	WOSB	WOMB	ROA	Employee	M. Cap	Turnover
2013	256	0.127	0.076	4.5	2178.5	313.7	557.4
2014	265	0.127	0.093	4.8	2193	282	534.8
2015	271	0.122	0.096	4.9	2125	297.9	502.5
2016	267	0.135	0.099	5.2	2238.7	348.7	480.4
overall	294	0.126	0.086	4.8	2312.4	345.5	552.2

Our measure of firm performance is the return on assets (ROA). We calculate ROA as net income over total assets. ROA is winsorized at both the top and bottom one percentiles to mitigate the effects of outliers. For reasons of robustness, we apply Tobin's Q for proxy firm performance. The drawbacks of this measure are 1) Tobin's Q can be applied only in the case of the firms whose stocks are traded in a liquid market, 2) it is also associated with the future outlook and growth opportunities of the firm rather than their operational performance. We use the logarithm of Tobin' Q in the analysis.

The key explanatory variables of the study are the ratios of women members on the management (WOMB) and supervisory (WOSB) boards, which are approximated by the female presence dummy variables as well. Female presence is measured by DM (management board) and DS (supervisory board) dummy variables. There was at least one woman on the management (supervisory) board in the case of the 27.8 (48.4) percent of the firm-year observations. In order to demonstrate the effect exerted by the number of women, we also employ other variables calculated by female participation. Variables WM and WS denote the number of females on boards. We need to point out the fact that the highest number of female executives was three in the observed sample, while the maximum number of executive board members was 13 and the average was 3.853. This fact means that the strong influence of female leaders cannot be presumed. Parallelly, the number of women on supervisory committees varied between zero and five, when the largest supervisory board consisted of 15 persons, with 5.711 members on average. Variables new.WM and new.WS indicate fresh appointments when the number of women increased on the boards. The occurrence of the new appointments was relatively rare, it took place in the 4.2 percent (executives) and 6.9 percent (supervisors) of the firm-year observations.

Control variables of the analysis include measures of board, firm, and ownership characteristics. Board controls are the number of members of the board (SBoardSize or MBoardSize), the dummy variable is_ceo_woman, which denotes the female chief director, and the dummy variable is one tier for indicating firms with the board of directors' system. Because the companies did not report their independent board members, we omit this character. We employ the minority non-controlling interests over common share ratio (minority) as an ownership control. Unfortunately, state ownership and management or institutional ownership statistics were not available. Firm controls consist of the natural logarithm of the total assets in millions of euros (FirmSize): the book value of debt divided by total assets (Leverage). Table 82 summarizes the descriptive statistics of the main variables of the dataset.

The Table 38 details the descriptive statistics of the main regression variables. ROA denotes the Profit after taxes over Total Assets. WOSB and WOMB equal to the women on supervisory and management board ratios. WS and WM show the number of female directors in the supervisory and management boards. DS and DM equal to one in case of female presence in the supervisory and management boards and zero otherwise. SBoardSize and MBoardSize shows the number of supervisory and management board members. Dummy variable is_ceo_woman indicates female director of the firm. One_tier indicates the firms having only one join corporate board. Minority denotes minority noncontrolling interests over total shareholder equity. FirmSize denotes the natural logarithm of Total Assets. Leverage equals to the Debt to Total Assets ratio. Variable new.WM (new.WS) equals to one if the number of women on management (supervisory) boards increased in a given year at a given firm and zero otherwise.

Table 38 Descriptive statistics of the model variables (Source: own edition)

Statistic	N	Mean	St. Dev.	Min	Max
ROA	2,216	0.048	0.088	-0.295	0.367
logQ	2,090	0.500	0.761	-2.408	5.526
WM	2,216	0.329	0.583	0	3
WOMB	2,216	0.087	0.165	0.000	1.000
MBoardSize	2,216	3.853	1.879	1	13
DM	2,216	0.278	0.448	0	1

new.WM	2,216	0.042	0.201	0	1
WS	2,216	0.691	0.874	0	5
WOSB	2,216	0.126	0.164	0.000	1.000
SBoardSize	2,216	5.711	1.691	1	15
DS	2,216	0.484	0.500	0	1
new.WS	2,216	0.069	0.254	0	1
is_ceo_woman	2,216	0.046	0.210	0	1
minority	2,216	0.029	0.066	-0.014	0.416
FirmSize	2,216	4.755	1.580	0.470	9.702
Leverage	2,216	0.178	0.148	0.000	1.000
one_tier	2,216	0.078	0.268	0	1

To briefly check the multicollinearity, we provide Table 19 describing the correlation structure of the investigated variables. Following Liu et al. (2014), we use a rule of thumb about a correlation of 0.7 or higher in absolute value that may indicate a multicollinearity issue. According to the outputs, all of the coefficient absolute values are below 0.6, except for the correlation between the alternative female ratio or female presence measures, which are not applied in the same model.

To identify the effect of the gender diversity on firm performance, we estimate the following equation:

$$\text{Firm\_Performance}_{it} = \gamma\ \text{Board\_Gender\_Diversity}_{it} + \beta_1\ \text{Board\_Char}_{it} + \beta_2\ \text{Firm\_Char}_{it} + \beta_3\ \text{Ownership\_Char}_{it} + \alpha_i + \lambda_t + e_{it} \quad (2)$$

We apply ROA and log Q to measure firm performance, and women on board ratios to measure board gender diversity. In the regressions, board size control variables are settled in the lagged form, female CEO dummy is also lagged, and Leverage is lagged twice to exclude the factor that board composition may affect financing decisions of the following year. We estimate firm-level fixed-effect within a panel model with year dummies to exclude the unobserved heterogeneity. F-tests rejected the null of no unobserved heterogeneity for all the estimated equations. Hausman-tests suggested using fixed-effects approach against random-effects

methods. To control potential heteroscedasticity, we report robust standard errors in the output tables.

However, three sources of endogeneity still remain. The first issue may arise because membership changes in the board take time to affect performance. Once a manager is appointed in a certain year, the new board member needs to spend some time and make efforts to enhance the company for at least a year. Hence, we use the lagged variables of gender composition where it is needed to avoid simultaneity. The second endogeneity is caused by past firm performance possibly providing an incentive for women to join or, conversely, to avoid doing so, and may also affect the motivation of boards to employ male or female directors. As mentioned before, one of the possible effects is the glass cliff phenomenon, where female managers are nominated more frequently in the case of bad performance or pessimistic future prospects, which can be implied by unobservable factors. We are not able to observe those factors that may be attractive for females, but we suppose that it is correlated with past firm

performance. To handle this problem, we employ instrumental variables that are correlated to this unobserved factor, but which have no correlation with past firm achievements. These instruments are calculated from the sectoral average of the women on corporate board ratios by years. The construction and the exogeneity of the instruments are discussed in the Results and Discussion section. According to the third concern, firm performance depends on past firm performance itself inducing special dynamics into the relationships. However, employing the instrumental variable approach solves this problem as well, because the instrument is not influenced by past performance. A good alternative would be using a dynamic panel approach with a one-step Arellano-Bond system generalized method of moments estimators. Authors, such as Wintoki et al. (2012) and Liu et al. (2014) apply this method by using two-year intervals instead of every year to get uncorrelated transient errors. Because selecting every second year reduces our sample to five observational periods, the applicability of this approach seems to be questionable in this case. Thus, we decided to conduct our analysis by using an instrumental variable Balestra and Varadharajan-Krishnakumar (1987) estimator in the fixed-effect panel framework.

To reveal the main driving factors of the newly appointed female and male directors, we developed the following equation:

$$\text{New\_Director}_{it} = \beta_1 \text{Firm\_Performance}_{it-1} + \beta_2 \text{Sectorial\_Average\_Board\_Gender\_Diversity}_{it-1} + \beta_3 \text{Gender\_Diversity\_Other\_Board}_{it-1} + \beta_4 \text{Board\_Size}_{it-1} + \beta_5 \text{Firm\_Char}_{it} + \beta_6 \text{Ownership\_Char}_{it} + \Sigma_j \alpha_j \text{Industry\_Dummy}_{ij} + e_{it} \quad (3)$$

Where New_Director equals one if one more female (male) member appears in the corporate board, and zero otherwise. The Industry_Dummy denotes the four-digit categories of industries in the Bloomberg Industrial Classification Systems. This equation is estimated as a probit regression using the maximum likelihood procedure.

Table 39 Correlation matrix of the main variables (Source: own edition)

	ROA	logQ	WM	WOMB	MBoardSize	DM	new.WM	WS	WOSB	SBoardSize	DS	new.WS	is_ceo_woman	minority	FirmSize	Leverage
ROA																
logQ	0.16***															
WM	-0.05*	0.06**														
WOMB	-0.05*	0.08***	0.87***													
MBoardSize	-0.01	-0.03	0.22***	-0.01												
DM	-0.03	0.09***	0.91***	0.84***	0.20***											
new.WM	-0.03	0.02	0.33***	0.27***	0.11***	0.34***										
WS	0.00	-0.04	0.20***	0.15***	0.04	0.12***	0.02									
WOSB	0.00	-0.03	0.19***	0.17***	-0.03	0.13***	0.01	0.94***								
SBoardSize	-0.04*	-0.06**	0.00	-0.08***	0.37***	-0.02	0.03	0.12***	-0.10***							
DS	0.03	-0.02	0.11***	0.08***	0.04*	0.09***	0.01	0.82***	0.79***	0.10***						
new.WS	-0.04	-0.04*	0.04	0.03	0.03	0.03	0.14***	0.31***	0.26***	0.09***	0.28***					
is_ceo_woman	-0.02	-0.04	0.34***	0.47***	-0.05*	0.33***	0.07***	0.06**	0.13***	-0.10***	0.02	0.01				
minority	-0.09***	0.04	0.03	0.07***	0.12***	0.05*	0.01	-0.05*	-0.03	-0.02	-0.05*	-0.01	0.07***			
FirmSize	-0.04*	-0.11***	0.01	-0.05*	0.46***	0.02	0.07***	0.00	-0.08***	0.44***	0.00	0.08***	0.04	0.20***		
Leverage	-0.29***	0.31***	0.13***	0.12***	0.01	0.11***	0.05*	-0.06**	-0.05*	-0.03	-0.08***	-0.03	0.04	0.05*	0.15***	
one_tier	-0.04*	-0.04	0.19***	0.06**	0.29***	0.14***	0.02	0.01	-0.01	0.00	0.00	-0.01	-0.04	-0.04	-0.06**	-0.02

5.4 Results

5.4.1 Do female executive directors enhance or hinder firm performance?

We first examine if the proportion of women directors on the management board has a significant impact on firm performance. Table 84 summarizes the output of the fixed-effect model. Equations 1, 3, 4 reports the coefficients of the percentage of women on the management board (WOMB), the number of women (WM) and the indicator if the number of women exceeds or is equal to one, two or three. Equation 2 is estimated by using the sectorial average of the women on management board ratios (WOMB.AVE) for an instrumental variable. With this equation, we preliminarily supposed that WOMB.AVE correlates with the women of the management board ratio of the firm, but the former ROA of the firm does not influence it. In order to inspect the application of this approach, we investigated instrumental variable tests. Firstly, we ran an F-test on instrument relevance using alternate first stage equations including and excluding the instrument. The test confirmed the relevance of the instrument at a 1% significance level. Secondly, we examined the overidentifying restrictions with the Sargan-Hansen J test, and although we were not able to reject the null of instrument validity, WOMB.AVE can be considered as a valid instrument. Thirdly, we checked the endogeneity of the WOMB variable by applying the Hausman-Wu test on two alternate regressions: the original equation and the one extended with the residuals of the first-stage estimate. The p-value was around 0.3 in this case; hence, we could not reject the null of exogeneity at either 10% nor the 5% level of significance. This finding suggests that there is not much to rely on in this approach in this case. Reviewing the table, one of the coefficient estimations for WOMB is significant, except for the dummy of three or more women, which is negative. However, the number of observations with three or more women is very low, there are only 19 firm-year observations. It is important to point that out because the female board ratio is low in the overall sample. The question rather concerns the gender diversity (is there any female on the board) than the absolute number of women (is there a critical mass of females). For reasons of robustness, we estimate equations 5, 6, 7, 8 using Tobin's Q as the performance measure. The sample is smaller because we restrict the sample for the firms with liquid securities (the traded days must reach at least 247 days in a year, the suitable firms cover 70 percentage of the entire sample). The received coefficients are not significant.

According to the results of the Hausman tests, all fixed effects models appropriate versus the random effects models.

The Table 40 summarizes the estimation results of fixed effect individual one-way within panel models with year dummies (OLS estimation: equations 1, 3, 4, 5, 7, 8; G2SLS IV: equations 2, 6). The target variables are return on assets (ROA, in percentage points) and logarithm of Tobin's Q (log Q). WOMB equals to the women on management board ratio. WM indicates the number of women on the management board. MBoardSize counts the number of management board members. FirmSize is the logarithm of firm Total Assets in million euros, Leverage is the Debt to Asset ratio, minority is Minority noncontrolling interest to Equity ratio. Is_ceo_woman indicates female CEO. Sectorial average of women on management board ratios is applied as instrument of WOMB. The robust standard error of each coefficient is shown in parentheses.

Table 40 Women on management board: fixed effect panel and IV estimations (Source: own edition)

	Dependent variable:							
	ROA				log Q			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lag(WOMB)	-4.220	12.806			0.249	1.217		
	(3.139)	(19.483)			(0.167)	(1.817)		
lag(WM)			-1.121				0.030	
			(0.933)				(0.061)	
lag(I(WM > = 1))				-1.510				0.062
				(1.087)				(0.071)
lag(I(WM > = 2))				1.487				0.054
				(1.450)				(0.139)
lag(I(WM > = 3))				-3.970**				
				(1.721)				
lag(MBoardSize)	-0.268	-0.126	-0.166	-0.230	0.036*	0.041	0.033	0.034
	(0.318)	(0.330)	(0.343)	(0.327)	(0.021)	(0.026)	(0.021)	(0.021)

FirmSize	1.910	1.723	1.840	1.968	-0.212**	-0.241**	-0.205*	-0.208**
	(1.984)	(2.084)	(1.982)	(1.961)	(0.105)	(0.121)	(0.105)	(0.105)
lag(Leverage, 2)	2.017	0.241	2.013	1.911	-0.281	-0.366	-0.270	-0.270
	(3.040)	(3.884)	(3.053)	(3.034)	(0.276)	(0.339)	(0.276)	(0.273)
minority	-2.320	-5.974	-2.614	-3.341	1.740	1.495	1.779	1.791
	(14.400)	(13.994)	(14.348)	(14.235)	(1.589)	(1.632)	(1.595)	(1.578)
lag(is_ceo_woman)	2.469	-4.239	1.685	1.421	-0.064	-0.456	0.014	0.034
	(2.181)	(8.179)	(1.747)	(1.623)	(0.169)	(0.750)	(0.186)	(0.167)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE	FE+IV	FE	FE
Observations	1,576	1,576	1,576	1,576	966	966	966	966
R^2	0.020	0.002	0.020	0.021	0.098	0.073	0.095	0.097
F Statistic	2.053**	-2.181	1.984**	1.867**	6.582***	3.685***	6.415***	6.062***
Hausman test	37.03***		36.54***	47.58***	30.64***		30.32***	30.81***
Note:								*p<0.1; **p<0.05; ***p<0.01

5.4.2 Women on management board regressions for individual countries[7]

For individual countries, the women on management board regressions are repeated. The next tables show the signs and significance levels of the independent variables. The signs of the control variables are the most frequent sign. NO indicates that the variable is omitted in the regression. For individual country regression models, logQ is calculated for less liquid shares also. All these regression models are calculated in Stata 13.

[7] Individual country regressions were not part of the published paper.

Table 41 Women on management board for countries ROA as dependent variable (Source: own edition)

ROA	Full	Hungary	Poland	Czechia	Slovakia	Bulgaria	Romania
lagWOMB FE	–	+ (**)	–	–	+	–	–
lagWOMB FE+IV	+	+	+	–	+	–	+
lagWM	–	+	–	NO	+	–	– (*)
lagMBoardsize	–	+	–	+	+	+	+
FirmSize	+	+ (***)	+ (**)	–	+	+ (*)	–
lag2 Leverage	+	+ (*)	+	–	+	+	–
minority	–	–	–	+	+	–	–
lagisceowoman	+	NO	–	NO	NO	+	+
F-test	**	***	***	***			
Hausman test	***	***	***	***		**	
Observations	1576	77	1235	54	26	98	86

For ROA as a dependent variable, the sign of the lag WOMB variable for Poland, the Czech Republic, Bulgaria, and Romania is the same for the regression on the full database. For the entire database, one of the main results was that for IV regression, when the variable WOMB.AVE is used as the instrument for the variable WOMB, the sign of lag WOMB changes from negative to positive. We can observe this phenomenon for Poland and Romania. For Hungary and Slovakia, the sign of lag WOMB is positive for firm fixed effects and IV regression also, while for Bulgaria and Czechia is negative. We also see that the sign of all variables is the same for the full dataset and for the regression on Polish firms, except for the lag is_ceo_woman variable. For the whole database, when the dependent variable is ROA, the dominant effect of the Polish companies is observed. All explanatory variables have the same sign in the full dataset and in the regressions for Polish companies except is_ceo_woman. The F-test of overall significance indicates whether your linear regression model provides a better fit to the data than a model that contains no independent variables. A significant F-test means that the fixed effects are non-zero and therefore pooled OLS and random effects will be biased if the covariance between explanatory variables and error terms does not equal zero. If F-test is significant it means that the model fits the data better than the intercept-only model. In this

respect, the model is appropriate for only three countries, Hungary, Poland, and the Czech Republic. The results of the Hausman tests are variable. For Bulgaria, the Czech Republic, Hungary, and Poland, both fixed effects models are the appropriate verses random effects models. For Romania and Slovakia this is not true, but this may be because the Hausman test is sensitive to sample size.

Table 42 Women on management board for countries Tobin's Q as dependent variable (Source: own edition)

logQ	Full	Hungary	Poland	Czechia	Slovakia	Bulgaria	Romania
lagWOMB FE	+	+ (***)	+	–	NO	+	+
lagWOMB FE+IV	+	+ (*)	–	+	NO	–	+
lagWM	+	+ (*)	+	NO	NO	+	+
lagMBoardsize	+	+	+ (**)	– (*)	NO	–	–
FirmSize	– (*/**)	–	– (**)	– (***)	NO	–	–
lag2 Leverage	–	+	–	– (**)	NO	+	–
minority	+	+ (***)	+	+	NO	+	–
lagisceowoman	+/–	NO	+	NO	NO	NO	+
F-test	***		***	***		. /*/***	
Hausman test	***		*	***			
Observations	966	60	797	53		16	64

For logQ (logarithm of Tobin's Q) as a dependent variable, the sign of the lag WOMB variable for Hungary, Poland, Bulgaria, and Romania is the same for the regression on the full database. For IV regression this is only valid for Hungary and Romania. An interesting result is that for Poland and the Czech Republic the lag WOMB sign becomes negative in IV regression. Another interesting result is that the signs of the main variables are the same for the full database and for the regressions for Hungary. These variables are lag WOMB for FE and IV regressions, lag WM and lag MBoardsize. In this case, we do not observe a dominant effect due to the high share of Polish companies. For logQ as a dependent variable, we cannot observe the phenomenon that the sign of lag WOMB changes from negative in fixed effects model to positive in IV regression model. According to the F-tests, the regression model appropriate for only Poland, Czech Republic, and Bulgaria. Although, for Bulgaria the number of observations

for logQ models are very few. The results of the Hausman tests do not now support the use of fixed effect models for Hungary and Romania but this may be because the Hausman test is sensitive to sample size as mentioned earlier.

5.4.3 Female presence on the management boards

Because the maximum number of female directors is three in the sample, WOMB and WM variables do not work well as continuous variables. Thus, we repeat the analysis placing a female presence dummy as an explanatory variable and detail the outcomes in Table 21. Equation 3 shows the estimation results of the fixed effect model explaining ROA, reporting that lagged female presence (lagDM) has significantly negative effects on ROA. Although, equation 3 does not treat the endogeneity concerns since female presence is a dichotomous variable, it cannot be estimated well with a linear OLS model that would be applied in the first stage regression. Using probit in the first stage would lead to Hausman's forbidden regressions with unreliable estimates. Thus, we carry out the procedure suggested by Angrist and Pischke (2009), pp. 142–144). We first estimate the female presence dummy with a probit model using the sectorial average of women on management board ratios (WOMB.AVE) according to equation 1. Then, we construct a new variable called DM.pred by the prediction of equation 1; this continuous variable captures the "possibility" of female presence. We run the Wald test for deciding whether WOMB.AVE significantly explains DM.pred. The F-statistic was 59.644, we reject the null of no relationship. Thereafter, we use DM.pred as the instrument of DM female presence dummy. The estimation of the first stage model is demonstrated in equation 2. Equation 4 displays the main estimation. Running the F-test on instrument relevance, we were able to reject the null of irrelevant instrument at a significance level of 5%. The Sargan-Hansen J test did not reject the null of instrument validity, and the endogeneity of DM could not be rejected at 1% based on the Hausman-Wu test. Now, considering the outcomes, (the possibility of) a female presence on the management board significantly increases the return on assets at a significance level of 10%. Repeating the whole procedure for Tobin's Q, we find a non-significant coefficient for the base fixed-effect estimation (equation 5), and positive impact at a significance level of 10% by using the instrument (equation 6). At first glance, we would conclude that female presence correlates negatively with firm performance. However, when we take into account the effects of past performance of gender diversity of management boards, we observe that female presence enhances the operative performance of the following year, as well as for the future outlook, despite the fact that the number of women directors is

below the critical mass. The lesson is that gender diversity of executive boards created value on CEE listed firms between 2007 and 2016, which supports Hypothesis 1.

The Table 43 summarizes OLS estimations: equations 3, 5, G2SLS IV: equations 4, 6, probit model for predicting DM: equation 1, first stage model of IV estimation: equation 2. Sectorial average of women on management board ratios (WOMB.AVE) is applied to estimate DM.pred, which is used as instrument of WOMB in eq. 4 and 6. DM indicates the female presence on the management board. MBoardSize counts the number of management board members. FirmSize is the logarithm of firm Total Assets in million euros, Leverage is the Debt to Asset ratio, minority is Minority noncontrolling interest to Equity ratio. Is_ceo_woman indicates female CEO. Robust standard error are reported eq. 3-6.

Table 43 Female presence on the management boards (Source: own edition)

	Dependent variable:					
	DM	lagDM	ROA		logQ	
	probit	*panel*	*panel*		*panel*	
		linear	*linear*		*linear*	
	(1)	(2)	(3)	(4)	(5)	(6)
WOMB.AVE	5.570***					
	(0.721)					
lag(DM.pred)		0.686***				
		(0.196)				
lag(DM)			-1.928*	16.619*	0.004	2.659*
			(0.994)	(9.853)	(0.069)	(1.549)
lag(MBoardSize)	0.207***	0.002	-0.158	-0.873	0.034	-0.057
	(0.018)	(0.016)	(0.335)	(0.605)	(0.021)	(0.070)

FirmSize	-0.118***	0.028	1.890	1.636	-0.204*	-0.352*
	(0.023)	(0.051)	(1.958)	(2.510)	(0.105)	(0.212)
lag(Leverage, 2)	1.041***	0.219	2.171	-3.548	-0.261	-1.228*
	(0.210)	(0.133)	(3.068)	(4.897)	(0.277)	(0.730)
minority	-0.266	0.380	-2.449	-9.925	1.800	-0.113
	(0.477)	(0.258)	(14.373)	(14.420)	(1.598)	(2.255)
lag(is_ceo_woman)	2.432***	0.098	1.947	-9.030	0.035	-1.570
	(0.217)	(0.178)	(1.684)	(6.359)	(0.188)	(1.037)
Constant	-1.661***					
	(0.124)					
Firm FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes
Model	Probit	First stage	FE	FE+IV	FE	FE+IV
Observations	2,216	1,576	1,576	1,576	966	966
R^2		0.106	0.022	0.001	0.095	0.004
Log Likelihood	-1,082.101					
Akaike Inf. Crit.	2,178.202					
F Statistic		11.732***	2.223***	-26.972	6.383***	-43.473
Hausman test			39.08***		33.95***	
Note:						*p<0.1; **p<0.05; ***p<0.01

It must be noted here that we made an implicit assumption in our method. Notably, the instrumental estimation works well only if WOMB.AVE does not directly influence the firm's future ROA. Otherwise, a linear model, which explains ROA with WOMB.AVE and DM at the same time would be non-identified, the instrumental approach would exist, because DM.pred is a nonlinear function of the sectorial WOMB.AVE, and the non-linearity would bring unwanted identification. From the economic point of view, the assumption of no

correlation between WOMB.AVE and ROA seems to be plausible. According to our former statistical tests that are not reported here, we were not able to find any significant relationships. According to the results of the Hausman tests, all fixed effects models appropriate versus the random effects models.

5.4.4 Female presence on management and supervisory board regressions for countries

Female presence on management and supervisory board regressions for individual countries are repeated, and the results are shown here.

Table 44 Female presence on management and supervisory board ROA as dependent variable (Source: own edition)

ROA	Full	Hungary	Poland	Czechia	Slovakia	Bulgaria	Romania
lag DM	– (*)	–	–	NO	+	–	–
lag DS	+ (**)	+	+ (***)	+	NO	+	– (**)
lagMBoardsize	–	+	–	+	+	+	+
lagSBoardsize	–	+	+	+	NO	+	+
FirmSize	+	+ (***)	+ (*/**)	–	+	+ (*)	–
lagLeverage2	+	+ (*/**)	+	–/+	+	+	–
minority	–	–/+	–	+	+	–	–
lagisceowoman	+/–	+	–	NO	NO	+	+
F-test	**/***	***	***	***		./*	(./*)
Hausman test	***	***	***	***		**/*	
Observations	M:1576 S:1467	77	1235	54	26	98	86

For ROA as a dependent variable, the sign of lag DM variable is the same for the full database, and for Hungary, Poland, Bulgaria, and Romania. The sign of lag DS variable is the same for the full database, and for Hungary, Poland, the Czech Republic, and Bulgaria. The dominant weight of Polish companies is observed, all variables except lag SBoardsize have the same sign in the regression models for the full database and for Poland. M indicates number of observations for the full database management board regression models, while S for supervisory board regression models. The Hausman tests only confirm the fixed effects models for Bulgaria, the Czech Republic, Hungary, and Poland.

Table 45 Female presence on management and supervisory board Tobin's Q as dependent variable (Source: own edition)

logQ	Full	Hungary	Poland	Czechia	Slovakia	Bulgaria	Romania
lag DM	+	+	–	NO	NO	+	+
lag DS	+	–	+	–	NO	–	+
lagMBoardsize	+	+	+ (**)	– (*)	NO	–	–
lagSBoardsize	– (**)	+	– (**)	+	NO	NO	–
FirmSize	– (-/*)	–	– (*/**)	– (***)	NO	– (./*)	–
lagLeverage2	–	+	–	– (***)	NO	+/–	–
minority	+/–	+ (**)	+	+/–	NO	+/–	–
lagisceowoman	+	NO	+	NO	NO	NO	+
F-test	***	./***	***	***		**/***	***
Hausman test	***		*/.	***		*/.	
Observations	M:966 S: 859	60	797	53		16	64

For Tobin's Q as a dependent variable, the sign of lag DM variable is the same for the entire database, and for Bulgaria, Hungary, and Romania. The sign of lag DS variable is the same for the whole database, and for Poland and Romania. The Hausman tests only confirm the fixed effects models for Bulgaria, the Czech Republic, and Poland.

5.4.5 What drives the appointment of female and male executive directors?

In order to gain a better understanding of the emerged selection effects of female executives exerted by Hypothesis 3, we run regressions in correspondence to equation 2 from the Data and Methodology section. We explore the driving factors of new female and male placements with four specifications, depending on the usage of past ROA, WOMB.AVE, the gender composition of the supervisory board, and the gender of the CEO. As can be seen in Table 22, in the case of equations belonging to the one more female executive director indicators, we find that bad firm performance anticipates the placements (lagged ROA has significant negative coefficient), namely glass cliff, which is in line with Hypothesis 3A. Furthermore, the higher past-year sectorial average of women on board ratios and female CEO also increase the chance of female appointments, which strengthens Hypothesis 3B. Interestingly, a higher proportion of women in the supervisory committee does not induce anything for the appointments that does not support Hypothesis 3C. Examining the new male placements,

female CEO indicator and ROA, WOSB ratios do not show any significant effects, and WOMB.AVE shows a lower coefficient than in the female case. The picture about the differences of correlations between male and female equations verifies the existence of the glass cliff phenomenon in the region. It also informs us that gender composition of the supervisory committee does not correlate much with the gender diversity of executive directors, which means that the presence of female executive board member does not indicate positive discrimination towards female executive board member appointments.

The Table 46 reports probit the results of probit estimations for explaining one more female and male appointments into the management board. ROA means return on assets, WOMB.AVE denotes sectorial average of women on management board ratios, WOSB means women proportion of the supervisory board. MBoardSize counts the number of management board members. FirmSize is the logarithm of firm Total Assets in million euros, Leverage is the Debt to Asset ratio, minority is Minority noncontrolling interest to Equity ratio. Is_ceo_woman indicates female CEO. Four-digit industry dummies (Bloomberg Industrial Classification Systems) are applied.

Table 46 New female and male executive directors (Source: own edition)

	Dependent variable:							
	One more female on the management board				One more male on the management board			
	probit				*probit*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lag(ROA)	-1.220*	-1.210*	-1.242*	-1.230*	-0.022	-0.006	-0.022	-0.007
	(0.633)	(0.637)	(0.635)	(0.640)	(0.447)	(0.449)	(0.447)	(0.449)
lag(WOMB.AVE)		4.711**		4.658**		3.146**		3.143**
		(2.176)		(2.179)		(1.592)		(1.593)
lag(WOSB)			0.244	0.212			0.030	0.016
			(0.359)	(0.362)			(0.251)	(0.252)
lag(MBoardSize)	0.112***	0.115***	0.111***	0.114***	0.170***	0.170***	0.170***	0.170***

	(0.030)	(0.030)	(0.030)	(0.030)	(0.022)	(0.022)	(0.022)	(0.022)
lag(is_ceo_woman)	0.857***	0.814***	0.847***	0.805***	0.286	0.257	0.284	0.256
	(0.203)	(0.205)	(0.204)	(0.205)	(0.182)	(0.183)	(0.183)	(0.184)
FirmSize	0.104**	0.104**	0.108**	0.107**	0.038	0.037	0.038	0.037
	(0.047)	(0.047)	(0.047)	(0.047)	(0.033)	(0.033)	(0.033)	(0.033)
minority	-0.807	-0.863	-0.774	-0.833	0.560	0.553	0.567	0.557
	(0.855)	(0.858)	(0.859)	(0.862)	(0.589)	(0.588)	(0.592)	(0.591)
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,216	2,216	2,216	2,216	2,216	2,216	2,216	2,216
Log Likelihood	-340.932	-338.570	-340.707	-338.405	-734.624	-732.690	-734.617	-732.688
Akaike Inf. Crit.	787.863	785.141	789.415	786.809	1,575.248	1,573.380	1,577.233	1,575.376

Note: *p<0.1; **p<0.05; ***p<0.01

5.4.6 Does gender diversity count in monitoring activities?

We now focus on the impacts of the gender diversity in the supervisory boards. We learned that the composition of the supervisory directors does not influence the gender composition of the management board. However, supervisors control managers and may specify the selection of managing directors, especially in Poland, where appointments are directly linked to the supervisory board. We look for evidence of more gender diverse supervisory boards taking better care of the activity of firms' executives or perhaps being more cautious in selecting or confirming new persons for managing directors to test Hypothesis 2.

We carry on investigations for the supervisory committee analogously to the management board examinations. Table 23 reports significant and positive correlations between the number of female supervisors and firm performance, and the significant positive direction remains after re-estimating the equation with the sectorial average of women on the supervisory board ratio (WOSB.AVE) instrumental variable. By checking the applicability of the instrument, we find that the null of irrelevant instrument is rejected by the F-test, the null of instrument invalidity is rejected by the Sargan-Hansen J test, and the Hausman-Wu test of endogeneity suggests that rejecting the WOSB variable is exogeneous. Thus, there is endogeneity, and the instrument seems to be appropriate. The estimated coefficients of the instrumental approach in equation 2

are for the positive role of female supervisors. Comparing the results of different specifications, the message is not very robust, and neither the partial dummies nor the coefficients for Tobin's Q are significant. Table 24 repeats the analysis for the female presence indicators. Unfortunately, we could not reject the irrelevance of the instrument in this examination; however, the exogeneity of DS is rejected at a 1% level of significance and therefore an instrumental approach should be used. Thus, we decided to still report the output without making any conclusions from that. A reasonable argument for why WOSB would work and DS would not work is that only one female presence is not enough to realize the advantage of gender diversity on boards that consists of around five to ten members.

We can report non-robust evidence with respect to higher ROA through better monitoring activity of the diverse supervisory committees only if we assume no endogeneity between past firm performance and the gender diversity of supervisory boards and no evidence with respect to the impact of Tobin's Q. That does not entirely verify Hypothesis 2. According to the results of the Hausman tests, all fixed effects models appropriate versus the random effects models.

The Table 47 summarizes the estimation results of fixed effect individual one-way within panel models with year dummies (OLS estimation: equations 1, 3, 4, 5, 7, 8; G2SLS IV: equations 2, 6). The target variables are return on assets (ROA, in percentage points) and logarithm of Tobin's Q (log Q). WOSB equals to the women on supervisory board ratio. WS indicates the number of women on the supervisory board. SBoardSize counts the number of supervisory board members. FirmSize is the logarithm of firm Total Assets in million euros, Leverage is the Debt to Asset ratio, minority is Minority noncontrolling interest to Equity ratio. Is_ceo_woman indicates female CEO. Sectorial average of women on supervisory board ratios is applied as instrument of WOSB. The robust standard error of each coefficient is shown in parentheses.

Table 47 Women on supervisory board: fixed effect panel and IV estimations (Source: own edition)

	Dependent variable:							
	ROA				log Q			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

lag(WOSB)	5.543**	36.827*			-0.005	0.748		
	(2.680)	(20.529)			(0.251)	(1.055)		
lag(WS)			0.925*				0.004	
			(0.475)				(0.040)	
lag(I(WS > = 1))				0.566				0.062
				(0.706)				(0.064)
lag(I(WS > = 2))				0.287				-0.033
				(0.854)				(0.066)
lag(I(WS > = 3))				0.325				-0.009
				(0.804)				(0.097)
lag(SBoardSize)	0.082	0.467	-0.017	0.004	-0.048**	-0.039*	-0.048**	-0.049**
	(0.258)	(0.516)	(0.248)	(0.244)	(0.020)	(0.023)	(0.020)	(0.020)
FirmSize	1.249	1.734	1.252	1.159	-0.068	-0.062	-0.068	-0.070
	(1.978)	(1.851)	(1.987)	(2.014)	(0.104)	(0.108)	(0.105)	(0.105)
lag(Leverage, 2)	1.464	1.506	1.496	1.522	-0.332	-0.279	-0.330	-0.313
	(3.285)	(3.387)	(3.285)	(3.299)	(0.270)	(0.270)	(0.270)	(0.272)
minority	-2.451	-0.665	-2.394	-2.782	-0.054	-0.057	-0.056	-0.090
	(14.507)	(14.773)	(14.507)	(14.513)	(0.950)	(0.959)	(0.951)	(0.941)
lag(is_ceo_woman)	-0.154	0.943	-0.173	-0.228	-0.008	0.057	-0.006	0.003
	(0.915)	(1.993)	(0.916)	(0.872)	(0.217)	(0.205)	(0.216)	(0.214)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE	FE+IV	FE	FE
Observations	1,467	1,467	1,467	1,467	859	859	859	859
R^2	0.020	0.010	0.020	0.016	0.095	0.076	0.095	0.097

F Statistic	1.924**	-11.633	1.866**	1.323	5.567***	4.062***	5.568***	4.937***
Hausman test	44.11***		42.89***	41.79***	27.32**		28.07***	33.14***

Note:

*p<0.1; **p<0.05; ***p<0.01

5.4.7 Women on supervisory board regressions for countries

Table 48 Women on supervisory board ROA as dependent variable (Source. own edition)

ROA	Full	Hungary	Poland	Czechia	Slovakia	Bulgaria	Romania
lagWOSB FE	+ (**)	+	+	–	+	–	–
lagWOSB FE+IV	+ (*)	+	–	+	+	–	+
lagWS	+ (*)	–	+ (***)	+	–	–	– (**)
lagSBoardsize	+	+	+	+	–	+	+
FirmSize	+	+ (***)	+ (**/*)	–	+	+ (*)	–
lagLeverage2	+	+ (*/**)	+	+	+	+	+
minority	–	–	–	+	+	–	–
lagisceowoman	–	+	–	NO	NO	+	+
F-test	./**	**/ ***	***	***		./*	
Hausman test	***	***	***	***		*/**	
Observations	1467	77	1235	54	26	98	19

For supervisory board and ROA as a dependent variable, we can also observe a dominant effect due to the high share of Polish companies. For all variables the signs are the same for regressions on the whole database and for Poland but except the IV regression model. The change in sign for the lag WOSB variable between the FE and IV regressions is only observed for the Czech Republic, however, this change in sign is not observed for the whole database. The results for countries show a mixed picture. The signs of lag WOSB in fixed effects and IV regression model are the same for the full database, and for Hungary and Slovakia. The signs of lag WS are the same for the full database, and Poland and the Czech Republic. Moreover, the appropriate only for Hungary, Poland, and the Czech Republic. The Hausman tests only confirms the fixed effects models for Bulgaria, the Czech Republic, Hungary, and Poland.

Table 49 Women on supervisory board Tobin's Q as dependent variable (Source: own edition)

log Q	Full	Hungary	Poland	Czechia	Slovakia	Bulgaria	Romania
lagWOSB FE	–	+	–	–	NO	–	–
lagWOSB FE+IV	+	–	–	–	NO	–	–
lagWS	+	+	–	– (***)	NO	–	+
lagSBoardsize	– (**)	+	– (**)	+	NO	NO	–
Firm Size	–	–	– (*)	– (***)	NO	–	–
lagLeverage2	–	+	–	– (***)	NO	+	–
minority	–	+ (**)	+	+	NO	–	–
lagisceowoman	+/–	NO	+	NO	NO	NO	+
F-test	***	***	***	***		*/**/***	***
Hausman test	***	***/.		***		*/.	
Observations	859	60	797	53		16	15

For log Q as a dependent variable, the change in sign for the lag WOSB variable between the FE and IV regressions is only observed for Hungary but in the opposite direction. The sign of lag WOSB are negative for all countries. The sign of lag WS is positive for the full database, and for Hungary and Romania. The models are appropriate for all countries, except for Slovakia. For Slovakia, none of the log Q regression models worked. The Hausman tests only confirms the fixed effects models for Bulgaria, the Czech Republic, and Hungary.

5.4.8 Does glass cliff selection of female supervisory board members exist?

To shed some light on the determinants of the new female and male supervisory directorial appointments, we repeat the studies already carried out with probit estimations. Table 25 indicates no significant correlation between the past performance and the new female supervisory appointments. In other words, this does not support Hypothesis 3A for supervisory boards (despite WOSB proving to be endogenous before, ROA may correlate with the gender ratio of supervisory boards in many ways). Female percentages of the sectorial average of WOSB and firm-level WOMB positively and significantly influence female appointments, but this does not hold for men. Thus, female-supportive environments positively affect the supervisory appointments of women, which supports the versions of Hypothesis 3B and 3C applied to supervisory boards. According to the results of the Hausman tests, all fixed effects models appropriate versus the random effects models.

The Table 50 summarizes OLS estimations: equations 3, 5, G2SLS IV: equations 4, 6, probit model for predicting DM: equation 1, first stage model of IV estimation: equation 2. Sectorial average of women on supervisory board ratios (WOSB.AVE) is applied to estimate DS.pred, which is used as instrument of WOSB in equations 4 and 6. DS indicates the female presence on the supervisory board. SBoardSize counts the number of supervisory board members. FirmSize is the logarithm of firm Total Assets in million euros, Leverage is the Debt to Asset ratio, minority is Minority noncontrolling interest to Equity ratio. Is_ceo_woman indicates female CEO. Robust standard errors are reported eq. 3-6.

Table 50 Female presence on the supervisory boards (Source: own edition)

	Dependent variable:					
	DS	lagDS	ROA		logQ	
	probit	*panel*	*panel*		*panel*	
		linear	*linear*		*linear*	
	(1)	(2)	(3)	(4)	(5)	(6)
WOSB.AVE	4.774***					
	(0.697)					
lag(DS.pred)		0.502*				
		(0.267)				
lag(DS)			1.771**	45.936	0.065	-1.154
			(0.812)	(29.033)	(0.063)	(5.136)
lag(SBoardSize)	0.101***	-0.008	-0.005	-0.479	-0.049**	-0.027
	(0.019)	(0.026)	(0.254)	(1.242)	(0.020)	(0.099)
FirmSize	-0.016	0.002	1.169	1.293	-0.070	-0.042
	(0.020)	(0.054)	(1.969)	(2.327)	(0.104)	(0.167)
lag(Leverage, 2)	-0.717***	0.062	1.463	1.628	-0.323	-0.484
	(0.188)	(0.143)	(3.260)	(6.777)	(0.269)	(0.711)

minority	-1.471***	-0.211	-2.177	12.561	-0.042	-0.280
	(0.442)	(0.250)	(14.564)	(22.920)	(0.950)	(1.234)
lag(is_ceo_woman)	0.125	-0.120	-0.200	3.503	0.003	-0.192
	(0.133)	(0.098)	(0.905)	(5.379)	(0.210)	(0.914)
Constant	-0.982***					
	(0.150)					
Firm FE	No	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes
Model	Probit	First stage	FE	FE+IV	FE	FE+IV
Observations	2,216	1,467	1,467	1,467	859	859
R^2		0.014	0.022	0.008	0.097	0.004
Log Likelihood	-1,488.037					
Akaike Inf. Crit.	2,990.073					
F Statistic		1.303	2.072**	-74.707	5.709***	-21.407
Hausman test			40.65***		26.84**	
Note:						*p<0.1; **p<0.05; ***p<0.01

5.5 Discussion

We examined three hypotheses to gain a better understanding of how gender diversity in management and supervisory boards relates to firm performance in Central Eastern European region. Through our first result (Hypothesis 1), we find that a female presence on management boards correlates negatively with firm performance at first glance. However, if we take into account the effects of past performance on the gender diversity of management boards, we can observe that a female presence enhances the operative performance of the following year, as well as that of the future outlook, despite the fact that the number of women directors is below the critical mass. We argue that gender diversity on executive boards created value on CEE listed firms between 2007 and 2016. However, the estimated coefficient of this effect is only significant at a level of 10%.

Interestingly, through our second result (Hypothesis 2), a higher proportion of women in the supervisory committee does not indicate much for their appointment. At the same time, the results suggest some positive ROA correlations for those estimations, which use the ratio of females. However, this relationship does not hold for Tobin's Q, and does not hold using female presence indicators. The IV estimation confirms the slightly positive effects, but only for ROA and only at a significance level of 10%.
The learned picture is similar to the CEE region and Western Europe in terms of the operational performance. Furthermore, we can talk about slightly positive effects even under the critical mass in CEE. However, in contrast to the Western European area, the stock market does not devalue firms in Central and Eastern Europe, and there is a slightly positive effect to Tobin's Q.

Looking at our third result (Hypothesis 3), by exploring the driving factors of new female and male executive placements, the findings confirm the existence of the glass cliff phenomenon in the region, but we cannot detect strong evidence with respect to glass cliff for supervisors. The results also show us that women members of supervisory boards do not result in more women on the management board, but higher management board gender diversity ratios increase the chance of new female supervisory appointments. One possible explanation for this is that a favorable firm climate attracts more women. Our findings support the ideas about new female executive and supervisory directors and point to a higher chance of a higher female ratio on the boards in the sector on average, which supports social network explications.

The Table 51 reports probit the results of probit estimations for explaining one more female and male appointments into the management board. ROA means return on assets, WOSB.AVE denotes sectorial average of women on supervisory board ratios, WOMB means women proportion of the manegement board. SBoardSize counts the number of supervisory board members. FirmSize is the logarithm of firm Total Assets in million euros, Leverage is the Debt to Asset ratio, minority is Minority noncontrolling interest to Equity ratio. Is_ceo_woman indicates female CEO. Four-digit industry dummies (Bloomberg Industrial Classification Systems) are applied.

Table 51 New female and male supervisory directors (Source: own edition)

	Dependent variable:							
	One more female on the supervisory board				One more male on the supervisory board			
	probit				*probit*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
lag(ROA)	-0.777	-0.904*	-0.691	-0.817	-0.481	-0.440	-0.532	-0.491
	(0.509)	(0.513)	(0.509)	(0.514)	(0.423)	(0.424)	(0.425)	(0.426)
lag(WOSB.AVE)		6.864***		6.846***		-2.977*		-2.949*
		(2.127)		(2.132)		(1.791)		(1.792)
lag(WOMB)			0.593**	0.590*			-0.350	-0.344
			(0.299)	(0.302)			(0.285)	(0.285)
lag(SBoardSize)	0.073***	0.072**	0.071**	0.070**	0.251***	0.252***	0.252***	0.253***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.026)	(0.026)	(0.026)	(0.026)
lag(is_ceo_woman)	0.110	0.079	-0.118	-0.150	0.219	0.232	0.340	0.350*
	(0.201)	(0.202)	(0.232)	(0.234)	(0.182)	(0.183)	(0.209)	(0.209)
FirmSize	0.033	0.036	0.039	0.042	-0.020	-0.022	-0.023	-0.025
	(0.038)	(0.038)	(0.038)	(0.038)	(0.033)	(0.033)	(0.033)	(0.033)
minority	-0.263	-0.337	-0.314	-0.396	-0.277	-0.247	-0.255	-0.229
	(0.719)	(0.719)	(0.721)	(0.722)	(0.606)	(0.608)	(0.608)	(0.610)
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,216	2,216	2,216	2,216	2,216	2,216	2,216	2,216

Log Likelihood	-518.607	-513.304	-516.777	-511.526	-787.955	-786.600	-787.194	-785.865
Akaike Inf. Crit.	1,143.214	1,134.607	1,141.554	1,133.053	1,681.910	1,681.200	1,682.388	1,681.731

Note: *p<0.1; **p<0.05; ***p<0.01

Theoretical implications are diverse. We have to consider the contradictory, and even paradoxical forces to uncover the true consequences of socialist gender order. It is obvious from the numbers that 40 years of full employment of women, global pressure on equality in education, multinational company's gender practice and its consequences on CEE subsidiaries pushes more gender equality in the region, even though the dominant rhetoric moves gender relations towards more traditional directions. These contradictory forces lead to higher representation of women on board positions, but also leaves men and women less equipped with understanding gender processes and gender theories. It is essential in the region that gender theorizing should shift from sociology literature to organizational literature. Otherwise, men and women educated in business schools cannot reflect on their positions and they are unable to understand processes they participate in. More quantitative and even more qualitative (in-depth, insightful) research about genders in organizations are needed and research results should be included in business and management education from bachelor's to MBA and Ph.D. level.

The practical implications are even more straightforward. The region has female talents and educated and experienced female managers are ready to be invited to corporate boards. The talent pool might be even larger than in the West. Organizational cultures though might be influenced by overall societal rhetoric, which are disadvantageous for women, as gender equality is either labelled as legacy of socialist past or inflow from the West, which is not embedded in the local cultures. While this traditionalizing overtone might be strong on general societal cultural level, organizational cultures might slowly change when women reach critical mass and gender balanced groups could lead important organizations in the region. This might happen without gender quotas, which are largely opposed in CEE by the general public. At the same time, reflections on gender roles and gender processes cannot be avoided, and essentializing tendencies should be consequently elided, otherwise the traditionalizing ideology might prevent to reach gender balance at the corporate boards.

The main message is that one can observe negative correlations between higher gender diversity and firm performance, however glass cliff may strongly bias this observation at least in the case of management boards, and gender diversity is not bad and even it can be good for the firm performance. What is important is that the increasing number of top firms with a female director does not have any negative impact in general.

5.6 Limitations and future directions of the research

Finally, we summarize the major limitations of our research. Our first concern is the corporate data quality of the region. Annual reports were available online, but often in a very brief version with a shortage of relevant information and in the original language. A more detailed dataset may solve our question of conducting dynamic panel estimations with a generalized method of moments. The second concern is about the measurement challenges. There are no women in many observed situations, and if there are, the number is rather low (1–3). Therefore, applying nonlinear-like (many zeros and only a few ones, twos and threes) women-on-board numbers or ratios do not grant that linear models will work in the usual way. Consequently, we are faced with the difficulties of creating appropriate instrumental variables because of this nonlinearity. Our third concern is about the concept of empirical strategy, namely, we can never differentiate with certainty whether the cause of higher/lower performance is the gender of the observed persons, or that their gender is only an indicator of the real cause. For example, a more inclusive organizational culture or environment, which may be more resilient in term of firm performance. It is also known that our approach is able to capture the main tendencies, but qualitative research should be employed to get a clearer picture about the recognized mechanisms.

Based on the lessons learned and the questions left open, we suggest some possible directions for future research. One is to know better about the board experience of the female leaders in the region in terms of tokenism and managerial selection and getting a better understanding of their decisions about the family and work trade-off. Oakley (2000) mentions many reasons for selection, it could be tested by using the profile of the managers and interviewing them about their perceptions and choices. From the business case perspective, not only would the performance on average be interesting to evaluate, but the risk mitigation role of female directors as well. This could be measured by the frauds and any operational breakdowns documented publicly or privately by the companies.

5.7 Interpretation the regression results for countries

Repeating the fixed effects and iv regressions, the results are as follows. For ROA as a dependent variable, the percentage of women on the management board (WOMB) and the number of women (WM) has a positive impact on firm performance for Hungary and Slovakia but negative for Bulgaria, the Czech Republic, Poland, and Romania. For IV regression, the change in the sign of the WOMB from negative to positive is observed in the same way as for the entire database. For Tobin's Q as a dependent variable, the percentage of women on the management board (WOMB) and the number of women (WM) have a positive impact on firm performance for Bulgaria, Hungary, Poland, and Romania but a negative for the Czech Republic. For IV regression, the change in the sign of the WOMB from negative to positive is observed, but the Czech Republic, this change is positive, for Bulgaria and Poland is negative. For ROA as a dependent variable, the percentage of women on the supervisory board (WOSB) has a positive impact on firm performance for Hungary, Poland, and Slovakia. In contrast, the number of women (WS) has a positive impact on firm performance for the Czech Republic and Poland. For IV regression, the WOSB's sign change from negative to positive is observed for Poland and Romania, but this change is negative for the Czech Republic

For Tobin's Q as a dependent variable, the percentage of women on the supervisory board (WOSB) has a positive impact on firm performance for only Hungary. The number of women (WS) has a positive impact on firm performance for only Hungary and Romania. For IV regression, the change in the sign of the WOMB from negative to positive is observed only for the entire database.

For ROA as a dependent variable, female presence on management board (DM) has a positive impact on firm performance for only Slovakia. Female presence on supervisory board (DS) has a positive impact on firm performance for Bulgaria, the Czech Republic, Hungary, and Poland. For Tobin's Q as a dependent variable, female presence on management board (DM) has a positive impact on firm performance for Bulgaria, Hungary, and Romania. Female presence on supervisory board (DS) has a positive impact on firm performance for Poland and Romania.

5.8 Conclusions

The postsocialist legacy has controversial consequences in terms of female top management employment, but the positive consequences are stronger; ratios of the middle and top female managers have grown in the last decade. The ratios are higher than in many Western European countries (except France and the Scandinavian states. For numbers see Oostveen et al. (2014)).

At first sight, it looks like firm performance decreases after a women director is appointed. Our findings confirm that glass cliff distorts the nomination of the directors. When we eliminate the effect of glass cliff, we find a slightly positive effect of female executive appointment in the next year's corporate performance. Thus, higher gender diversity should not be harmful. We also learn from nomination statistics that there is no positive discrimination towards women. Namely, more women on supervisory boards does not mean that they would appoint more women on executive boards. A managerial implication of these lessons suggests developing the organizational culture towards a more inclusive organization that may reduce distortion of managerial selection, and the resulting higher gender diversity may not worsen the performance. The situation outlined from the empirical analysis is that in spite of the relatively advantageous past position of the female workers in the past, recent female directors are often in token roles, and many times they enter on the board only if the firms' operation is not attractive for male top managers. The good news is that the firm performance improves when a female or females are present, even if there are many cases, when the number of women is below the critical mass among the executive directors. The study did not explore why the token women are able to affect the firm performance positively, the regional characters of this observation could be a possible pathway to future research. Altogether, we encourage CEE firms to consider employing more female executive directors and not only in the bad periods.

6 Summary

In the dissertation, after an extensive literature review, the authors presented the results of two published papers.

The analysis of the impact of the board of directors on firm performance is a popular research topic in the corporate governance literature. The generally accepted view that the board size has a negative impact on firm financial performance in developed economies. Usually, researchers explain this that larger boards have more agency costs, when the board becomes larger, coordination failures occur, communication between board members becomes difficult. Lipton and Lorsch (1992) emphasized that the only way to improve firm performance is to improve the efficiency of the Board of Directors, and that board size is important. Jensen (1993) thought that optimal board size exists, neither a board that is too small nor too large is favorable for financial performance. For example, Purushottam (2019) thinks the same when he writes that: "… *medium size boards are found to perform better than either very small or very big boards*" investigating BSE-100 companies. Researchers analyze the relationship between

board size and financial performance in empirical papers. One of the well-known studies is Yermack's paper (1996) in which the author showed that board size has a significantly negative impact on firm performance, regardless of, if firm performance is proxied with Tobin's Q or ROA, in OLS and firm fixed effects econometric methods on US data. Later, more researchers confirmed this negative effect, such as Vafeas (1999), Cheng et al. (2008), Coles et al. (2008) with US data, Bozec (2005) with the Canadian data, Conyon and Peck (1998) with the Danish, Dutch, French and Italian data, Bennendsen (2008) with Danish data, Eisenberg (1998) with Finnish data, Postma et al. (2001) with Dutch data, Loderer and Peyer (2002) with Swiss data, Beiner et al. (2004) also with Swiss data, Mak and Kusnadi (2005) and Haniffa and Hudaib (2006) with Malaysian data, and Mak and Kusnadi (2005) with Singapore firm data, Guest (2008) with British data, Nguyen et al. (2015) with Australian data. However, relatively few researchers analyzed the relationship between board size and financial performance on data from the CEE countries.

Gugler et al. (2014) found a significantly positive relation between board size and Tobin's Q in Central Eastern European (CEE) countries. Moscu (2013) found an insignificant positive relation between board size and firm performance in Romania. Ionascu et al. (2018) found an insignificant negative between board size and ROA in OLS model, and an insignificant positive effect in firm fixed effects model in Romania. Moreover, Ionascu et al. (2018) found an insignificant positive relationship between market to book value ratio and board size. Dobija and Kravchenko (2017) found an insignificant negative relation between board size and firm performance (ROE, ROA) among Polish companies. Pintea et al. (2020) did not find a significant impact of corporate governance indicators on financial performance measures ((ROE, ROA, EVA, TSR), but a significant positive relationship for Tobin's Q. Achim et al. (2015) examined the relationship between corporate governance and business performance in Romania and found a positive correlation between corporate governance quality and the market value of companies measured by Tobin's Q. Przybylowski et al. (2013) examined the role of independent supervisory board members in Central and Eastern European countries. The authors found no evidence that the independence of the supervisory board members would increase the effectiveness of the company but to lower agency costs and to increase the safety of company operations in the long run. Bistrova and Lace (2012) examined corporate governance influence on firms' financial performance in CEE countries. The authors found that "*the companies with the best CG ratings delivered below average profitability (Return on Equity, profit margin, operating cash flow to equity) and business efficiency (asset turnover)*."

Moreover, the authors found that worst companies (companies with worst corporate governance indicators) outperformed the other firms with financial performance.

Although the literature on corporate governance consists mainly of empirical studies, many studies approach the role of the board of directors from a theoretical perspective. The academics who support agency theory think that the board's primary role is to monitor management and protect the owners' interests. According to stakeholder theory, the board's role is to protect stakeholders' interests. The stewardship theory thinks that the role of the board of directors is management empowerment and reputation. According to resource dependence theory, the primary role of the board of directors is to complement the board (co-optation). A board with solid external connections is a cooperative mechanism for firms to access external resources. Adams, Hermalin, and Weisbach (2009) summarize the role of the Board of directors from a theoretical perspective. The duties of the members of the Board of directors are the following: monitoring the management, management advice, creating a corporate strategy and vision; hiring, firing, and assessment of management; controlling the CEO (chief executive officer); selecting the CEO, and project selection. In the Anglo-Saxon governance structure, which is called one-tier, the Board of directors consists of inside directors (or executive directors) and outside directors (or non-executive). From the empirical research perspective, whether the corporate governance structure is one-tier or two-tier is essential. In the one-tier structure, the analysis of the independence of the Board (the ratio of the outside directors on the Board) and the CEO-Chairman duality (the CEO and the Chairman of the Board, whether the same person is) is important. Adams, Hermalin, and Weisbach (2009) summarize the role of outside directors. They write that many firms have bankers on their boards. The reason is that bankers can monitor the firm for the lender and provide financial expertise. Many American firms have been founded by venture capitalists, Adams, Hermalin and Weisbach (2009) mention that the presence of venture capitalists affects the firm strongly even after having sold their shares and leaving the Board since decreasing the bargaining power of the CEO. On American boards, political-connected directors or directors of other firms' CEO can also be found, and stakeholder representatives also.

Researchers see the diversity of the board of directors as an advantageous characteristic. Board diversity refers not only to age, race, gender, education, background, skills, and experience but also to fewer tangible factors, such as personal beliefs and attitudes. Academic studies and research projects show a strong correlation between board diversity, financial performance, and value creation. In addition, diversity brings many benefits to the board. These include better

decision-making, access to a broader range of talent, better customer insight, improved investor relations, a more substantial corporate reputation, and better-quality corporate governance. Inclusive and diverse boards are more likely to be effective boards. Board diversity is a competitive advantage in a globalized economy and a key driver of growth and value creation. In the dissertation, the gender diversity of the board is investigated.

A generally accepted view is that more women on corporate boards are favorable for firms. For example, the By Women's Leadership Foundation summarizes what values women can bring to boards. The think that "*Boards with more than one woman on their boards performed better than all-male boards*." "*Data argues good reasons to include women on corporate boards. Global companies with more than 1 woman on the board have better performance than those with zero women*." Phillips (2017) mentions to build teams or organizations which are capable to innovate must be diverse. Phillips (2017) writes that "*Diversity enhances creativity. It encourages the search for novel information and perspectives, leading to better decision making and problem solving*."

Moreover, the European Union urges its member states to introduce quota regulations in their national legislation. Ahern (2012) summarizes that Gender equality in governance code exists from 2004 in Sweden, from 2008 in Denmark, from 2006 in Spain, from 2009 in Australia, Belgium, Germany, Luxembourg, Norway, and the United States, from 2010 in Austria, Finland, France, the Netherlands, Poland, and United Kingdom. There is mandatory quota in Belgium (33%), Finland (40%), France (40%), Iceland (40%), Italy (30%), Netherlands (33%), Norway (40%), and Spain (40%). Central and Eastern Europe is unique in terms of women in management and female employment. After the Second World War, these countries were under socialist regime, and as part of the ideology, equality between the genders was on the agenda from the late 1940s. In developed economies, gender research has a vast literature but according to Rybnikova (2018), gender literature in CEE is relatively silent about organizational and management consequences of the unique gender relations.

Hypotheses development of the analysis between board composition and firm performance is based on literature reviews and suggestions provided by Terjesen, Sealy, and Singh (2009) and Kirch (2018). Resource dependency, institutional and agency theories argue why gender diversity is beneficial for firms. According to the resource dependency theory (Pfeffer/Salancik 1978), female executive leaders may bring new approaches into communication and business networks, or they may provide other advantages for corporations. According to the institutional

theory developed by Bilimora (2000), a female board presence signals that a firm recognizes the high performance of its female employees. Beyond this indication of institutional quality, it also means that the selection of managers is less biased with respect to gender, inducing a better quality of the board. The agency theory (Fama and Jensen, 1983) applied by Aguilera, Filatotchev, Gospel, and Jackson (2008) states that gender diversity of directors may better facilitate the resolution of conflicts between the management board and the shareholders.

Researchers see the diversity of the board of directors as an advantageous characteristic. Board diversity refers not only to age, race, gender, education, background, skills, and experience but also to fewer tangible factors, such as personal beliefs and attitudes. Academic studies and research projects show a strong correlation between board diversity, financial performance, and value creation. In addition, diversity brings many benefits to the board. These include better decision-making, access to a broader range of talent, better customer insight, improved investor relations, a more substantial corporate reputation, and better-quality corporate governance.

Several studies report positive impacts of board gender diversity on ROA, such as Carter et al. (2010) for the US, Liu, Wei, and Xie (2014) for Chinese firms, Oostveen, Dam and Hermes (2014) for 19 European states, and Terjesen, Couto and Francisco (2015) for a global sample with 47 countries. Ciavarella (2017) documents a positive relationship in the case of the executive boards in a sample of the five largest European countries (Italy, France, Germany, Spain, UK) between 2006 and 2016. Dang and Nguyen (2016) for France, Karayel and Dogan (2016) for Turkey confirm this positive role played by gender diversity. However, others do not find significant impacts for Spanish firms (Gallego-Alvarez/Garczía-Sánchez/Rodríguez-Dominguez (2010)), and for Indonesian listed firms (Darmadi 2013). Among the scant evidence of the non-listed firms, Daunfeldt and Rudholm (2012) report negative effects on ROA after two years on Swedish data. Alternative performance measures, such as return on equity (ROE) and return on sales (ROS) are usually applied for robustness checks (positive impact on ROE was found by Lückerath and Rovers (2013), Karayel and Dogan (2016), Ayuso, Rodriguez, Garcia and Ariño (2007)).

Many of the studies revealed negative effects on Tobin's Q, for US firms (Adams/Ferreira 2009, Carter et al. 2010), for the UK firms (Shehata/Salhin/Moataz 2017) or for Norwegian corporations (Ahren/ Dittmar 2012; Voß 2015). Further findings support this view, such as Dang and Nguyen (2016) for French, Darmadi (2013) for Indonesian, and Abdullah (2014) for Malaysian listed companies. However, on a European (Oostveen/Dam/Hermes 2014) or a

global level (Terjesen/Couto/ Francisco 2015), evidence exists on the positive effects of board gender diversity. In Spain (Campbell/Mínguez-Vera 2008; Gallego-Alvarez et al. 2010), and in India (Jackling/Johl 2009), the relationship also seems to be positive. Numerous authors find an insignificant correlation in other European countries (Ciavarella 2017; Marinova/Plantenga/Remery 2015; Rose 2007).

Dunavölgyi (2016) provides an overview bout the literature on women and men in senior management. Dunavölgyi (2016) cites Alvesson and Billing (1997), who developed a framework to analyze the relationship between women and management. The four dimensions are ethical/political considerations, emphasis on gender similarities, emphasis on gender differences, and emphasis on organizational efficiency. The four approaches are equal opportunities, alternative values, meritocracy, and special contribution. Dunavölgyi (2016) presents basic concepts, definitions following papers. Definitions were defined for the concepts of sex (Broadbridge – Hearn, 2008), gender (Unger, 1979; Calás – Smircich, 1996; Archer – Lloyd, 2002; Powell – Graves, 2003; Lippa, 2005), gender stereotypes (Gherardi, 1994; Kite et al., 2008) and gender roles (Eagly et al., 2000; Wood – Eagly, 2010). Dunavölgyi (2016) reviews the literature on feminine leadership culture as comparative advantage, the ideal composition of management, meritocracy, and barriers to equal opportunities.

In the dissertation the author presents the empirical results of two published papers. The title of one of the studies is, *Do larger boards improve shareholder value creation? – Effects of the board size on the business performance in Eastern Central Europe*, while the title of the other is, *Does female presence on corporate boards impact firm performance? Evidence from Central Eastern Europe*. The database consists of the 300 largest market capitalization companies in the CEE region (Bulgaria, the Czech Republic, Hungary, Poland, Romania, and Slovakia) excluding firms from financials and utilities. Financial data have been downloaded from the Bloomberg monitor system, while information on corporate boards have been collected manually from annual reports. Financial data are year-end data (December 31), while the size of the board (number of directors) reflects the status as of January 1 in the given year. The dataset covers years 2007 to 2016.

In the analysis of the relationship between board size and financial performance, the author uses fixed effects and dynamical effects panel regression techniques. In the analysis of the relationship between board composition and financial performance, the author uses fixed

effects panel regression, G2SLS instrumental regression techniques, and probit model for predicting some regressors.

In the chapter, the impact of board size on firm financial performance, the primary research question is: How board size affects financial performance?

However, the study tries to answer for the next two research questions also: How the outside director ratio affects financial performance? How does large cash affect management board?

The author sets up the following hypotheses.

H1: Based on Figures 1-2, a negative relation between management board size and firm market performance measures can be expected.

H2: Based on Figure 3, a positive relation between management board size and firm operational performance measures can be expected.

Based on pairwise correlation, the following hypotheses can be expected.

H3: Based on pairwise correlation, a positive relation between outside director ratio and firm market performance measures can be expected.

H4: Based on pairwise correlation, a negative relation between outside director ratio and firm operational performance measures can be expected.

H5: Based on the study of Guest (2008), using board size multiplied by firm size interactive term, board size has a positive impact on firm performance, but this interactive term has a negative impact on firm performance.

The main results of the research that the management board has a significant positive impact on both market and operational performance measures, but this effect is limited, which is shown by the significant negative sign of the interaction term between board size and firm size. Firm performance cannot be improved if management board size increases along with firm size. The outside director ratio also has a positive impact on a firm's performance measures in dynamic regression models and this effect is significant for Tobin's Q and the market-to-book value ratio. The interaction term between management board size and cash has the same effect on firm performance as the outside director ratio. These results indicate that larger cash can have a disciplining effect on the management board.

Testing the hypotheses, H1 is not supported, but H2 is. Controlling individual firm characteristics in firm fixed effects or in dynamic panel regression models, the impact of management board size on firm market performance is the opposite as the pairwise correlations would indicate. In the case of firm operational measures, this individual firm characteristic does not matter. H3 is only supported in the dynamic regression models, but H4 is rejected. Moreover, the outside director ratio has a positive impact on firm operational performance according to both regression techniques. H5 is supported by both regression techniques.

For countries, the results of the dynamical panel regression models show that Bulgaria, the Czech Republic, and Poland's management boards positively impact financial performance. In contrast, for Hungary, the effect is the opposite. However, significant effects can only be observed in Bulgaria and Poland. Moreover, according to empirical results, a large management board is favorable for Hungarian firms, but the effect is not significant. Large boards for Bulgaria, the Czech Republic, and Poland negatively impact financial performance, but this effect is only significant for Bulgaria and Poland.

The outside director ratio has a positive impact on financial performance for Bulgarian and Czech firms but a negative for Hungarian and Slovakian firms. However, these effects are not significant. According to the results, large supervisory boards are favorable for Hungarian and Polish firms but small for Czech and Slovakian firms. The disciplinary effect of large cash on the management board can be shown for Czech, Polish, and Slovakian firms.

Discussion of the results of the impact of board composition on firm performance

In the chapter, the impact of board size on firm financial performance, the two research questions are: 1. Do female executive directors enhance or hinder firm performance? 2. What drives the appointment of female and male executive directors? 3. Does gender diversity count in monitoring activities? 4. Does glass cliff selection of female supervisory board members exist?

Based on the former research questions the author sets up the following hypotheses.

Hypothesis 1 The greater the firm’s proportion of female directors on its management board, the better its performance.

Hypothesis 2 The greater a firm’s proportion of female directors on its supervisory board, the better its performance.

Hypothesis 3 The possibility of a new female (management/supervisory) director appointment is higher if

a) the firm's performance was previously weaker; and/or
b) the firm's gender diversity on its boards is higher; and/or
c) the sectorial average of the gender diversity of the boards is higher.

The three arguments may explain a) glass cliff, b) homophily, c) network effects. According to the last, the members of female manager minorities invite each other to participate in their own boards.

Increasing the number of female directors on boards improves the financial performance of companies, and gender diversity on boards creates value. However, in the case of CEE firms, a glass-rock phenomenon can be observed, with the poor financial performance of firms predicting the appointment of female directors. In addition, a higher proportion of female directors on the board than the sectoral average of the previous year increases the likelihood of female appointments. However, a higher proportion of women on the supervisory board does not affect appointments, and the results suggest no significant relationship between the appointment of new female supervisory board members and past financial performance. The sectorial average of female members of supervisory boards and the firm average of female board directors has a significant positive effect on the appointment of female directors. Thus, a pro-women corporate environment positively influences the appointment of female directors to supervisory boards.

Based on the empirical results, the following research questions were answered.

1. Do female executive directors enhance or hinder firm performance?

The empirical results suggest that the presence of women on the board of directors has a significant positive effect on the ROA indicator, and that gender diversity on boards creates value. This supports hypothesis H1.

2. What drives the appointment of female and male executive directors?

Poor financial performance of firms is a predictor of appointments through the glass-rock phenomenon. Supporting H3/a.

A higher proportion of female directors on boards than the industry average in the preceding year increases the likelihood of female appointments. Support H3/b.

A higher proportion of women on the supervisory board has no effect on appointments, which does not support hypothesis H3/c.

3. Does gender diversity count in monitoring activities?

Only non-robust results can be observed, higher ROA through better monitoring activities of different boards if we do not assume that there is no endogeneity between past firm performance and the gender diversity of boards and no evidence of Tobin Q effects. This does not fully support Hypothesis 2.

4. Does glass cliff selection of female supervisory board members exist?

No significant relationship has been found between the appointment of new female board members and past financial performance. This does not support hypothesis H3 a) for the supervisory board. The sectorial average of female members on supervisory boards and the firm average of female directors on boards have a significant positive effect on the appointment of female directors. Thus, a pro-women corporate environment positively affects the appointment of female directors to supervisory boards. Hypotheses H3 b) and H3 c) are accepted.

Contribution of the author to the existing literature

The main contribution of the author to the existing literature is the two published empirical paper. No similar empirical studies have previously been carried out in the CEE region to examine the impact of board size and board diversity on corporate financial performance among the most important listed companies in this region.

Gugler et al. (2014) analyzed the ownership and control among firm in CEE region. Telegdy (2003) also investigated this relationship among Romania, and later among Hungarian firms (Telegdy, 2011). Moscu (2013), Achim et al. (2015), Ionescu et al. (2018), and Pintea et al. (2020) analyzed the relationship between corporate governance and firm performance among Romanian firms, Dobija and Kravchenko (2017) among Polish companies. Przybylowski et al. (2010) examined the role of independent supervisory board members in Central and Eastern European countries, while Bistrova and Lace (2012) examined corporate governance influence on firms' financial performance in CEE countries.

Only a little research has been done in the CEE region on the role of women in management. A special issue of Journal of east European Management (2020) presented the results of similar

papers. Lipovka and Buzady (2020) investigated gender stereotypes about managers in CEE and Central Asian region. Wieczorek-Kosmala (2020) analyzed female representation in management and supervisory boards and risk management practices among Polish firms. Frankiene et al. (2020) reviewed women's political representation at local self-government in Lithuania. Griessbach and Ettl (2020) analyzed the entrepreneurial ecosystem and its impact on female managers in Georgia. Stan (2020) investigated time work practices of Forbes 50 Romania most influential women corporate leaders. Ainsaar et al. (2020) examined the influence of female municipal council members on child-friendly policy implementation during the 2009 economic crises in Estonia. Tokbaeva (2020) analyzed the role of female business owners and managers in the early 2000s and 2010s in Kyrgyzstan.

Limitations and future research directions

The database of the two empirical studies presented in this dissertation consists of secondary data. The main feature of these data is that they are objective, but interview-based surveys can complement this type of data well. For example, Willert et al. (2012) have done similar research. The database currently contains data on the 300 largest companies in six Central and Eastern European countries between 2006 and 2016. The data could be extended in time, with data for the period after 2016 and geographically, with data from companies in several countries, with data from companies in Croatia, Slovenia, or the Baltic countries.

The database could be extended to include the compensation and remuneration of managers, management board members (members of the board of directors), and supervisory board members. Data on the ownership structure of companies could be added to the database. Telegdy (2011) analyzed the relationship between corporate governance and the structure of ownership of Hungarian corporations and also Romanian companies (Telgedy, 2003).

Other possible future research directions could be the analysis between law and finance following LaPorta et al. (1998) or between investor protection and corporate governance (LaPorta et al., 2000). For example, the ownership structure (dispersed or concentrated) affects corporate governance structure, and the legal system and the effectiveness of property rights protection define corporate governance structure.

A further research direction could be to analyze the relationship between corporate governance and risk management. Béláycz (2017) believes risk management should be an integral part of the corporate organization. The moral responsibility of the board of directors also could be a

future research direction. Bélyácz (2017) thinks there are limits to sustainably effective corporate governance, and he stresses the importance of the moral responsibility of the board of directors.

For the board of directors and the supervisory board, the author only examines only gender diversity. The diversity of boards could also be examined by age, expertise, nationality, or political commitment. political-connected directors or directors of other firms' CEO can also be found, and stakeholder representatives also. For supervisory boards, it could be considered to analyze whether they include politically connected directors, CEOs of other companies, or representatives of a stakeholder. Primecz et al. (2017) investigate not only women in terms of diversity but also people from ethnic groups and other minorities, as well as people with disabilities. Nagy et al. (2017) study gender diversity on boards in Hungary. Following their paper, a future research direction could be to investigate obligatory quota regulation, application of the 'comply or explain' principle and the non-regulation of gender representation. How much competition law supports gender diversity on boards of directors and supervisory boards? Is such support needed? Do general management rules or corporate governance recommendations support gender diversity? Whether gender diversity is different at public listed and non-listed companies.

The results of the published papers presented in this doctoral dissertation may interest stock exchange regulators, company managers, and stock exchange investors. In addition, the studies can help to understand the mechanisms related to board size and composition.

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Appendix[8]

Table 52 Fixed effects regressions for Bulgaria Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.240	0.402*	-0.665	-7.289	-0.381	-0.132
	(0.202)	(0.224)	(1.026)	(4.690)	(1.106)	(1.151)
Log Board size*Firm size			0.231	0.254	0.202	0.115
			(0.217)	(0.217)	(0.221)	(0.224)
Outside director ratio		3.033	3.240*	-18.67	3.401*	2.846
		(1.855)	(1.864)	(15.25)	(1.881)	(2.173)
Log Board size*Outside dir.r.				13.10		
				(9.053)		
Firm size	-0.347***	-0.330***	-0.710*	-0.752**	-0.667*	-0.535
	(0.105)	(0.105)	(0.372)	(0.372)	(0.378)	(0.384)
Net Fixed Assets	-0.217	-0.106	-0.0995	-0.0223	-0.0844	-0.342
	(0.361)	(0.366)	(0.366)	(0.369)	(0.367)	(0.365)
Leverage	-0.363	-0.398	-0.333	-0.254	0.596	-0.0577
	(0.440)	(0.438)	(0.442)	(0.444)	(1.407)	(0.431)
CAPEX	0.347	0.168	0.283	0.125	0.367	0.981
	(0.763)	(0.767)	(0.774)	(0.779)	(0.784)	(0.785)
One-tiered management	0.0586	-0.0418	-0.0645	-0.0734	-0.0864	-0.134
	(0.262)	(0.268)	(0.269)	(0.268)	(0.271)	(0.255)
Minority	-0.221	-0.204	-0.236	-0.279	-0.225	-0.0974
	(0.359)	(0.358)	(0.359)	(0.359)	(0.360)	(0.369)
Age	-0.0685***	-0.0719***	-0.0709***	-0.0689***	-0.0735***	0.0280*
	(0.0160)	(0.0160)	(0.0161)	(0.0161)	(0.0165)	(0.0160)
Volatility	4.329***	4.322***	4.319***	4.355***	4.323***	4.358***
	(0.516)	(0.514)	(0.513)	(0.512)	(0.514)	(0.452)
Log Board size*Leverage					-0.654	
					(0.939)	
Log Board size*Cashlag1						2.625*
						(1.443)
Cash lag1						-3.976*
						(2.166)
Constant	3.447***	1.705	3.323*	14.38*	2.852	1.371
	(0.542)	(1.195)	(1.932)	(7.883)	(2.049)	(2.255)
Observations	212	212	212	212	212	194
R-squared	0.504	0.512	0.515	0.521	0.516	0.489
Number of Index	29	29	29	29	29	29
F-test	4.20***	4.20***	4.09***	4.16***	3.99***	3.80***
Hausman test	35.73***	37.53***	37.74***	41.95***	35.24**	34.53**

[8] In the Appendix all tables are own edited.

Table 53 Fixed effects regressions for Bulgaria Market-to-book-value ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.746*	1.106***	-1.315	-10.88	-1.604	-1.259
	(0.383)	(0.422)	(1.930)	(8.858)	(2.086)	(2.194)
Log Board size*Firm size			0.525	0.558	0.554	0.439
			(0.408)	(0.409)	(0.417)	(0.428)
Outside director ratio		6.789*	7.270**	-24.39	7.104**	4.952
		(3.497)	(3.511)	(28.81)	(3.548)	(4.143)
Log Board size*Outside dir.r.				18.93		
				(17.10)		
Firm size	-0.535***	-0.497**	-1.361*	-1.421**	-1.406*	-1.217*
	(0.199)	(0.198)	(0.701)	(0.703)	(0.713)	(0.732)
Net Fixed Assets	-0.216	0.0292	0.0465	0.159	0.0295	-0.752
	(0.683)	(0.689)	(0.688)	(0.695)	(0.691)	(0.695)
Leverage	-0.539	-0.604	-0.465	-0.353	-1.388	-0.422
	(0.820)	(0.814)	(0.819)	(0.825)	(2.620)	(0.805)
CAPEX	1.002	0.584	0.855	0.631	0.765	2.255
	(1.431)	(1.436)	(1.449)	(1.462)	(1.473)	(1.489)
One tiered management	-0.0973	-0.321	-0.373	-0.387	-0.351	-0.295
	(0.497)	(0.506)	(0.507)	(0.506)	(0.512)	(0.486)
Minority	-1.981***	-1.940***	-2.013***	-2.075***	-2.023***	-1.693**
	(0.680)	(0.675)	(0.676)	(0.678)	(0.678)	(0.704)
Age	-0.142***	-0.149***	-0.147***	-0.144***	-0.144***	-0.00325
	(0.0303)	(0.0303)	(0.0303)	(0.0304)	(0.0312)	(0.0305)
Volatility	8.172***	8.154***	8.149***	8.201***	8.144***	8.203***
	(0.977)	(0.970)	(0.968)	(0.968)	(0.970)	(0.862)
Log Board size*Leverage					0.654	
					(1.762)	
Log Board size*Cash lag1						4.152
						(2.752)
Cash lag1						-7.505*
						(4.131)
Constant	4.797***	0.899	4.566	20.55	5.046	3.787
	(1.026)	(2.251)	(3.632)	(14.89)	(3.864)	(4.296)
Observations	213	213	213	213	213	195
R-squared	0.536	0.546	0.550	0.554	0.551	0.515
Number of Index	29	29	29	29	29	29
F-test	3.89***	3.80***	3.76***	3.67***	3.73***	3.76***
Hausman test	24.94*	32.34**	30.90**	36.28***	29.50*	23.66

Table 54 Fixed effects regressions for Bulgaria Total shareholder return as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.162	-0.454	-3.513***	-14.44**	-2.579*	-1.042
	(0.274)	(0.303)	(1.314)	(5.876)	(1.387)	(1.430)
Log Board size*Firm size			0.668**	0.767***	0.583**	0.309
			(0.279)	(0.282)	(0.280)	(0.279)
Outside director ratio		-5.426**	-4.913*	-39.83**	-4.300*	2.029
		(2.514)	(2.489)	(18.48)	(2.488)	(2.708)
Log Board size*Outside dir.r.				21.00*		
				(11.01)		
Firm size	-0.175	-0.203	-1.319***	-1.471***	-1.187**	-0.478
	(0.140)	(0.139)	(0.486)	(0.489)	(0.487)	(0.478)
Net Fixed Assets	-0.555	-0.738	-0.769	-0.578	-0.697	-0.0701
	(0.487)	(0.489)	(0.483)	(0.489)	(0.480)	(0.454)
Leverage	-0.563	-0.516	-0.355	-0.212	3.040*	-0.293
	(0.586)	(0.580)	(0.576)	(0.576)	(1.818)	(0.522)
CAPEX	-1.207	-0.866	-0.576	-0.735	-0.201	0.325
	(1.027)	(1.028)	(1.021)	(1.017)	(1.030)	(0.971)
One-tiered management	0.150	0.328	0.267	0.238	0.182	-0.176
	(0.359)	(0.365)	(0.361)	(0.358)	(0.360)	(0.318)
Minority	0.465	0.435	0.347	0.266	0.372	-0.00366
	(0.490)	(0.485)	(0.480)	(0.478)	(0.476)	(0.460)
Age	-0.123***	-0.117***	-0.114***	-0.111***	-0.123***	0.128***
	(0.0218)	(0.0218)	(0.0215)	(0.0214)	(0.0218)	(0.0199)
Volatility	3.184***	3.196***	3.194***	3.245***	3.214***	3.202***
	(0.707)	(0.699)	(0.690)	(0.685)	(0.684)	(0.564)
Log Board size*Leverage					-2.379*	
					(1.209)	
Log Board size*Cash lag1						-1.866
						(1.798)
CashAssetslag1						4.028
						(2.699)
Constant	3.223***	6.334***	11.11***	29.14***	9.501***	-0.993
	(0.731)	(1.613)	(2.553)	(9.787)	(2.660)	(2.804)
Observations	216	216	216	216	216	196
R-squared	0.492	0.506	0.522	0.532	0.533	0.493
Number of Index	29	29	29	29	29	29
F-test	0.69	0.84	1.07	1.21	1.04	0.74
Hausman test	9.51	14.47	20.13	2282.38***	0.5043	11.94

Table 55 Fixed effects regressions for Bulgaria ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.00899	0.00863	-0.166	0.963	-0.169	-0.0406
	(0.0273)	(0.0306)	(0.135)	(0.602)	(0.144)	(0.183)
Log Board size*Firm size			0.0381	0.0278	0.0384	0.0181
			(0.0286)	(0.0289)	(0.0290)	(0.0357)
Outside director ratio		-0.00666	0.0226	3.631*	0.0204	0.224
		(0.255)	(0.255)	(1.892)	(0.258)	(0.347)
Log Board size*Outside dir.r.				-2.170*		
				(1.127)		
Firm size	-0.00713	-0.00716	-0.0708	-0.0552	-0.0713	-0.0371
	(0.0140)	(0.0141)	(0.0498)	(0.0501)	(0.0505)	(0.0612)
Net Fixed Assets	-0.132***	-0.133***	-0.134***	-0.154***	-0.134***	-0.151**
	(0.0486)	(0.0495)	(0.0494)	(0.0501)	(0.0497)	(0.0581)
Leverage	-0.144**	-0.144**	-0.135**	-0.150**	-0.147	-0.168**
	(0.0585)	(0.0587)	(0.0590)	(0.0590)	(0.188)	(0.0669)
CAPEX	0.0832	0.0836	0.100	0.117	0.0988	0.0507
	(0.103)	(0.104)	(0.105)	(0.104)	(0.107)	(0.124)
One-tiered management	0.00888	0.00910	0.00561	0.00859	0.00592	-0.00204
	(0.0359)	(0.0369)	(0.0369)	(0.0367)	(0.0373)	(0.0407)
Minority	-0.125**	-0.125**	-0.130***	-0.122**	-0.130***	-0.133**
	(0.0490)	(0.0491)	(0.0492)	(0.0490)	(0.0493)	(0.0589)
Age	-0.000535	-0.000528	-0.000339	-0.000635	-0.000307	-0.00467*
	(0.00218)	(0.00221)	(0.00220)	(0.00219)	(0.00226)	(0.00255)
Volatility	-0.0857	-0.0857	-0.0858	-0.0912	-0.0859	-0.0827
	(0.0706)	(0.0708)	(0.0706)	(0.0701)	(0.0708)	(0.0721)
Log Board size*Leverage					0.00859	
					(0.125)	
Log Board size Cash lag1						0.00753
						(0.230)
Cash lag1						-0.0682
						(0.345)
Constant	0.149**	0.153	0.425	-1.438	0.431	0.205
	(0.0731)	(0.163)	(0.261)	(1.002)	(0.276)	(0.359)
Observations	216	216	216	216	216	196
R-squared	0.160	0.160	0.169	0.187	0.169	0.178
Number of Index	29	29	29	29	29	29
F-test	1.47*	1.44*	1.49*	1.65**	1.47*	1.57**
Hausman test	26.72*	24.94	25.92	29.39**	27.35	20.79

Table 56 Fixed effects regressions for the Czech Republic Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.309	-0.352*	-0.851	-0.803	-1.754	-1.388
	(0.199)	(0.185)	(1.305)	(1.404)	(1.520)	(1.247)
Log Board size*Firm size			0.0781	0.0823	0.187	0.162
			(0.202)	(0.209)	(0.223)	(0.191)
Outside director ratio		1.222***	1.204***	1.414	1.229***	1.029**
		(0.427)	(0.434)	(2.143)	(0.433)	(0.390)
Log Board size*Outside dir.r.				-0.141		
				(1.414)		
Firm size	-0.811***	-0.764***	-0.928*	-0.927*	-1.079**	-1.265***
	(0.218)	(0.203)	(0.470)	(0.475)	(0.486)	(0.433)
Net Fixed Assets	0.602	0.163	0.105	0.115	-0.0657	0.179
	(0.625)	(0.600)	(0.624)	(0.640)	(0.639)	(0.586)
Leverage	2.490***	2.191***	2.218***	2.232***	0.184	2.355***
	(0.790)	(0.740)	(0.750)	(0.773)	(1.926)	(0.688)
CAPEX	-0.701	0.118	0.0936	0.0880	0.171	-0.290
	(0.985)	(0.957)	(0.968)	(0.982)	(0.967)	(0.884)
One-tiered management	-	-	-	-	-	-
Minority	20.79	33.22**	34.76**	34.16**	37.96***	33.44**
	(12.91)	(12.73)	(13.47)	(14.90)	(13.71)	(14.15)
Age	-0.00744	-0.00558	-0.00563	-0.00523	-0.00134	0.0232
	(0.0177)	(0.0165)	(0.0166)	(0.0173)	(0.0170)	(0.0177)
Volatility	-1.930	-3.750	-3.689	-3.688	-4.123	-3.475
	(3.188)	(3.023)	(3.058)	(3.094)	(3.070)	(2.728)
Log Board size*Leverage					1.469	
					(1.282)	
Log Board size Cash lag1						0.554
						(1.514)
Cash lag1						0.796
						(2.627)
Constant	6.219***	5.540***	6.579**	6.459**	7.800**	7.963***
	(1.114)	(1.059)	(2.894)	(3.165)	(3.074)	(2.684)
Observations	68	68	68	68	68	63
R-squared	0.646	0.703	0.704	0.704	0.713	0.788
Number of Index	8	8	8	8	8	8
F-test	5.02***	5.98***	5.55***	5.13***	5.36***	7.05***
Hausman test	40.49***	40.62***	39.67***	38.85***	38.89***	34.30***

Table 57 Fixed effects regressions for the Czech Republic MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.437	-0.556	-0.614	0.818	-2.379	-3.286
	(0.536)	(0.495)	(3.498)	(3.705)	(4.106)	(3.321)
Log Board size*Firm size			0.00913	0.134	0.222	0.458
			(0.542)	(0.552)	(0.602)	(0.509)
Outside director ratio		3.415***	3.413***	9.718*	3.462***	2.996***
		(1.142)	(1.163)	(5.656)	(1.168)	(1.039)
Log Board size*Outside dir.r.				-4.250		
				(3.732)		
Firm size	-1.422**	-1.291**	-1.310	-1.300	-1.606	-2.435**
	(0.588)	(0.543)	(1.259)	(1.255)	(1.314)	(1.155)
Net Fixed Assets	0.274	-0.954	-0.961	-0.654	-1.294	-1.782
	(1.685)	(1.604)	(1.672)	(1.688)	(1.726)	(1.560)
Leverage	9.983***	9.145***	9.148***	9.584***	5.174	9.819***
	(2.129)	(1.979)	(2.011)	(2.040)	(5.201)	(1.834)
CAPEX	-0.248	2.041	2.039	1.869	2.190	0.587
	(2.654)	(2.560)	(2.596)	(2.591)	(2.612)	(2.356)
One-tiered management	-	-	-	-	-	-
Minority	69.92*	104.6***	104.8***	86.72**	111.1***	142.4***
	(34.79)	(34.06)	(36.10)	(39.33)	(37.01)	(37.69)
Age	-0.0532	-0.0480	-0.0480	-0.0361	-0.0397	-0.0562
	(0.0478)	(0.0440)	(0.0446)	(0.0456)	(0.0459)	(0.0471)
Volatility	-11.34	-16.43**	-16.42*	-16.40*	-17.27**	-15.56**
	(8.591)	(8.088)	(8.195)	(8.166)	(8.289)	(7.269)
Log Board size*Leverage					2.870	
					(3.461)	
Log Board size*Cash lag1						-1.525
						(4.035)
Cash lag1						7.951
						(6.998)
Constant	10.11***	8.211***	8.332	4.730	10.72	14.67**
	(3.001)	(2.834)	(7.758)	(8.353)	(8.302)	(7.151)
Observations	68	68	68	68	68	63
R-squared	0.635	0.698	0.698	0.707	0.703	0.788
Number of Index	8	8	8	8	8	8
F-test	4.79***	5.85***	5.39***	5.21***	5.11***	7.03***
Hausman test	37.52***	37.40***	36.45***	35.99***	35.32***	31.03***

Table 58 Fixed effects regressions for the Czech Republic TSR ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.514*	-0.556*	-0.141	-0.604	1.876	0.0943
	(0.293)	(0.287)	(2.023)	(2.166)	(2.316)	(2.231)
Log Board size*Firm size			-0.0651	-0.106	-0.308	-0.153
			(0.314)	(0.322)	(0.340)	(0.342)
Outside director ratio		1.201*	1.215*	-0.825	1.159*	1.114
		(0.661)	(0.672)	(3.307)	(0.659)	(0.698)
Log Board size*Outside dir.r.				1.375		
				(2.182)		
Firm size	-0.295	-0.248	-0.112	-0.116	0.226	0.00545
	(0.321)	(0.314)	(0.728)	(0.734)	(0.741)	(0.776)
Net Fixed Assets	-1.142	-1.574*	-1.526	-1.625	-1.145	-1.079
	(0.920)	(0.928)	(0.967)	(0.987)	(0.974)	(1.048)
Leverage	-1.673	-1.968*	-1.990*	-2.131*	2.551	-2.172*
	(1.163)	(1.145)	(1.163)	(1.193)	(2.934)	(1.232)
CAPEX	-1.249	-0.444	-0.424	-0.369	-0.597	-0.393
	(1.450)	(1.481)	(1.501)	(1.515)	(1.473)	(1.582)
One-tiered management	-	-	-	-	-	-
Minority	23.63	35.84*	34.55	40.41*	27.40	22.25
	(19.01)	(19.71)	(20.88)	(22.99)	(20.88)	(25.32)
Age	-0.0375	-0.0357	-0.0357	-0.0395	-0.0452*	0.0180
	(0.0261)	(0.0255)	(0.0258)	(0.0267)	(0.0259)	(0.0317)
Volatility	1.057	-0.731	-0.782	-0.789	0.186	-0.832
	(4.693)	(4.680)	(4.739)	(4.774)	(4.675)	(4.882)
Log Board size*Leverage					-3.280	
					(1.952)	
Log Board size*Cash lag1						4.514
						(2.710)
Cash lag1						-7.186
						(4.700)
Constant	4.017**	3.350**	2.486	3.651	-0.241	1.263
	(1.640)	(1.640)	(4.487)	(4.883)	(4.683)	(4.802)
Observations	68	68	68	68	68	63
R-squared	0.426	0.466	0.467	0.472	0.501	0.506
Number of Index	8	8	8	8	8	8
F-test	2.04**	2.21**	2.04**	1.93**	2.17**	1.94*
Hausman test	11.20	13.48*	10.05	53.76***	11.88	7.66

Table 59 Fixed effects regressions for the Czech Republic ROA ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.0469	0.0425	-0.325	-0.266	-0.356	-0.369
	(0.0296)	(0.0289)	(0.196)	(0.209)	(0.232)	(0.226)
Log Board size*Firm size			0.0577*	0.0628**	0.0613*	0.0626*
			(0.0304)	(0.0311)	(0.0339)	(0.0346)
Outside director rato		0.127*	0.113*	0.374	0.114*	0.110
		(0.0666)	(0.0651)	(0.319)	(0.0659)	(0.0706)
Log Board size*Outside dir.r				-0.176		
				(0.210)		
Firm size	-0.0328	-0.0280	-0.148**	-0.148**	-0.153**	-0.154*
	(0.0325)	(0.0317)	(0.0705)	(0.0707)	(0.0741)	(0.0785)
Net Fixed Assets	-0.147	-0.192**	-0.235**	-0.223**	-0.241**	-0.239**
	(0.0931)	(0.0936)	(0.0936)	(0.0952)	(0.0973)	(0.106)
Leverage	0.0728	0.0418	0.0617	0.0797	-0.00609	0.0512
	(0.118)	(0.115)	(0.113)	(0.115)	(0.293)	(0.125)
CAPEX	0.195	0.280*	0.262*	0.255*	0.265*	0.247
	(0.147)	(0.149)	(0.145)	(0.146)	(0.147)	(0.160)
One-tiered management	-	-	-	-	-	-
Minority	0.832	2.119	3.260	2.512	3.367	3.480
	(1.922)	(1.987)	(2.021)	(2.217)	(2.087)	(2.563)
Age	2.63e-05	0.000219	0.000181	0.000673	0.000324	0.000812
	(0.00264)	(0.00257)	(0.00249)	(0.00257)	(0.00259)	(0.00320)
Volatility	0.498	0.310	0.355	0.356	0.340	0.343
	(0.475)	(0.472)	(0.459)	(0.460)	(0.467)	(0.494)
Log Board size*Leverage					0.0489	
					(0.195)	
Log Board size*Cash lag1						0.0774
						(0.274)
Cash lag1						-0.110
						(0.476)
Constant	0.225	0.155	0.921**	0.773	0.962**	0.966*
	(0.166)	(0.165)	(0.434)	(0.471)	(0.468)	(0.486)
Observations	68	68	68	68	68	63
R-squared	0.393	0.440	0.484	0.493	0.485	0.479
Number of Index	8	8	8	8	8	8
F-test	1.78*	1.99**	2.19**	2.10**	2.03**	1.74*
Hausman test	30.46***	30.92***	28.41***	27.86***	27.64***	23.48***

Table 60 Fixed effects regressions for Hungary Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.129	-0.233	-0.535	-1.988	-0.521	-0.735
	(0.250)	(0.337)	(0.639)	(1.397)	(0.638)	(0.592)
Log Board size*Firm size			0.0664	0.128	0.0372	0.105
			(0.119)	(0.130)	(0.122)	(0.107)
Outside director ratio		-1.801	-1.786	-6.198	-1.906	-1.701
		(1.140)	(1.146)	(3.943)	(1.150)	(1.022)
Log Board size*Outside dir.r.				2.296		
				(1.964)		
Firm size	-0.612***	-0.637***	-0.751***	-0.847***	-0.698***	-0.727***
	(0.125)	(0.124)	(0.239)	(0.252)	(0.244)	(0.213)
Net Fixed Assets	0.477	0.485	0.495	0.408	0.599	0.686*
	(0.436)	(0.431)	(0.434)	(0.439)	(0.444)	(0.405)
Leverage	0.725	0.628	0.618	0.533	-1.283	0.411
	(0.517)	(0.515)	(0.518)	(0.522)	(1.824)	(0.464)
CAPEX	0.479	0.421	0.445	0.444	0.521	0.694
	(0.711)	(0.705)	(0.710)	(0.708)	(0.712)	(0.632)
One-tiered management	0.662*	0.754**	0.808**	0.681*	0.632	0.737**
	(0.371)	(0.372)	(0.386)	(0.400)	(0.418)	(0.342)
Minority	0.259	0.628	0.631	0.703	0.300	0.761
	(0.824)	(0.849)	(0.853)	(0.853)	(0.905)	(0.760)
Age	-0.0137	-0.0106	-0.01000	-0.00743	-0.00669	0.0599***
	(0.0177)	(0.0176)	(0.0177)	(0.0178)	(0.0179)	(0.0213)
Volatility	6.838	5.541	5.289	5.011	6.061	3.300
	(5.816)	(5.816)	(5.861)	(5.851)	(5.896)	(5.322)
Log Board size*Leverage					1.244	
					(1.144)	
Log Board size*Cash lag1						-0.508
						(1.693)
Cash lag1						2.298
						(3.039)
Constant	4.160***	5.795***	6.244***	8.944***	6.163***	4.793***
	(0.815)	(1.312)	(1.544)	(2.777)	(1.544)	(1.508)
Observations	104	104	104	104	104	95
R-squared	0.446	0.464	0.467	0.477	0.475	0.495
Number of Index	13	13	13	13	13	13
F-test	3.50***	3.52***	3.32***	3.23***	3.22***	3.04***
Hausman test	54.24***	52.76***	51.61***	51.36***	49.90***	40.51***

Table 61 Fixed effects regressions for Hungary MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.0512	-0.965	-2.074*	-5.866**	-1.972*	-2.238**
	(0.442)	(0.600)	(1.095)	(2.296)	(1.083)	(1.068)
Log Board size*Firm size			0.239	0.399*	0.162	0.269
			(0.198)	(0.212)	(0.201)	(0.186)
Outside director ratio		-4.740**	-4.729**	-16.25**	-4.916**	-4.464**
		(1.963)	(1.957)	(6.455)	(1.937)	(1.837)
Log Board size*Outside dir.r.				5.998*		
				(3.208)		
Firm size	-0.884***	-0.938***	-1.347***	-1.597***	-1.212***	-1.306***
	(0.214)	(0.208)	(0.396)	(0.412)	(0.400)	(0.370)
Net Fixed Assets	1.552**	1.696**	1.750**	1.522**	1.959**	2.109***
	(0.773)	(0.751)	(0.750)	(0.747)	(0.752)	(0.725)
Leverage	2.071**	1.643*	1.577*	1.360	-3.131	1.175
	(0.931)	(0.919)	(0.918)	(0.909)	(2.993)	(0.851)
CAPEX	1.242	0.923	0.982	0.981	1.245	1.472
	(1.249)	(1.217)	(1.214)	(1.193)	(1.210)	(1.135)
One-tiered management	2.642***	3.091***	3.322***	2.984***	2.781***	3.180***
	(0.727)	(0.728)	(0.751)	(0.760)	(0.811)	(0.701)
Minority	-3.625*	-3.403*	-3.505*	-3.304*	-4.046**	-2.373
	(1.908)	(1.850)	(1.846)	(1.818)	(1.853)	(1.715)
Age	-0.0264	-0.0162	-0.0135	-0.00682	-0.00634	0.114***
	(0.0304)	(0.0298)	(0.0298)	(0.0295)	(0.0297)	(0.0379)
Volatility	11.73	10.52	9.932	9.165	11.04	7.224
	(10.63)	(10.30)	(10.28)	(10.11)	(10.18)	(9.618)
Log Board size*Leverage					3.133	
					(1.898)	
Log Board size*Cash lag1						-0.387
						(2.958)
Cash lag1						2.742
						(5.310)
Constant	5.579***	9.876***	11.53***	18.58***	11.20***	8.848***
	(1.397)	(2.236)	(2.615)	(4.561)	(2.592)	(2.671)
Observations	103	103	103	103	103	94
R-squared	0.565	0.598	0.606	0.625	0.621	0.632
Number of Index	13	13	13	13	13	13
F-test	5.58***	5.94***	5.74***	5.82***	5.72***	5.24***
Hausman test	53.07***	53.70***	53.24***	53.46***	52.79***	42.53***

Table 62 Fixed effects regressions for Hungary TSR ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.0893	-0.443	-0.509	-2.260	-0.500	-0.635
	(0.285)	(0.386)	(0.732)	(1.600)	(0.736)	(0.761)
Log Board size*Firm size			0.0145	0.0884	-0.00540	0.0402
			(0.136)	(0.149)	(0.140)	(0.138)
Outside director ratio		-1.765	-1.761	-7.078	-1.843	-1.395
		(1.304)	(1.314)	(4.517)	(1.325)	(1.314)
Log Board size*Outside dir.r.				2.767		
				(2.249)		
Firm size	0.171	0.147	0.122	0.00621	0.158	0.101
	(0.142)	(0.142)	(0.274)	(0.289)	(0.281)	(0.274)
Net Fixed Assets	-0.0999	-0.0921	-0.0901	-0.194	-0.0192	0.125
	(0.496)	(0.494)	(0.497)	(0.503)	(0.511)	(0.521)
Leverage	0.899	0.804	0.802	0.700	-0.491	0.758
	(0.589)	(0.590)	(0.594)	(0.598)	(2.102)	(0.597)
CAPEX	1.197	1.141	1.146	1.144	1.197	1.172
	(0.810)	(0.807)	(0.814)	(0.811)	(0.821)	(0.813)
One-tiered management	-0.419	-0.329	-0.317	-0.471	-0.437	-0.246
	(0.422)	(0.425)	(0.442)	(0.458)	(0.482)	(0.440)
Minority	1.157	1.518	1.519	1.605	1.294	1.864*
	(0.939)	(0.971)	(0.978)	(0.977)	(1.043)	(0.978)
Age	-0.00448	-0.00152	-0.00138	0.00172	0.000872	0.133***
	(0.0201)	(0.0201)	(0.0203)	(0.0204)	(0.0207)	(0.0274)
Volatility	16.10**	14.83**	14.78**	14.44**	15.30**	16.61**
	(6.625)	(6.655)	(6.720)	(6.702)	(6.797)	(6.845)
Log Board size*Leverage					0.846	
					(1.319)	
Log Board size*Cash lag1						1.361
						(2.178)
Cash lag1						-2.458
						(3.909)
Constant	-0.812	0.790	0.888	4.142	0.833	-1.513
	(0.929)	(1.502)	(1.771)	(3.181)	(1.780)	(1.940)
Observations	104	104	104	104	104	95
R-squared	0.492	0.505	0.505	0.515	0.508	0.535
Number of Index	13	13	13	13	13	13
F-test	4.22****	4.14***	3.87***	3.77***	3.66***	3.56***
Hausman test	15.36	16.38	15.69	311.98***	15.71	17.09

Table 63 Fixed effects regressions for Hungary ROA ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.0142	0.0570	-0.221*	-0.457	-0.219*	-0.276*
	(0.0507)	(0.0690)	(0.125)	(0.275)	(0.125)	(0.141)
Log Board size*Firm size			0.0611**	0.0711***	0.0554**	0.0680***
			(0.0233)	(0.0255)	(0.0239)	(0.0255)
Outside director ratio		0.214	0.228	-0.489	0.204	0.184
		(0.233)	(0.225)	(0.775)	(0.225)	(0.244)
Log Board size*Outside dir.r.				0.373		
				(0.386)		
Firm size	0.0190	0.0220	-0.0827*	-0.0983*	-0.0724	-0.0909*
	(0.0252)	(0.0255)	(0.0469)	(0.0496)	(0.0477)	(0.0508)
Net Fixed Assets	-0.0472	-0.0482	-0.0395	-0.0535	-0.0191	-0.00805
	(0.0882)	(0.0883)	(0.0850)	(0.0863)	(0.0870)	(0.0965)
Leverage	0.111	0.123	0.113	0.0998	-0.258	0.0860
	(0.105)	(0.106)	(0.102)	(0.103)	(0.357)	(0.111)
CAPEX	-0.0305	-0.0236	-0.00124	-0.00152	0.0135	0.0179
	(0.144)	(0.144)	(0.139)	(0.139)	(0.140)	(0.151)
One-tiered management	-0.213***	-0.224***	-0.174**	-0.194**	-0.208**	-0.160*
	(0.0751)	(0.0761)	(0.0756)	(0.0786)	(0.0819)	(0.0816)
Minority	0.171	0.127	0.130	0.142	0.0651	0.195
	(0.167)	(0.174)	(0.167)	(0.168)	(0.177)	(0.181)
Age	-0.000629	-0.000988	-0.000403	1.50e-05	0.000244	-0.00261
	(0.00358)	(0.00360)	(0.00347)	(0.00350)	(0.00352)	(0.00507)
Volatility	-1.785	-1.631	-1.864	-1.909	-1.713	-1.824
	(1.177)	(1.191)	(1.149)	(1.150)	(1.156)	(1.269)
Log Board size*Leverage					0.243	
					(0.224)	
Log Board size*Cash lag1						0.0319
						(0.404)
Cash lag1						0.0665
						(0.724)
Constant	0.0158	-0.178	0.235	0.674	0.219	0.341
	(0.165)	(0.269)	(0.303)	(0.546)	(0.303)	(0.359)
Observations	104	104	104	104	104	95
R-squared	0.363	0.370	0.425	0.432	0.434	0.435
Number of Index	13	13	13	13	13	13
F-test	2.48***	2.38***	2.80***	2.71***	2.73***	2.38***
Hausman test	26.90**	25.48**	30.02***	28.74***	29.06***	18.78

Table 64 Fixed effects regressions for Poland Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.121**	-0.0987	0.256	0.707*	0.303	0.301
	(0.0509)	(0.107)	(0.186)	(0.407)	(0.187)	(0.192)
Log Board size*Firm size			-0.0762**	-0.0907***	-0.0541	-0.0801**
			(0.0327)	(0.0347)	(0.0337)	(0.0333)
Outside director ratio		-1.159**	-1.165**	-0.424	-1.064**	-0.760
		(0.478)	(0.477)	(0.761)	(0.477)	(0.469)
Log Board size*Outside dir.r.				-0.479		
				(0.384)		
Firm size	-0.219***	-0.221***	-0.138**	-0.127**	-0.178***	-0.100*
	(0.0417)	(0.0417)	(0.0548)	(0.0555)	(0.0567)	(0.0558)
Net Fixed Assets	-0.202	-0.153	-0.150	-0.138	-0.147	0.0928
	(0.186)	(0.185)	(0.185)	(0.185)	(0.185)	(0.189)
Leverage	-0.714***	-0.724***	-0.736***	-0.732***	0.180	-0.701***
	(0.183)	(0.182)	(0.182)	(0.182)	(0.385)	(0.179)
CAPEX	1.457***	1.472***	1.485***	1.491***	1.480***	0.897***
	(0.312)	(0.310)	(0.310)	(0.310)	(0.309)	(0.320)
One-tiered management	-	-	-	-	-	-
Minority	-0.167	-0.168	-0.152	-0.167	-0.110	-0.346
	(0.274)	(0.273)	(0.272)	(0.272)	(0.272)	(0.261)
Age	-0.0623***	-0.0609***	-0.0599***	-0.0596***	-0.0587***	0.0392***
	(0.00701)	(0.00700)	(0.00700)	(0.00700)	(0.00700)	(0.00712)
Volatility	9.94e-05	0.000126	5.47e-05	0.000167	8.58e-05	-0.000316
	(0.00158)	(0.00158)	(0.00157)	(0.00158)	(0.00157)	(0.00150)
Log Board size*Leverage					-0.828***	
Log Board size*Cash lag1					(0.307)	
						1.002**
Cash lag1						(0.409)
						-0.273
Constant						(0.515)
	3.241***	4.211***	3.841***	3.210***	3.780***	2.002***
Observations	1,708	1,705	1,705	1,705	1,705	1,594
R-squared	0.208	0.210	0.213	0.214	0.217	0.122
Number of index	214	214	214	214	214	214
F-test	24.26***	23.12***	22.20***	21.12***	21.50***	9.96***
Hausman test	35.74***	37.83***	44.32***	44.74***	47.94***	66.38***

Table 65 Fixed effects regressions for Poland MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.353***	-0.0986	0.661	1.099	0.716	0.411
	(0.129)	(0.272)	(0.473)	(1.036)	(0.475)	(0.509)
Log Board size*Firm size			-0.163*	-0.177**	-0.135	-0.139
			(0.0832)	(0.0885)	(0.0860)	(0.0881)
Outside director ratio		-2.226*	-2.244*	-1.527	-2.119*	-1.781
		(1.209)	(1.208)	(1.933)	(1.212)	(1.238)
Log Board size*Outside dir.r.				-0.463		
				(0.975)		
Firm size	-0.879***	-0.876***	-0.697***	-0.686***	-0.742***	-0.680***
	(0.107)	(0.107)	(0.141)	(0.143)	(0.145)	(0.148)
Net Fixed Assets	0.0716	0.111	0.110	0.120	0.127	0.553
	(0.473)	(0.472)	(0.472)	(0.472)	(0.472)	(0.500)
Leverage	1.197**	1.204**	1.180**	1.185**	2.260**	1.232**
	(0.478)	(0.477)	(0.477)	(0.477)	(0.975)	(0.491)
CAPEX	2.062***	2.087***	2.109***	2.111***	2.102***	1.162
	(0.791)	(0.789)	(0.788)	(0.788)	(0.788)	(0.845)
One-tiered management	-	-	-	-	-	-
Minority	0.166	0.152	0.111	0.100	0.179	-0.207
	(0.875)	(0.872)	(0.871)	(0.871)	(0.872)	(0.891)
Age	-0.0825***	-0.0784***	-0.0761***	-0.0758***	-0.0746***	0.117***
	(0.0176)	(0.0176)	(0.0176)	(0.0177)	(0.0177)	(0.0188)
Volatility	3.98e-05	7.22e-05	-8.87e-05	1.84e-05	-4.62e-05	-0.000580
	(0.00398)	(0.00396)	(0.00396)	(0.00397)	(0.00396)	(0.00392)
Log Board size*Leverage					-1.010	
					(0.796)	
Log Board size*Cash lag1						2.597**
						(1.082)
Cash lag1						-1.992
						(1.362)
Constant	6.599***	8.452***	7.658***	7.045***	7.566***	4.781***
	(0.515)	(1.169)	(1.236)	(1.786)	(1.238)	(1.278)
Observations	1,691	1,688	1,688	1,688	1,688	1,578
R-squared	0.145	0.142	0.145	0.145	0.146	0.095
Number of index	213	213	213	213	213	213
F-test	15.45***	14.25***	13.70***	12.98***	13.07***	7.40***
Hausman test	36.94***	43.61***	55.76***	55.71***	56.87***	67.76***

Table 66 Fixed effects regressions for Poland TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.0418	-0.115	0.407**	0.403	0.409**	0.424*
	(0.0547)	(0.116)	(0.200)	(0.439)	(0.200)	(0.220)
Log Board size*Firm size			-0.113***	-0.112***	-0.112***	-0.124***
			(0.0350)	(0.0373)	(0.0362)	(0.0380)
Outside director ratio		-0.348	-0.356	-0.362	-0.352	-0.257
		(0.517)	(0.516)	(0.821)	(0.517)	(0.543)
Log Board size*Outside dir.r.				0.00395		
				(0.413)		
Firm size	-0.194***	-0.197***	-0.0758	-0.0759	-0.0776	-0.0554
	(0.0441)	(0.0442)	(0.0579)	(0.0588)	(0.0603)	(0.0629)
Net Fixed Assets	-0.722***	-0.717***	-0.712***	-0.712***	-0.712***	-0.698***
	(0.199)	(0.200)	(0.199)	(0.200)	(0.199)	(0.218)
Leverage	0.513***	0.507**	0.484**	0.484**	0.524	0.493**
	(0.196)	(0.197)	(0.196)	(0.196)	(0.415)	(0.207)
CAPEX	0.314	0.320	0.341	0.341	0.341	0.573
	(0.334)	(0.334)	(0.333)	(0.333)	(0.333)	(0.368)
One-tiered management	-	-	-	-	-	-
Minority	-0.0158	-0.0100	0.0170	0.0171	0.0189	-0.108
	(0.295)	(0.295)	(0.294)	(0.294)	(0.295)	(0.302)
Age	0.0105	0.0114	0.0130*	0.0130*	0.0131*	0.102***
	(0.00754)	(0.00756)	(0.00756)	(0.00756)	(0.00758)	(0.00821)
Volatility	0.000253	0.000264	0.000161	0.000160	0.000162	2.32e-05
	(0.00171)	(0.00171)	(0.00170)	(0.00170)	(0.00170)	(0.00173)
Log Board size*Leverage					-0.0365	
					(0.331)	
Log Board size*Cash lag1						0.331
						(0.471)
Cash lag1						-0.541
						(0.592)
Constant	1.176***	1.484***	0.947*	0.952	0.945*	-0.272
	(0.212)	(0.498)	(0.523)	(0.757)	(0.524)	(0.556)
Observations	1,720	1,717	1,717	1,717	1,717	1,604
R-squared	0.304	0.306	0.311	0.311	0.311	0.327
Number of Index	214	214	214	214	214	214
F-test	40.76***	38.50***	37.16***	35.18***	35.18***	35.00***
Hausman test	47.05***	47.34***	60.92***	54560***	60.99***	51.19***

Table 67 Fixed effects regressions for Poland ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.00752	-0.0241	0.0316	0.0186	0.0311	0.0379
	(0.00733)	(0.0156)	(0.0268)	(0.0589)	(0.0269)	(0.0293)
Log Board size*Firm size			-0.0120**	-0.0116**	-0.0123**	-0.0121**
			(0.00470)	(0.00501)	(0.00486)	(0.00507)
Outside director ratio		-0.0882	-0.0890	-0.110	-0.0902	-0.0507
		(0.0694)	(0.0692)	(0.110)	(0.0695)	(0.0725)
Log Board size*Outside dir.r.				0.0137		
				(0.0555)		
Firm size	0.00103	0.000810	0.0137*	0.0134*	0.0142*	0.00855
	(0.00591)	(0.00593)	(0.00778)	(0.00789)	(0.00809)	(0.00839)
Net Fixed Assets	-0.268***	-0.264***	-0.264***	-0.264***	-0.264***	-0.261***
	(0.0267)	(0.0268)	(0.0268)	(0.0268)	(0.0268)	(0.0291)
Leverage	-0.0754***	-0.0757***	-0.0782***	-0.0783***	-0.0890	-0.0542**
	(0.0263)	(0.0263)	(0.0263)	(0.0263)	(0.0557)	(0.0275)
CAPEX	0.236***	0.237***	0.239***	0.239***	0.239***	0.206***
	(0.0447)	(0.0448)	(0.0447)	(0.0447)	(0.0447)	(0.0491)
One-tiered management	-	-	-	-	-	-
Minority	0.108***	0.108***	0.111***	0.111***	0.110***	0.103**
	(0.0395)	(0.0395)	(0.0395)	(0.0395)	(0.0395)	(0.0403)
Age	-0.00254**	-0.00250**	-0.00232**	-0.00233**	-0.00234**	0.000955
	(0.00101)	(0.00101)	(0.00101)	(0.00102)	(0.00102)	(0.00109)
Volatility	-1.04e-05	-8.17e-06	-1.92e-05	-2.24e-05	-1.95e-05	-2.42e-05
	(0.000229)	(0.000229)	(0.000228)	(0.000229)	(0.000228)	(0.000231)
Log Board size*Leverage					0.00983	
					(0.0445)	
Log Board size*Cash lag1						0.0955
						(0.0628)
Cash lag1						-0.0217
						(0.0790)
Constant	0.154***	0.229***	0.172**	0.190*	0.173**	0.113
	(0.0284)	(0.0667)	(0.0703)	(0.102)	(0.0703)	(0.0742)
Observations	1,719	1,716	1,716	1,716	1,716	1,603
R-squared	0.099	0.100	0.104	0.104	0.104	0.098
Number of Index	214	214	214	214	214	214
F-test	10.26***	9.73***	9.58***	9.07***	9.07***	7.79***
Hausman test	95.54***	99.31***	102.49***	104.14***	102.14***	105.69***

Table 68 Fixed effects regressions for Romania Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.182	0.210	0.142	-6.103	0.160	-0.868
	(0.321)	(0.327)	(0.875)	(14.00)	(0.892)	(1.416)
Log Board size*Firm size			0.0159	-0.0208	0.0224	0.177
			(0.188)	(0.206)	(0.196)	(0.266)
Outside director ratio		2.142	2.280	-17.91	2.334	4.790
		(4.158)	(4.485)	(45.39)	(4.527)	(5.327)
Log Board size*Outside dir.r.				12.74		
				(28.51)		
Firm size	0.153	0.160	0.138	0.205	0.122	-0.0740
	(0.173)	(0.174)	(0.319)	(0.354)	(0.344)	(0.510)
Net Fixed Assets	-0.289	-0.339	-0.321	-0.0886	-0.330	-0.421
	(0.719)	(0.728)	(0.761)	(0.924)	(0.768)	(0.887)
Leverage	0.110	0.169	0.163	0.131	0.583	-0.0651
	(0.791)	(0.802)	(0.809)	(0.815)	(3.461)	(0.957)
CAPEX	-0.894	-0.808	-0.808	-0.781	-0.840	-1.274
	(1.424)	(1.438)	(1.445)	(1.452)	(1.475)	(1.590)
One-tiered management	0.231	0.462	0.480	-0.385	0.470	0.491
	(0.380)	(0.589)	(0.630)	(2.037)	(0.639)	(0.861)
Minority	-0.611	-0.608	-0.645	-0.587	-0.689	-0.743
	(1.403)	(1.408)	(1.482)	(1.493)	(1.530)	(1.568)
Age	-0.0592	-0.0652	-0.0652	-0.0655	-0.0663	-0.0769*
	(0.0382)	(0.0401)	(0.0403)	(0.0404)	(0.0414)	(0.0436)
Volatility	2.752	2.779	2.792	2.838	2.794	3.118
	(3.875)	(3.889)	(3.911)	(3.927)	(3.929)	(4.633)
Log Board size*Leverage					-0.251	
					(2.012)	
Log Board size*Cash lag1						2.387
						(2.539)
Cash lag1						-3.799
						(4.180)
Constant	0.879	-0.401	-0.402	10.11	-0.411	-0.0324
	(1.127)	(2.731)	(2.744)	(23.67)	(2.758)	(3.351)
Observations	152	152	152	152	152	137
R-squared	0.096	0.099	0.099	0.101	0.099	0.103
Number of Index	28	28	28	28	28	26
F-test	0.67	0.65	0.61	0.58	0.57	0.52
Hausman test	7.05	6.85	8.05	10.64	7.38	12.16

Table 69 Fixed effects regressions for Romania MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.378	0.429	-0.716	-12.25	-0.567	-2.970
	(0.558)	(0.565)	(1.522)	(24.23)	(1.545)	(2.334)
Log Board size*Firm size			0.271	0.193	0.333	0.652
			(0.335)	(0.374)	(0.350)	(0.439)
Outside director ratio		4.585	6.812	-30.68	7.391	12.60
		(7.119)	(7.642)	(78.99)	(7.720)	(8.587)
Log Board size*Outside dir.r.				23.59		
				(49.48)		
Firm size	0.576*	0.595*	0.212	0.353	0.0824	-0.229
	(0.301)	(0.304)	(0.562)	(0.637)	(0.600)	(0.828)
Net Fixed Assets	-0.628	-0.767	-0.400	0.0337	-0.484	-0.523
	(1.223)	(1.245)	(1.327)	(1.613)	(1.337)	(1.484)
Leverage	-0.217	-0.0513	-0.216	-0.309	3.702	-1.185
	(1.454)	(1.481)	(1.497)	(1.516)	(6.402)	(1.722)
CAPEX	-0.545	-0.325	-0.370	-0.306	-0.641	-1.721
	(2.457)	(2.487)	(2.492)	(2.505)	(2.536)	(2.602)
One-tiered management	0.231	0.734	1.012	-0.599	0.922	1.328
	(0.653)	(1.019)	(1.077)	(3.547)	(1.090)	(1.386)
Minority	-14.66	-13.81	-13.29	-13.41	-13.40	-17.73
	(17.27)	(17.37)	(17.41)	(17.48)	(17.46)	(20.76)
Age	-0.108*	-0.121*	-0.119*	-0.119*	-0.129*	-0.162**
	(0.0641)	(0.0674)	(0.0676)	(0.0678)	(0.0697)	(0.0739)
Volatility	5.766	5.783	6.091	6.222	6.139	7.547
	(6.577)	(6.596)	(6.618)	(6.649)	(6.638)	(7.492)
Log Board size*Leverage					-2.352	
					(3.737)	
Log Board size*Cash lag1						3.472
						(4.107)
Cash lag1						-5.743
						(6.758)
Constant	-0.514	-3.242	-3.265	16.21	-3.438	-2.811
	(1.899)	(4.644)	(4.652)	(41.10)	(4.674)	(5.436)
Observations	148	148	148	148	148	133
R-squared	0.114	0.118	0.124	0.126	0.127	0.171
Number of Index	28	28	28	28	28	26
F-test	0.78	0.76	0.75	0.72	0.73	0.89
Hausman test	11.73	12.40	16.96	17.66	17.56	17.78

Table 70 Fixed effects regressions for Romania TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	-0.212	-0.200	-1.441	-5.179	-1.467	-2.088
	(0.321)	(0.328)	(0.893)	(14.27)	(0.911)	(1.326)
Log Board size*Firm size			0.283	0.261	0.276	0.415*
			(0.190)	(0.208)	(0.196)	(0.247)
Outside director ratio		0.876	3.363	-8.727	3.291	4.334
		(4.265)	(4.557)	(46.29)	(4.598)	(5.135)
Log Board size*Outside dir.r.				7.630		
				(29.07)		
Firm size	-0.0430	-0.0404	-0.435	-0.395	-0.418	-0.693
	(0.174)	(0.175)	(0.317)	(0.353)	(0.334)	(0.454)
Net Fixed Assets	-0.729	-0.743	-0.401	-0.258	-0.389	-0.406
	(0.679)	(0.686)	(0.720)	(0.906)	(0.727)	(0.782)
Leverage	0.738	0.754	0.684	0.662	0.114	0.344
	(0.726)	(0.733)	(0.730)	(0.738)	(3.463)	(0.822)
CAPEX	1.409	1.444	1.493	1.512	1.529	1.328
	(1.452)	(1.468)	(1.460)	(1.468)	(1.482)	(1.542)
One-tiered management	0.608	0.701	1.031	0.511	1.045	1.726**
	(0.387)	(0.599)	(0.635)	(2.081)	(0.643)	(0.821)
Minority	0.359	0.361	-0.271	-0.235	-0.222	-0.322
	(1.436)	(1.443)	(1.496)	(1.509)	(1.531)	(1.513)
Age	-0.0149	-0.0172	-0.0167	-0.0168	-0.0153	0.119***
	(0.0389)	(0.0406)	(0.0404)	(0.0406)	(0.0415)	(0.0421)
Volatility	1.524	1.523	1.942	1.962	1.899	5.713
	(3.887)	(3.904)	(3.892)	(3.910)	(3.918)	(4.421)
Log Board size*Leverage					0.335	
					(1.986)	
Log Board size*Cash lag1						-1.752
						(2.448)
CashAssetslag1						3.699
						(4.023)
Constant	0.543	0.0193	-0.0664	6.227	-0.0409	-2.113
	(1.140)	(2.797)	(2.782)	(24.14)	(2.799)	(3.222)
Observations	155	155	155	155	155	140
R-squared	0.277	0.278	0.292	0.293	0.292	0.293
Number of Index	28	28	28	28	28	26
F-test	2.48***	2.33***	2.35***	2.21***	2.21***	1.94**
Hausman test	9.66	9.12	11.12	1792.45***	12.56	16.68

Table 71 Fixed effects regressions for Romania ROA ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.0488	0.0577	0.105	2.859	0.0668	0.0814
	(0.0489)	(0.0497)	(0.137)	(2.168)	(0.138)	(0.199)
Log Board size*Firm size			-0.0108	0.00536	-0.0217	-0.00175
			(0.0291)	(0.0317)	(0.0296)	(0.0371)
Outside director ratio		0.634	0.539	9.448	0.435	0.477
		(0.646)	(0.697)	(7.033)	(0.695)	(0.772)
Log Board size*Outside dir.r.				-5.622		
				(4.416)		
Firm size	0.0255	0.0274	0.0425	0.0128	0.0673	0.00100
	(0.0265)	(0.0266)	(0.0484)	(0.0536)	(0.0505)	(0.0682)
Net Fixed Assets	-0.0506	-0.0613	-0.0744	-0.180	-0.0570	-0.0401
	(0.103)	(0.104)	(0.110)	(0.138)	(0.110)	(0.118)
Leverage	0.335***	0.346***	0.349***	0.365***	-0.479	0.366***
	(0.110)	(0.111)	(0.112)	(0.112)	(0.524)	(0.123)
CAPEX	0.305	0.330	0.328	0.315	0.380*	0.355
	(0.221)	(0.223)	(0.223)	(0.223)	(0.224)	(0.232)
One-tiered management	-0.0402	0.0275	0.0149	0.398	0.0350	0.147
	(0.0590)	(0.0907)	(0.0972)	(0.316)	(0.0973)	(0.123)
Minority	0.0518	0.0534	0.0776	0.0512	0.150	0.0954
	(0.219)	(0.219)	(0.229)	(0.229)	(0.232)	(0.227)
Age	-0.00780	-0.00948	-0.00950	-0.00944	-0.00743	0.0130**
	(0.00591)	(0.00616)	(0.00618)	(0.00616)	(0.00627)	(0.00632)
Volatility	2.675***	2.674***	2.658***	2.644***	2.596***	3.152***
	(0.592)	(0.592)	(0.596)	(0.594)	(0.592)	(0.665)
Log Board size*Leverage					0.486	
					(0.300)	
Log Board size*Cash lag1						-0.518
						(0.368)
Cash lag1						0.974
						(0.605)
Constant	-0.137	-0.517	-0.514	-5.150	-0.476	-0.822*
	(0.174)	(0.424)	(0.426)	(3.667)	(0.423)	(0.484)
Observations	155	155	155	155	155	140
R-squared	0.291	0.297	0.298	0.308	0.314	0.348
Number of Index	28	28	28	28	28	26
F-test	2.65***	2.56***	2.41***	2.38***	2.45***	2.51***
Hausman test	34.62***	37.96***	36.70***	37.53***	39.03***	35.40**

Table 72 Fixed effects regressions for Slovakia Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.529	1.054	0.729	-4.038	0.744	6.483
	(0.377)	(0.608)	(3.002)	(19.49)	(3.124)	(14.47)
Log Board size*Firm size			0.0762	0.645	0.0822	-0.834
			(0.687)	(2.403)	(0.720)	(2.369)
Outside director ratio		2.921	2.919	-2.382	3.082	4.308
		(2.669)	(2.761)	(21.58)	(3.855)	(3.405)
Log Board size*Outside dir.r.				2.594		
				(10.47)		
Firm size	-0.885	-0.836	-0.903	-1.375	-0.905	0.671
	(0.803)	(0.799)	(1.023)	(2.181)	(1.062)	(2.760)
Net Fixed Assets	-1.395	-1.927*	-1.939*	-1.460	-1.966	-1.775
	(0.901)	(1.019)	(1.060)	(2.223)	(1.177)	(1.286)
Leverage	-0.0343	-0.577	-0.600	-0.729	-0.372	-1.383
	(0.828)	(0.960)	(1.015)	(1.172)	(3.746)	(1.318)
CAPEX	-0.935	0.0718	0.0290	-0.401	0.0570	-0.513
	(2.014)	(2.203)	(2.312)	(2.957)	(2.439)	(2.650)
One-tiered management	-	-	-	-	-	-
Minority	-1.034	-0.631	-0.622	-0.752	-0.604	-0.239
	(0.775)	(0.854)	(0.887)	(1.059)	(0.963)	(0.997)
Age	-0.0246	-0.0170	-0.0121	-0.00146	-0.0109	0.0236
	(0.0367)	(0.0371)	(0.0590)	(0.0746)	(0.0641)	(0.0397)
Volatility	-2.058	-5.066	-5.203	-5.024	-5.472	-7.569
	(7.680)	(8.112)	(8.484)	(8.813)	(9.773)	(9.250)
Log Board size*Leverage					-0.153	
					(2.424)	
Log Board size*Cash lag1						0.286
						(8.409)
Cash lag1						-5.232
						(12.39)
Constant	6.803	4.469	4.596	9.707	4.449	-5.655
	(4.507)	(4.961)	(5.260)	(21.33)	(5.937)	(16.58)
Observations	37	37	37	37	37	35
R-squared	0.685	0.708	0.708	0.710	0.708	0.720
Number of Index	5	5	5	5	5	5
F-test	2.17*	2.14*	1.89	1.67	1.66	1.49
Hausman test	1.70	2.73	2.34	1.22	2.20	1.37

Table 73 Fixed effects regressions for Slovakia MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.914	1.640	-2.243	-2.412	-2.190	23.52
	(0.705)	(1.159)	(5.623)	(36.59)	(5.849)	(26.84)
Log Board size*Firm size			0.910	0.930	0.931	-3.191
			(1.288)	(4.512)	(1.347)	(4.395)
Outside director ratio		4.040	4.012	3.824	4.588	8.233
		(5.085)	(5.172)	(40.52)	(7.219)	(6.316)
Log Board size*Outside dir.r.				0.0916		
				(19.66)		
Firm size	0.226	0.294	-0.503	-0.520	-0.511	4.416
	(1.502)	(1.522)	(1.916)	(4.095)	(1.988)	(5.121)
Net Fixed Assets	-6.210***	-6.946***	-7.096***	-7.079	-7.189***	-7.741***
	(1.687)	(1.941)	(1.986)	(4.174)	(2.204)	(2.386)
Leverage	1.040	0.290	0.0157	0.0112	0.819	-0.473
	(1.549)	(1.830)	(1.901)	(2.201)	(7.014)	(2.445)
CAPEX	1.202	2.594	2.084	2.069	2.183	2.325
	(3.770)	(4.197)	(4.330)	(5.552)	(4.567)	(4.916)
One-tier management	-	-	-	-	-	-
Minority	1.509	2.067	2.179	2.175	2.243	2.513
	(1.450)	(1.626)	(1.662)	(1.988)	(1.804)	(1.850)
Age	-0.0712	-0.0608	-0.00152	-0.00115	0.00275	-0.0592
	(0.0687)	(0.0707)	(0.110)	(0.140)	(0.120)	(0.0736)
Volatility	23.93	19.77	18.14	18.14	17.19	17.59
	(14.37)	(15.46)	(15.89)	(16.55)	(18.30)	(17.16)
Log Board size*Leverage					-0.542	
					(4.539)	
Log Board size*Cash lag1						8.746
						(15.60)
Cash lag1						-15.45
						(22.98)
Constant	2.227	-1.002	0.520	0.701	-0.00180	-29.86
	(8.436)	(9.453)	(9.853)	(40.06)	(11.12)	(30.75)
Observations	37	37	37	37	37	35
R-squared	0.866	0.871	0.876	0.876	0.876	0.891
Number of Index	5	5	5	5	5	5
F-test	6.45***	5.97***	5.48***	4.82***	4.82***	4.71***
Hausman test	6.85	6.95	6.50	5.86	5.99	3.53

Table 74 Fixed effects regressions for Slovakia TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.387	0.232	0.427	-34.11	-0.0624	-20.05
	(0.459)	(0.768)	(3.790)	(22.67)	(3.511)	(16.77)
Log Board size*Firm size			-0.0456	4.074	-0.243	3.221
			(0.868)	(2.796)	(0.809)	(2.745)
Outside director ratio		-0.865	-0.863	-39.26	-6.212	-3.710
		(3.368)	(3.486)	(25.11)	(4.334)	(3.945)
Log Board size*Outside dir.r.				18.79		
				(12.18)		
Firm size	0.216	0.202	0.241	-3.181	0.319	-2.964
	(0.977)	(1.008)	(1.291)	(2.538)	(1.194)	(3.199)
Net Fixed Assets	0.713	0.871	0.878	4.349	1.747	1.833
	(1.097)	(1.286)	(1.339)	(2.587)	(1.323)	(1.491)
Leverage	-0.228	-0.0676	-0.0539	-0.986	-7.508*	-0.615
	(1.007)	(1.212)	(1.282)	(1.364)	(4.211)	(1.527)
CAPEX	4.133	3.835	3.860	0.744	2.942	2.873
	(2.452)	(2.780)	(2.918)	(3.440)	(2.742)	(3.071)
One-tiered management	-	-	-	-	-	-
Minority	-0.185	-0.304	-0.310	-1.255	-0.898	-0.143
	(0.943)	(1.077)	(1.120)	(1.232)	(1.083)	(1.155)
Age	0.0593	0.0571	0.0541	0.131	0.0145	0.144***
	(0.0447)	(0.0468)	(0.0745)	(0.0868)	(0.0721)	(0.0460)
Volatility	-16.39*	-15.50	-15.41	-14.11	-6.613	-18.36
	(9.347)	(10.24)	(10.71)	(10.25)	(10.99)	(10.72)
Log Board size*Leverage					5.026*	
					(2.725)	
Log Board size*Cash lag1						-11.32
						(9.745)
Cash lag1						12.37
						(14.35)
Constant	-2.447	-1.756	-1.832	35.19	3.012	17.69
	(5.485)	(6.261)	(6.641)	(24.82)	(6.674)	(19.21)
Observations	37	37	37	37	37	35
R-squared	0.648	0.649	0.649	0.703	0.722	0.738
Number of Index	5	5	5	5	5	5
F-test	1.84	1.63	1.44	1.62	1.78	1.63
Hausman test	3.92	2.74	2.11	7.75	1.04	1.69

Table 75 Fixed effects regressions for Slovakia ROA as dependent variable

VAIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Log Board size	0.157**	0.159	-0.136	-8.110**	-0.130	-3.901
	(0.0715)	(0.120)	(0.587)	(3.091)	(0.610)	(2.727)
Log Board size*Firm size			0.0690	1.020**	0.0711	0.672
			(0.134)	(0.381)	(0.141)	(0.447)
Outside director ratio		0.0129	0.0108	-8.856**	0.0670	-0.307
		(0.526)	(0.540)	(3.423)	(0.753)	(0.642)
Log Board size*Outside dir.r.				4.339**		
				(1.660)		
Firm size	0.0752	0.0755	0.0150	-0.775**	0.0142	-0.590
	(0.152)	(0.158)	(0.200)	(0.346)	(0.207)	(0.520)
Net Fixed Assets	-0.167	-0.169	-0.180	0.621	-0.189	0.00751
	(0.171)	(0.201)	(0.207)	(0.353)	(0.230)	(0.242)
Leverage	-0.0674	-0.0698	-0.0906	-0.306	-0.0122	-0.245
	(0.157)	(0.189)	(0.198)	(0.186)	(0.732)	(0.248)
CAPEX	0.273	0.277	0.238	-0.481	0.248	-0.0502
	(0.382)	(0.434)	(0.452)	(0.469)	(0.477)	(0.500)
One-tiered management	-	-	-	-	-	-
Minority	0.0695	0.0712	0.0798	-0.138	0.0860	0.136
	(0.147)	(0.168)	(0.173)	(0.168)	(0.188)	(0.188)
Age	-0.00390	-0.00386	0.000633	0.0184	0.00105	0.00875
	(0.00696)	(0.00732)	(0.0115)	(0.0118)	(0.0125)	(0.00748)
Volatility	-1.551	-1.564	-1.688	-1.388	-1.781	-2.069
	(1.457)	(1.599)	(1.658)	(1.398)	(1.909)	(1.744)
Log Board size*Leverage					-0.0529	
					(0.474)	
Log Board size*Cash lag1						0.681
						(1.585)
Cash lag1						-1.570
						(2.335)
Constant	-0.452	-0.462	-0.347	8.203**	-0.398	3.285
	(0.855)	(0.978)	(1.028)	(3.384)	(1.160)	(3.125)
Observations	37	37	37	37	37	35
R-squared	0.591	0.591	0.598	0.737	0.599	0.600
Number of Index	5	5	5	5	5	5
F-test	1.44	1.27	1.16	1.91	1.02	0.87
Hausman test	3.76	3.11	2.81	6.99	2.56	3.22

Table 76 GMM-type dynamic panel regression models for Bulgaria Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.0319	0.0294	0.0500	0.0500	0.0443	0.0524
	(0.0354)	(0.0354)	(0.0361)	(0.0362)	(0.0362)	(0.0357)
Log Board size	0.310	0.328	2.865***	3.918	2.752***	2.438***
	(0.200)	(0.204)	(0.869)	(5.345)	(0.871)	(0.870)
Log Board size*Firm size			-0.529***	-0.537***	-0.542***	-0.458***
			(0.176)	(0.181)	(0.176)	(0.177)
Outside director ratio		0.642	0.601	3.791	0.696	0.151
		(1.379)	(1.385)	(16.05)	(1.387)	(1.377)
Log Board size*Outside dir.r.				-2.051		
				(10.26)		
Firm size	-0.222***	-0.214***	0.573**	0.589**	0.603**	0.446
	(0.0726)	(0.0742)	(0.272)	(0.286)	(0.273)	(0.275)
Net Fixed Assets	-1.119***	-1.145***	-1.155***	-1.172***	-1.308***	-1.109***
	(0.407)	(0.406)	(0.407)	(0.414)	(0.417)	(0.398)
Leverage	0.431	0.404	0.135	0.122	-2.988	0.305
	(0.447)	(0.453)	(0.464)	(0.467)	(1.896)	(0.460)
CAPEX	2.400***	2.411***	2.264***	2.266***	2.277***	2.156***
	(0.801)	(0.803)	(0.808)	(0.809)	(0.809)	(0.794)
One-tiered management	-0.150	-0.148	-0.218	-0.207	-0.222	-0.179
	(0.158)	(0.159)	(0.161)	(0.171)	(0.161)	(0.160)
Minority	-0.301	-0.327	-0.458	-0.453	-0.436	-0.418
	(0.302)	(0.307)	(0.311)	(0.312)	(0.311)	(0.306)
Age	0.00171	0.000510	0.00905	0.00837	0.0123	0.0142
	(0.0114)	(0.0114)	(0.0118)	(0.0123)	(0.0120)	(0.0119)
Volatility	1.590	1.617	1.520	1.495	1.413	1.609
	(2.254)	(2.261)	(2.265)	(2.273)	(2.264)	(2.238)
Log Board size*Leverage					2.444*	
					(1.435)	
Log Board size*Cash lag1						1.004
						(1.537)
Cash lag1						-2.672
						(2.227)
Constant	1.997***	1.652*	-2.070	-3.718	-1.981	-1.177
	(0.462)	(0.891)	(1.525)	(8.426)	(1.527)	(1.548)
Observations	190	190	190	190	190	190
Number of Index	29	29	29	29	29	29
Wald Chi-squared	36.03***	36.18***	45.16***	44.98***	47.93***	51.66***

Table 77 GMM-type dynamic panel regression models for Bulgaria MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of MB ratio	0.200***	0.198***	0.209***	0.210***	0.203***	0.209***
	(0.0329)	(0.0330)	(0.0334)	(0.0335)	(0.0334)	(0.0327)
Log Board size	0.390	0.409	4.205**	0.544	3.866**	2.785
	(0.393)	(0.395)	(1.741)	(11.30)	(1.748)	(1.757)
Log Board size*Firm size			-0.799**	-0.769**	-0.812**	-0.549
			(0.357)	(0.368)	(0.356)	(0.362)
Outside director ratio		2.918	2.223	-9.051	1.995	1.560
		(2.885)	(2.909)	(34.50)	(2.905)	(2.852)
Log Board size*Outside dir.r.				7.161		
				(21.87)		
Firm size	-0.420***	-0.394***	0.834	0.771	0.871	0.396
	(0.142)	(0.145)	(0.567)	(0.597)	(0.566)	(0.578)
Net Fixed Assets	-1.554**	-1.694**	-1.794**	-1.722**	-2.090***	-1.570**
	(0.760)	(0.771)	(0.773)	(0.808)	(0.789)	(0.753)
Leverage	0.531	0.566	0.217	0.196	-5.823*	0.627
	(0.824)	(0.829)	(0.846)	(0.848)	(3.439)	(0.833)
CAPEX	3.059**	3.009*	2.902*	2.907*	2.761*	2.731*
	(1.526)	(1.535)	(1.540)	(1.541)	(1.539)	(1.502)
One-tiered management	-0.247	-0.265	-0.413	-0.443	-0.412	-0.330
	(0.292)	(0.294)	(0.302)	(0.315)	(0.301)	(0.298)
Minority	-1.399**	-1.455**	-1.504***	-1.513***	-1.415**	-1.446**
	(0.567)	(0.572)	(0.573)	(0.576)	(0.574)	(0.563)
Age	0.0176	0.0135	0.0223	0.0241	0.0284	0.0375*
	(0.0218)	(0.0221)	(0.0225)	(0.0233)	(0.0226)	(0.0226)
Volatility	1.371	1.566	1.851	1.781	1.474	2.055
	(4.393)	(4.420)	(4.424)	(4.437)	(4.420)	(4.333)
Log Board size*Leverage					4.842*	
					(2.676)	
Log Board size*Cash lag1						1.658
						(2.883)
Cash lag1						-5.460
						(4.188)
Constant	2.696***	1.250	-4.094	1.731	-3.556	-1.570
	(0.863)	(1.676)	(2.915)	(17.97)	(2.925)	(2.963)
Observations	192	192	192	192	192	192
Number of Index	29	29	29	29	29	29
Wald Chi-squared	90.86***	90.73***	95.32***	95.02***	98.99***	108.59***

Table 78 GMM-type dynamic panel regression models for Bulgaria TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of TSR	-0.138***	-0.150***	-0.145***	-0.143***	-0.146***	-0.155***
	(0.0490)	(0.0495)	(0.0511)	(0.0509)	(0.0512)	(0.0496)
Log Board size	1.333***	1.430***	2.001	-6.989	2.084	1.011
	(0.408)	(0.412)	(1.794)	(6.357)	(1.798)	(1.819)
Log Board size*Firm size			-0.115	-0.109	-0.115	0.0971
			(0.349)	(0.347)	(0.351)	(0.357)
Outside director ratio		4.193*	3.970*	-24.08	3.744	3.168
		(2.265)	(2.380)	(19.09)	(2.448)	(2.711)
Log Board size*Outside dir.r.				18.30		
				(12.37)		
Firm size	-0.0231	-0.0182	0.167	0.218	0.166	-0.0719
	(0.117)	(0.117)	(0.577)	(0.575)	(0.579)	(0.593)
Net Fixed Assets	-0.288	-0.406	-0.350	-0.201	-0.322	-0.121
	(0.718)	(0.721)	(0.746)	(0.750)	(0.758)	(0.761)
Leverage	-0.354	-0.354	-0.371	-0.377	0.828	-0.528
	(0.725)	(0.725)	(0.729)	(0.727)	(2.777)	(0.725)
CAPEX	-0.226	-0.119	-0.134	-0.000432	-0.116	0.517
	(1.299)	(1.300)	(1.308)	(1.305)	(1.311)	(1.324)
One-tiered management	-0.114	-0.330	-0.314	-0.333	-0.258	-0.475
	(0.324)	(0.338)	(0.344)	(0.343)	(0.354)	(0.370)
Minority	0.675	0.552	0.568	0.591	0.581	0.754
	(0.577)	(0.581)	(0.585)	(0.581)	(0.588)	(0.676)
Age	0.0311*	0.0325**	0.0332**	0.0283*	0.0322*	0.0308*
	(0.0162)	(0.0163)	(0.0165)	(0.0168)	(0.0166)	(0.0169)
Volatility	4.320***	4.484***	4.520***	4.517***	4.554***	4.801***
	(0.628)	(0.634)	(0.647)	(0.640)	(0.650)	(0.623)
Log Board size*Leverage					-0.878	
					(1.975)	
Log Board size*Cash lag1						-2.227
						(2.567)
Cash lag1						3.513
						(3.758)
Constant	-2.066**	-4.123***	-4.959*	8.599	-4.998*	-3.513
	(0.936)	(1.460)	(2.944)	(9.644)	(2.952)	(3.043)
Observations	204	204	204	204	204	196
Number of Index	29	29	29	29	29	29
Wald Chi-squared	63.89***	67.23***	67.08***	71.59***	67.36***	78.87***

Table 79 GMM-type dynamic panel regression models for Bulgaria ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.118*	0.0991	0.101	0.0994	0.107	0.103
	(0.0693)	(0.0706)	(0.0706)	(0.0709)	(0.0713)	(0.0716)
Log Board size	-0.0207	-0.0109	-0.339**	-0.00845	-0.334**	-0.353**
	(0.0340)	(0.0352)	(0.169)	(0.896)	(0.170)	(0.171)
Log Board size*Firm size			0.0717**	0.0687*	0.0749**	0.0776**
			(0.0362)	(0.0373)	(0.0365)	(0.0371)
Outside director ratio		0.317	0.455	1.447	0.355	0.431
		(0.299)	(0.308)	(2.654)	(0.319)	(0.317)
Log Board size*Outside dir.r.				-0.636		
				(1.686)		
Firm size	-1.59e-05	0.00601	-0.123*	-0.117*	-0.132**	-0.133**
	(0.0149)	(0.0155)	(0.0660)	(0.0688)	(0.0668)	(0.0672)
Net Fixed Assets	-0.1000	-0.112*	-0.130*	-0.137**	-0.113*	-0.146**
	(0.0665)	(0.0669)	(0.0669)	(0.0700)	(0.0685)	(0.0688)
Firm size	-0.149*	-0.154**	-0.157**	-0.163**	0.259	-0.148*
	(0.0764)	(0.0761)	(0.0762)	(0.0776)	(0.311)	(0.0773)
CAPEX	0.179	0.187	0.194	0.203	0.204	0.184
	(0.137)	(0.136)	(0.136)	(0.138)	(0.137)	(0.138)
One-tiered management	-0.0607	-0.0640	-0.0622	-0.0571	-0.0476	-0.0643
	(0.0447)	(0.0447)	(0.0447)	(0.0470)	(0.0462)	(0.0452)
Minority	-0.143**	-0.156**	-0.180***	-0.179***	-0.169**	-0.180**
	(0.0670)	(0.0681)	(0.0691)	(0.0692)	(0.0701)	(0.0708)
Age	0.000842	-0.000222	2.46e-05	-0.000340	-9.66e-05	0.000290
	(0.00177)	(0.00195)	(0.00194)	(0.00218)	(0.00195)	(0.00195)
Volatility	-0.0292	-0.0322	-0.0443	-0.0454	-0.0439	-0.0407
	(0.0739)	(0.0735)	(0.0740)	(0.0742)	(0.0745)	(0.0747)
Log Board size*Leverage					-0.308	
					(0.223)	
Log Board size*Cash lag1						-0.233
						(0.283)
Cash lag1						0.224
						(0.431)
Constant	0.158	-0.0175	0.507	-0.0141	0.552*	0.551*
	(0.0969)	(0.188)	(0.317)	(1.427)	(0.321)	(0.322)
Observations	196	196	196	196	196	196
Number of Index	29	29	29	29	29	29
Wald Chi-squared	19.31**	20.09**	24.41**	24.53**	25.98***	25.97***

Table 80 GMM-type dynamic panel regression models for the Czech Republic Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.426***	0.411***	0.408***	0.400***	0.419***	0.319***
	(0.0976)	(0.0981)	(0.0967)	(0.0980)	(0.0978)	(0.113)
Log Board size	-0.332	-0.287	1.480	1.787	1.836	1.532
	(0.245)	(0.242)	(1.262)	(1.321)	(1.516)	(1.375)
Log Board size*Firm size			-0.272	-0.146	-0.312	-0.307
			(0.190)	(0.223)	(0.212)	(0.198)
Outside director ratio		0.482	0.522	3.500	0.464	0.679
		(0.542)	(0.525)	(2.625)	(0.548)	(0.514)
Log Board size*Outside dir.r				-2.023		
				(1.744)		
Firm size	0.0301	0.00807	0.428	0.204	0.494	0.500
	(0.0995)	(0.102)	(0.305)	(0.368)	(0.345)	(0.321)
Net Fixed Assets	-1.473***	-1.531***	-1.463***	-1.432***	-1.380***	-1.312***
	(0.441)	(0.443)	(0.437)	(0.447)	(0.475)	(0.412)
Leverage	1.568**	1.658**	1.468**	1.578**	2.777	1.734**
	(0.729)	(0.732)	(0.732)	(0.754)	(3.078)	(0.769)
CAPEX	-0.823	-0.570	-0.304	-0.298	-0.418	-0.576
	(1.138)	(1.170)	(1.172)	(1.200)	(1.211)	(1.133)
Minority	3.358	-0.0407	2.599	-1.449	2.247	10.83
	(18.18)	(18.50)	(17.99)	(18.73)	(18.07)	(17.47)
Age	0.00674	0.00882	0.00301	0.00776	0.00113	-0.000753
	(0.0142)	(0.0141)	(0.0142)	(0.0151)	(0.0150)	(0.0137)
Volatility	-3.544	-3.684	-4.537	-4.917	-4.139	-3.799
	(3.672)	(3.645)	(3.654)	(3.755)	(3.794)	(3.538)
Log Board size*Leverage					-0.972	
					(2.210)	
Log Board size*Cash lag1						1.410
						(1.708)
Cash lag1						-1.146
						(2.879)
Constant	1.523**	1.350**	-1.277	-1.593	-1.821	-1.596
	(0.593)	(0.622)	(1.935)	(2.002)	(2.319)	(2.189)
Observations	63	63	63	63	63	63
Number of Index	8	8	8	8	8	8
Wald chi-squared	126.18***	127.47***	132.29***	127.41***	129.13***	147.76***

Table 81 GMM-type dynamic panel regression models for the Czech Republic MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of MB ratio	0.253***	0.194**	0.201**	0.207**	0.236***	0.116
	(0.0824)	(0.0866)	(0.0873)	(0.0895)	(0.0870)	(0.0844)
Log Board size	-0.352	-0.0171	3.977	4.235	7.526**	5.734**
	(0.532)	(0.553)	(2.709)	(2.807)	(3.475)	(2.888)
Log Board size*Firm size			-0.655	-0.153	-1.066**	-0.960**
			(0.420)	(0.527)	(0.488)	(0.425)
Outside director ratio		3.572***	3.328***	12.79**	2.726**	4.107***
		(1.235)	(1.195)	(5.774)	(1.235)	(1.136)
Log Board size*Outside dir.r.				-6.452*		
				(3.846)		
Firm size	0.0132	-0.276	0.896	-0.0218	1.534*	1.369*
	(0.297)	(0.320)	(0.752)	(0.949)	(0.844)	(0.742)
Net Fixed Assets	-4.300***	-4.725***	-4.549***	-4.242***	-3.891***	-2.830***
	(1.019)	(1.047)	(1.053)	(1.101)	(1.117)	(1.022)
Leverage	5.310***	6.408***	5.793***	5.873***	16.40**	7.758***
	(1.579)	(1.660)	(1.692)	(1.749)	(6.881)	(1.710)
CAPEX	-4.718*	-3.345	-2.218	-2.256	-3.058	-2.509
	(2.525)	(2.621)	(2.745)	(2.834)	(2.751)	(2.577)
Minority	106.0**	74.42	102.3**	91.01*	88.13*	127.4***
	(43.90)	(46.25)	(45.49)	(47.56)	(45.56)	(43.53)
Age	0.0288	0.0371	0.00646	0.0210	-0.00363	-0.0191
	(0.0301)	(0.0308)	(0.0338)	(0.0359)	(0.0340)	(0.0322)
Volatility	-21.33***	-22.66***	-25.80***	-27.60***	-23.01***	-18.81**
	(8.239)	(8.427)	(8.742)	(9.087)	(8.775)	(8.347)
Log Board size*Leverage					-7.762	
					(4.875)	
Log Board size*Cash lag1						-0.474
						(3.999)
Cash lag1						6.220
						(6.676)
Constant	2.757*	2.271	-4.307	-3.970	-9.410*	-8.647*
	(1.605)	(1.651)	(4.426)	(4.580)	(5.414)	(4.782)
Observations	63	63	63	63	63	63
Number of Index	8	8	8	8	8	8
Wald chi-squared	225.71***	224.02***	220.10***	208.29***	228.71***	268.34***

Table 82 GMM-type dynamic panel regression models for the Czech Republic TSR ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of TSR	-0.249**	-0.240**	-0.305***	-0.304***	-0.319***	-0.353***
	(0.111)	(0.113)	(0.107)	(0.109)	(0.107)	(0.106)
Log Board size	-0.555*	-0.569*	3.797**	4.475**	4.748***	2.796*
	(0.315)	(0.328)	(1.573)	(1.747)	(1.840)	(1.690)
Log Board size*Firm size			-0.674***	-0.557**	-0.751***	-0.594**
			(0.238)	(0.254)	(0.258)	(0.246)
Outside director ratio		-0.0635	0.380	4.373	0.238	0.269
		(0.686)	(0.629)	(3.368)	(0.665)	(0.596)
Log Board size*Outside dir.r.				-2.502		
				(2.161)		
Firm size	-0.0172	-0.0205	0.963**	0.752*	1.075***	0.849**
	(0.124)	(0.126)	(0.377)	(0.408)	(0.411)	(0.390)
Net Fixed Assets	-0.728	-0.690	-0.604	-0.393	-0.437	-0.590
	(0.616)	(0.645)	(0.598)	(0.647)	(0.609)	(0.584)
Leverage	1.096	1.030	0.686	0.765	5.291	0.629
	(0.879)	(0.921)	(0.860)	(0.879)	(3.729)	(0.832)
CAPEX	-0.517	-0.743	0.395	0.447	0.106	0.259
	(1.491)	(1.578)	(1.501)	(1.535)	(1.508)	(1.459)
Minority	15.74	15.51	-1.225	-14.07	-11.02	-2.073
	(21.19)	(21.63)	(20.27)	(22.19)	(20.06)	(19.45)
Age	0.000331	0.00160	0.00139	0.0147	0.00324	0.00321
	(0.0232)	(0.0236)	(0.0218)	(0.0241)	(0.0220)	(0.0211)
Volatility	4.035	4.891	2.622	2.556	3.011	2.546
	(4.897)	(4.949)	(4.467)	(4.584)	(4.535)	(4.247)
Log Board size*Leverage					-3.200	
					(2.619)	
Log Board size*Cash lag1						5.159**
						(2.437)
Cash lag1						-7.992**
						(4.002)
Constant	1.180	1.228	-5.224**	-6.415**	-6.577**	-3.651
	(0.882)	(0.983)	(2.509)	(2.794)	(2.849)	(2.718)
Observations	62	62	62	62	62	62
Number of Index	8	8	8	8	8	8
Wald chi-squared	15.32*	15.24	26.27***	25.11**	26.44***	34.96***

Table 83 GMM-type dynamic panel regression models for the Czech Republic ROA ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.388***	0.402***	0.397***	0.403***	0.408***	0.438***
	(0.132)	(0.130)	(0.131)	(0.130)	(0.132)	(0.137)
Log Board size	0.0315	0.0334	0.0185	0.110	0.162	-0.0963
	(0.0331)	(0.0329)	(0.197)	(0.201)	(0.240)	(0.203)
Log Board size*Firm size			0.00209	0.0265	-0.0148	0.0153
			(0.0294)	(0.0313)	(0.0335)	(0.0296)
Outside director ratio		0.0802	0.0697	0.745**	0.0566	0.0506
		(0.0747)	(0.0727)	(0.354)	(0.0738)	(0.0700)
Log Board size*Outside dir.r.				-0.457**		
				(0.229)		
Firm size	-0.0305**	-0.0374***	-0.0394	-0.0703	-0.0188	-0.0689
	(0.0119)	(0.0136)	(0.0459)	(0.0479)	(0.0500)	(0.0481)
Net Fixed Assets	-0.170**	-0.155**	-0.162**	-0.157**	-0.120	-0.159**
	(0.0771)	(0.0766)	(0.0779)	(0.0767)	(0.0856)	(0.0756)
Leverage	-0.0803	-0.0541	-0.0542	-0.0527	0.417	-0.0540
	(0.0989)	(0.102)	(0.105)	(0.103)	(0.439)	(0.103)
CAPEX	0.0316	0.0442	0.0517	0.0748	0.00573	0.0502
	(0.179)	(0.175)	(0.175)	(0.172)	(0.179)	(0.173)
Minority	-2.612	-3.442	-3.206	-3.068	-4.256*	-4.022*
	(2.041)	(2.183)	(2.167)	(2.128)	(2.357)	(2.254)
Age	0.00344	0.00409*	0.00388*	0.00467**	0.00357	0.00501**
	(0.00214)	(0.00223)	(0.00218)	(0.00220)	(0.00220)	(0.00224)
Volatility	0.399	0.367	0.331	0.218	0.428	0.227
	(0.535)	(0.534)	(0.530)	(0.522)	(0.533)	(0.528)
Log Board size*Leverage					-0.329	
					(0.300)	
Log Board size*Cash lag1						0.370
						(0.260)
Cash lag1						-0.724*
						(0.440)
Constant	0.215**	0.196**	0.222	0.0376	0.0360	0.463
	(0.0850)	(0.0868)	(0.308)	(0.321)	(0.355)	(0.330)
Observations	63	63	63	63	63	63
Number of Index	8	8	8	8	8	8
Wald chi-squared	57.34***	58.36***	57.59***	62.04***	58.66***	62.88***

Table 84 GMM-type dynamic panel regression models for Hungary Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.577***	0.582***	0.587***	0.586***	0.586***	0.513***
	(0.0759)	(0.0767)	(0.0781)	(0.0782)	(0.0787)	(0.0786)
Log Board size	0.134	0.0435	-0.176	-1.945	-0.186	-0.685
	(0.208)	(0.258)	(0.526)	(1.523)	(0.531)	(0.522)
Log Board size*Firm size			0.0517	0.142	0.0414	0.172*
			(0.0987)	(0.122)	(0.102)	(0.0993)
Outside director ratio		-0.660	-0.674	-5.535	-0.693	-0.979
		(1.126)	(1.141)	(4.125)	(1.153)	(1.082)
Log Board size*Outside dir.r.				2.556		
				(2.078)		
Firm size	-0.183***	-0.182***	-0.284	-0.456*	-0.266	-0.523***
	(0.0648)	(0.0652)	(0.200)	(0.242)	(0.207)	(0.202)
Net Fixed Assets	0.795*	0.835*	0.860*	0.753	0.892*	0.887**
	(0.436)	(0.444)	(0.453)	(0.465)	(0.464)	(0.429)
Leverage	-0.612	-0.659	-0.638	-0.707	-1.437	-0.501
	(0.536)	(0.544)	(0.551)	(0.553)	(1.864)	(0.521)
CAPEX	-0.268	-0.311	-0.325	-0.251	-0.294	-0.150
	(0.615)	(0.623)	(0.632)	(0.638)	(0.640)	(0.598)
One-tiered management	-0.403*	-0.370	-0.317	-0.352	-0.394	-0.210
	(0.242)	(0.250)	(0.272)	(0.275)	(0.321)	(0.260)
Minority	-1.096*	-0.934	-0.901	-0.656	-1.077	-0.787
	(0.599)	(0.663)	(0.680)	(0.713)	(0.788)	(0.656)
Age	0.0267*	0.0276*	0.0297*	0.0310**	0.0317**	0.0317**
	(0.0150)	(0.0151)	(0.0153)	(0.0154)	(0.0161)	(0.0146)
Volatility	-7.535*	-7.478*	-7.126	-7.437	-6.864	-7.358*
	(4.470)	(4.492)	(4.534)	(4.568)	(4.619)	(4.288)
Log Board size*Leverage					0.545	
					(1.210)	
Log Board size*Cash lag1						-2.363
						(1.686)
Cash lag1						6.559**
						(3.068)
Constant	1.009*	1.452	1.803	5.172*	1.777	2.726**
	(0.570)	(0.940)	(1.195)	(2.969)	(1.208)	(1.167)
Observations	95	95	95	95	95	95
Number of Index	13	13	13	13	13	13
Wald chi-squared	200.82***	198.60***	195.79***	194.99***	192.68***	236.34***

Table 85 GMM-type dynamic panel regression models for Hungary MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of MB ratio	0.482***	0.484***	0.486***	0.486***	0.482***	0.431***
	(0.0775)	(0.0780)	(0.0803)	(0.0810)	(0.0793)	(0.0783)
Log Board size	0.181	0.219	0.0579	-1.345	-0.146	-0.554
	(0.359)	(0.468)	(0.919)	(3.164)	(0.914)	(0.998)
Log Board size*Firm size			0.0369	0.108	-0.0354	0.224
			(0.179)	(0.236)	(0.181)	(0.177)
Outside director ratio		0.304	0.356	-3.707	-0.284	-1.639
		(2.232)	(2.274)	(9.056)	(2.264)	(2.226)
Log Board size*Outside dir.r.				2.034		
				(4.385)		
Firm size	-0.532***	-0.535***	-0.607	-0.736	-0.488	-0.941***
	(0.125)	(0.128)	(0.370)	(0.466)	(0.371)	(0.361)
Net Fixed Assets	1.331*	1.308*	1.323*	1.286	1.614**	1.472**
	(0.742)	(0.770)	(0.782)	(0.795)	(0.787)	(0.744)
Leverage	-0.215	-0.196	-0.193	-0.222	-5.661*	0.0437
	(0.858)	(0.881)	(0.889)	(0.900)	(3.016)	(0.840)
CAPEX	-0.254	-0.248	-0.246	-0.152	0.202	0.331
	(1.146)	(1.156)	(1.167)	(1.196)	(1.175)	(1.115)
One-tiered management	-0.490	-0.511	-0.469	-0.421	-0.945	-0.218
	(0.478)	(0.510)	(0.551)	(0.566)	(0.599)	(0.574)
Minority	0.459	0.468	0.467	0.582	-0.508	-0.673
	(1.744)	(1.759)	(1.774)	(1.808)	(1.826)	(1.704)
Age	0.0477*	0.0473*	0.0469*	0.0457*	0.0622**	0.0613**
	(0.0257)	(0.0260)	(0.0263)	(0.0267)	(0.0272)	(0.0255)
Volatility	-19.46**	-19.24**	-19.64**	-20.78**	-17.56**	-17.95**
	(8.267)	(8.474)	(8.645)	(9.083)	(8.600)	(8.245)
Log Board size*Leverage					3.687*	
					(1.946)	
Log Board size*Cash lag1						-7.800**
						(3.122)
Cash lag1						17.06***
						(5.649)
Constant	2.596***	2.398	2.668	5.435	2.948	4.156*
	(0.932)	(1.739)	(2.160)	(6.350)	(2.132)	(2.224)
Observations	93	93	93	93	93	93
Number of Index	13	13	13	13	13	13
Wald chi-squared	178.15***	175.44***	173.33***	169.60***	181.25***	208.17***

Table 86 GMM-type dynamic panel regression models for Hungary TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of TSR	-0.0947	-0.0837	-0.0846	-0.0974	-0.0936	-0.0933
	(0.0937)	(0.0944)	(0.0948)	(0.0954)	(0.0954)	(0.0989)
Log Board size	-0.132	-0.441	0.329	-0.932	0.420	0.324
	(0.240)	(0.318)	(0.628)	(1.625)	(0.629)	(0.663)
Log Board size*Firm size			-0.134	-0.0768	-0.144	-0.136
			(0.105)	(0.123)	(0.109)	(0.113)
Outside director ratio		-2.043*	-2.076*	-5.535	-1.982	-1.990
		(1.221)	(1.225)	(4.416)	(1.236)	(1.273)
Log Board size*Outside dir.r.				1.928		
				(2.274)		
Firm size	-0.193*	-0.197*	0.0175	-0.0851	0.0294	0.0300
	(0.101)	(0.102)	(0.214)	(0.240)	(0.222)	(0.236)
Net Fixed Assets	0.387	0.418	0.482	0.384	0.442	0.439
	(0.540)	(0.544)	(0.546)	(0.557)	(0.553)	(0.566)
Leverage	-0.484	-0.734	-0.665	-0.671	-0.348	-0.638
	(0.577)	(0.601)	(0.602)	(0.604)	(1.908)	(0.619)
CAPEX	0.844	1.055	1.061	1.061	1.152	1.072
	(0.755)	(0.771)	(0.774)	(0.776)	(0.776)	(0.786)
One-tiered management	-0.0651	0.0255	-0.0408	-0.0703	-0.0327	-0.0513
	(0.249)	(0.258)	(0.264)	(0.267)	(0.305)	(0.277)
Minority	2.031***	2.715***	2.409***	2.474***	2.358***	2.413***
	(0.648)	(0.775)	(0.786)	(0.800)	(0.872)	(0.799)
Age	0.00573	0.0100	0.0159	0.0136	0.0157	0.0146
	(0.0160)	(0.0162)	(0.0164)	(0.0166)	(0.0175)	(0.0176)
Volatility	-1.036	-0.921	-0.614	-1.407	-1.418	-0.678
	(5.561)	(5.581)	(5.639)	(5.687)	(5.754)	(5.782)
Log Board size*Leverage					-0.169	
					(1.229)	
Log Board size*Cash lag1						0.218
						(2.257)
Cash lag1						-0.546
						(3.977)
Constant	1.045	2.517**	1.280	3.627	1.135	1.245
	(0.666)	(1.140)	(1.496)	(3.191)	(1.502)	(1.573)
Observations	93	93	93	93	93	93
Number of Index	13	13	13	13	13	13
Wald chi-squared	31.57***	33.93***	35.55***	35.89***	35.58***	34.59***

Table 87 GMM-type dynamic panel regression models for Hungary ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.181	0.111	0.144	0.127	0.132	0.136
	(0.112)	(0.113)	(0.115)	(0.117)	(0.117)	(0.116)
Log Board size	-0.0137	0.0963	-0.174	-0.454	-0.180	-0.166
	(0.0514)	(0.0722)	(0.130)	(0.281)	(0.133)	(0.142)
Log Board size*Firm size			0.0566**	0.0636***	0.0657***	0.0547**
			(0.0224)	(0.0236)	(0.0241)	(0.0235)
Outside director ratio		0.559**	0.581**	-0.263	0.604**	0.605**
		(0.267)	(0.268)	(0.785)	(0.273)	(0.284)
Log Board size*Outside dir.r.				0.464		
				(0.413)		
Firm size	-0.00423	0.00356	-0.0982**	-0.114**	-0.105**	-0.0924*
	(0.0189)	(0.0186)	(0.0437)	(0.0465)	(0.0451)	(0.0472)
Net Fixed Assets	-0.116	-0.117	-0.113	-0.132	-0.103	-0.110
	(0.103)	(0.0988)	(0.0994)	(0.102)	(0.101)	(0.102)
Leverage	0.0643	0.0936	0.0759	0.0640	0.470	0.0717
	(0.119)	(0.116)	(0.117)	(0.119)	(0.378)	(0.119)
CAPEX	0.0272	-0.0265	0.0490	0.0719	0.0291	0.0545
	(0.151)	(0.148)	(0.152)	(0.155)	(0.155)	(0.154)
One-tiered management	-0.213***	-0.254***	-0.217***	-0.223***	-0.179***	-0.220***
	(0.0475)	(0.0497)	(0.0522)	(0.0530)	(0.0629)	(0.0547)
Minority	0.306**	0.174	0.199	0.263	0.295	0.191
	(0.148)	(0.156)	(0.158)	(0.168)	(0.182)	(0.161)
Age	0.00210	-0.000322	-0.00224	-0.00287	-0.00320	-0.00268
	(0.00347)	(0.00355)	(0.00365)	(0.00374)	(0.00374)	(0.00377)
Volatility	0.658	0.439	-0.0337	-0.0928	-0.372	-0.0194
	(1.139)	(1.104)	(1.126)	(1.141)	(1.149)	(1.158)
Log Board size*Leverage					-0.287	
					(0.251)	
Log Board size*Cash lag1						0.0798
						(0.454)
Cash lag1						-0.168
						(0.815)
Constant	0.0621	-0.395	0.0690	0.609	0.0461	0.0381
	(0.116)	(0.245)	(0.304)	(0.567)	(0.310)	(0.325)
Observations	95	95	95	95	95	95
Number of Index	13	13	13	13	13	13
Wald chi-squared	65.11***	74.75***	80.44***	79.95***	77.75***	77.40***

Table 88 GMM-type dynamic panel regression models for Poland Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.192***	0.193***	0.188***	0.187***	0.186***	0.183***
	(0.0239)	(0.0240)	(0.0240)	(0.0240)	(0.0241)	(0.0240)
Log Board size	0.00176	0.109	0.663***	0.967*	0.674***	0.499*
	(0.0700)	(0.139)	(0.256)	(0.547)	(0.257)	(0.259)
Log Board size*Firm size			-0.124**	-0.136***	-0.116**	-0.120**
			(0.0485)	(0.0524)	(0.0495)	(0.0483)
Outside director ratio		0.526	0.485	0.966	0.510	0.539
		(0.592)	(0.591)	(0.952)	(0.592)	(0.590)
Log Board size*Outside dir.r.				-0.319		
				(0.501)		
Firm size	-0.646***	-0.646***	-0.506***	-0.497***	-0.518***	-0.506***
	(0.0433)	(0.0433)	(0.0700)	(0.0720)	(0.0716)	(0.0705)
Net Fixed Assets	0.0640	0.0575	0.0372	0.0348	0.0274	0.0161
	(0.263)	(0.263)	(0.263)	(0.263)	(0.263)	(0.263)
Leverage	-0.257	-0.257	-0.280	-0.278	0.0261	-0.296
	(0.229)	(0.229)	(0.228)	(0.229)	(0.488)	(0.228)
CAPEX	-0.869**	-0.866**	-0.810**	-0.802**	-0.794**	-0.823**
	(0.385)	(0.385)	(0.385)	(0.385)	(0.384)	(0.393)
Minority	-0.0416	-0.0448	-0.0217	-0.0253	-0.0145	-0.0154
	(0.329)	(0.329)	(0.329)	(0.329)	(0.329)	(0.329)
Age	0.0412***	0.0410***	0.0417***	0.0420***	0.0420***	0.0406***
	(0.00582)	(0.00582)	(0.00581)	(0.00583)	(0.00582)	(0.00581)
Volatility	-0.000380	-0.000405	-0.000434	-0.000381	-0.000405	-0.000472
	(0.00160)	(0.00160)	(0.00160)	(0.00160)	(0.00160)	(0.00159)
Log Board size*Leverage					-0.280	
					(0.395)	
Log Board size*Cash lag1						2.005***
						(0.538)
Cash lag1						-1.806***
						(0.672)
Constant	3.783***	3.324***	2.772***	2.358***	2.757***	2.888***
	(0.215)	(0.559)	(0.598)	(0.886)	(0.598)	(0.599)
Observations	1,582	1,582	1,582	1,582	1,582	1,582
Number of Index	213	213	213	213	213	213
Wald chi-squared	550.69***	550.63***	560.39***	560.09***	561.25***	582.12***

Table 89 GMM-type dynamic panel regression models for Poland MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of MB ratio	0.292***	0.293***	0.287***	0.287***	0.288***	0.284***
	(0.0276)	(0.0276)	(0.0276)	(0.0277)	(0.0278)	(0.0275)
Log Board size	0.432**	0.00659	1.363**	1.078	1.262*	1.027
	(0.178)	(0.352)	(0.657)	(1.421)	(0.659)	(0.663)
Log Board size*Firm size			-0.300**	-0.285**	-0.322**	-0.290**
			(0.123)	(0.134)	(0.126)	(0.123)
Outside director ratio		-2.121	-2.180	-2.573	-2.357	-1.883
		(1.498)	(1.496)	(2.451)	(1.501)	(1.495)
Log Board size*Outside dir.r.				0.282		
				(1.291)		
Firm size	-1.833***	-1.834***	-1.504***	-1.521***	-1.480***	-1.526***
	(0.133)	(0.133)	(0.190)	(0.194)	(0.193)	(0.190)
Net Fixed Assets	-1.597**	-1.533**	-1.599**	-1.602**	-1.641**	-1.783***
	(0.682)	(0.683)	(0.683)	(0.682)	(0.682)	(0.681)
Leverage	1.902***	1.910***	1.851***	1.860***	0.615	1.751***
	(0.596)	(0.596)	(0.595)	(0.595)	(1.244)	(0.594)
CAPEX	-4.883***	-4.887***	-4.740***	-4.730***	-4.649***	-4.561***
	(0.978)	(0.977)	(0.978)	(0.978)	(0.976)	(1.009)
Minority	-0.878	-0.838	-0.908	-0.913	-0.847	-0.359
	(1.338)	(1.337)	(1.335)	(1.335)	(1.335)	(1.344)
Age	0.145***	0.146***	0.148***	0.148***	0.148***	0.146***
	(0.0152)	(0.0152)	(0.0152)	(0.0152)	(0.0151)	(0.0151)
Volatility	-0.000658	-0.000464	-0.000574	-0.000476	-0.000465	-0.000642
	(0.00404)	(0.00404)	(0.00403)	(0.00403)	(0.00403)	(0.00402)
Log Board size*Leverage					1.155	
					(1.010)	
Log Board size*Cash lag1						4.580***
						(1.370)
Cash lag1						-5.023***
						(1.712)
Constant	8.502***	10.32***	8.971***	9.346***	9.206***	9.258***
	(0.623)	(1.421)	(1.522)	(2.280)	(1.524)	(1.523)
Observations	1,561	1,561	1,561	1,561	1,561	1,561
Number of Index	213	213	213	213	213	213
Wald chi-squared	672.45***	673.62***	682.57***	682.29***	682.09***	698.50***

Table 90 GMM-type dynamic panel regression models for Poland TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag of Tobin's Q	-0.0849***	-0.0847***	-0.0924***	-0.0925***	-0.0884***	-0.0913***
	(0.0227)	(0.0227)	(0.0228)	(0.0228)	(0.0229)	(0.0229)
Log Board size	-0.0905	-0.138	0.780**	0.670	0.693*	0.727*
	(0.104)	(0.203)	(0.366)	(0.832)	(0.368)	(0.375)
Log Board size*Firm size			-0.202***	-0.195***	-0.227***	-0.190***
			(0.0677)	(0.0749)	(0.0693)	(0.0684)
Outside director ratio		-0.229	-0.274	-0.412	-0.439	-0.276
		(0.874)	(0.870)	(1.437)	(0.875)	(0.876)
Log Board size*Outside dir.r.				0.102		
				(0.751)		
Firm size	0.0410	0.0427	0.262***	0.254**	0.296***	0.244**
	(0.0605)	(0.0608)	(0.0970)	(0.102)	(0.0989)	(0.0981)
Net Fixed Assets	0.802**	0.803**	0.861**	0.865**	0.832**	0.828**
	(0.376)	(0.378)	(0.376)	(0.376)	(0.376)	(0.377)
Leverage	0.625*	0.626*	0.614*	0.618*	-0.609	0.612*
	(0.337)	(0.337)	(0.336)	(0.336)	(0.702)	(0.338)
CAPEX	-2.822***	-2.829***	-2.774***	-2.768***	-2.759***	-2.749***
	(0.570)	(0.571)	(0.568)	(0.568)	(0.569)	(0.587)
Minority	-0.757	-0.773	-0.714	-0.718	-0.736	-0.690
	(0.486)	(0.486)	(0.483)	(0.484)	(0.484)	(0.486)
Age	-0.00317	-0.00325	-0.00120	-0.00123	-0.00231	-0.00178
	(0.00825)	(0.00826)	(0.00824)	(0.00828)	(0.00826)	(0.00828)
Volatility	0.000939	0.000931	0.000826	0.000908	0.000843	0.000830
	(0.00231)	(0.00232)	(0.00231)	(0.00231)	(0.00231)	(0.00231)
Log Board size*Leverage					1.136**	
					(0.572)	
Log Board size*Cash lag1						-0.231
						(0.834)
Cash lag1						-0.121
						(1.052)
Constant	-0.0889	0.105	-0.841	-0.701	-0.642	-0.716
	(0.259)	(0.770)	(0.830)	(1.333)	(0.836)	(0.840)
Observations	1,531	1,531	1,531	1,531	1,531	1,527
Number of Index	214	214	214	214	214	214
Wald chi-squared	52.75***	52.89***	62.37***	62.18***	65.49***	63.02***

Table 91 GMM-type dynamic panel regression models for Poland ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.281***	0.282***	0.279***	0.283***	0.283***	0.274***
	(0.0275)	(0.0275)	(0.0274)	(0.0276)	(0.0279)	(0.0282)
Log Board size	0.0272**	0.0445**	0.131***	0.0525	0.124***	0.127***
	(0.0114)	(0.0225)	(0.0412)	(0.0901)	(0.0414)	(0.0417)
Log Board size*Firm size			-0.0185**	-0.0152*	-0.0195**	-0.0186**
			(0.00749)	(0.00815)	(0.00766)	(0.00747)
Outside director ratio		0.0866	0.0984	-0.0214	0.0911	0.100
		(0.0965)	(0.0963)	(0.158)	(0.0966)	(0.0963)
Log Board size*Outside dir.r.				0.0802		
				(0.0830)		
Firm size	0.0206**	0.0203**	0.0405***	0.0370***	0.0431***	0.0395***
	(0.00878)	(0.00880)	(0.0122)	(0.0126)	(0.0127)	(0.0122)
Net Fixed Assets	-0.249***	-0.250***	-0.254***	-0.252***	-0.256***	-0.255***
	(0.0412)	(0.0412)	(0.0411)	(0.0413)	(0.0411)	(0.0414)
Leverage	-0.126***	-0.126***	-0.131***	-0.131***	-0.204**	-0.129***
	(0.0372)	(0.0372)	(0.0371)	(0.0372)	(0.0822)	(0.0372)
CAPEX	0.156**	0.158***	0.163***	0.162***	0.167***	0.167***
	(0.0608)	(0.0609)	(0.0607)	(0.0608)	(0.0608)	(0.0621)
Minority	0.117**	0.116**	0.121**	0.121**	0.121**	0.123**
	(0.0541)	(0.0541)	(0.0539)	(0.0540)	(0.0540)	(0.0539)
Age	-0.000953	-0.000874	-0.000802	-0.000825	-0.000928	-0.000755
	(0.00109)	(0.00109)	(0.00109)	(0.00109)	(0.00110)	(0.00109)
Volatility	5.04e-05	4.45e-05	4.06e-05	4.33e-05	4.98e-05	4.05e-05
	(0.000264)	(0.000264)	(0.000263)	(0.000264)	(0.000264)	(0.000263)
Log Board size*Leverage					0.0652	
					(0.0658)	
Log Board size*Cash lag1						0.0559
						(0.0878)
Cash lag1						-0.0593
						(0.109)
Constant	-0.00283	-0.0772	-0.172*	-0.0650	-0.166*	-0.165*
	(0.0376)	(0.0908)	(0.0987)	(0.148)	(0.0988)	(0.0993)
Observations	1,601	1,599	1,599	1,599	1,599	1,599
Number of Index	214	214	214	214	214	214
Wald chi-squared	192.28***	193.07***	198.72***	198.65***	199.73***	198.00***

Table 92 GMM-type dynamic panel regression models for Romania Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.520***	0.519***	0.522***	0.521***	0.520***	0.623***
	(0.0988)	(0.0994)	(0.101)	(0.101)	(0.101)	(0.115)
Log Board size	-0.478	-0.477	-0.848	-0.315	-0.840	-1.033
	(0.574)	(0.578)	(1.762)	(9.794)	(1.776)	(1.790)
Log Board size*Firm size			0.0776	0.0970	0.0744	0.0346
			(0.342)	(0.367)	(0.376)	(0.345)
Outside director ratio		0.267	0.467	1.653	0.436	5.842
		(7.708)	(7.844)	(33.36)	(7.890)	(8.058)
Log Board size*Outside dir.r				-1.235		
				(20.32)		
Firm size	-0.254	-0.250	-0.363	-0.386	-0.359	-0.335
	(0.222)	(0.229)	(0.541)	(0.541)	(0.622)	(0.546)
Net Fixed Assets	0.0590	0.0112	0.102	0.104	0.0783	-0.352
	(0.851)	(0.906)	(0.982)	(1.116)	(0.983)	(0.984)
Leverage	0.355	0.385	0.331	0.335	0.303	0.548
	(1.205)	(1.215)	(1.255)	(1.283)	(6.570)	(1.266)
CAPEX	-3.151	-3.157	-3.181	-3.203	-3.176	-2.860
	(2.152)	(2.174)	(2.193)	(2.205)	(2.227)	(2.213)
One-tiered management	0.300	0.324	0.402	0.415	0.405	0.317
	(0.627)	(0.968)	(1.052)	(1.631)	(1.075)	(1.098)
Minority	-0.0304	0.0682	0.0617	0.0686	0.0767	0.539
	(1.842)	(1.848)	(1.858)	(1.869)	(1.871)	(1.871)
Age	-0.00813	-0.0103	-0.0105	-0.0114	-0.0119	-0.00759
	(0.0506)	(0.0527)	(0.0530)	(0.0545)	(0.0534)	(0.0538)
Volatility	-4.667	-4.647	-4.885	-4.893	-4.896	-3.316
	(5.005)	(5.055)	(5.214)	(5.247)	(5.280)	(5.226)
Log Board size*Leverage					0.0324	
					(3.808)	
Log Board size*Cash lag1						8.549**
						(3.390)
Cash lag1						-13.49**
						(5.395)
Constant	2.578*	2.449	2.783	2.291	2.817	0.617
	(1.427)	(4.809)	(4.968)	(17.64)	(4.993)	(5.049)
Observations	135	135	135	135	135	135
Number of Index	26	26	26	26	26	26
Wald chi-squared	47.93***	47.52***	46.86***	46.27***	46.33***	49.81***

Table 93 GMM-type dynamic panel regression models for Romania MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of MB ratio	0.214**	0.230**	0.252**	0.261**	0.255**	0.287**
	(0.107)	(0.110)	(0.113)	(0.115)	(0.113)	(0.124)
Log Board size	0.994	0.885	-1.377	-17.43	-1.319	-1.554
	(0.910)	(0.932)	(2.865)	(15.03)	(2.898)	(2.904)
Log Board size*Firm size			0.482	0.292	0.529	0.423
			(0.572)	(0.607)	(0.610)	(0.573)
Outside director ratio		-14.21	-13.78	-67.45	-13.66	-9.082
		(12.13)	(12.36)	(49.95)	(12.45)	(12.71)
Log Board size*Outside dir.r.				33.28		
				(30.78)		
Firm size	-0.494	-0.600*	-1.375	-1.348	-1.462	-1.291
	(0.328)	(0.346)	(0.980)	(0.984)	(1.060)	(0.983)
Net Fixed Assets	-1.422	-0.694	-0.0528	1.043	-0.0509	-0.530
	(1.435)	(1.592)	(1.768)	(2.019)	(1.774)	(1.762)
Leverage	-2.696	-3.031	-3.362	-3.674	-1.106	-3.376
	(2.060)	(2.121)	(2.192)	(2.234)	(10.87)	(2.204)
CAPEX	-4.619	-4.997	-5.044	-5.163	-5.163	-4.805
	(3.544)	(3.627)	(3.664)	(3.704)	(3.726)	(3.701)
One-tiered management	-1.554*	-2.790*	-2.337	-4.187*	-2.379	-2.236
	(0.945)	(1.426)	(1.566)	(2.250)	(1.583)	(1.616)
Minority	-29.32	-35.13	-27.05	-39.02	-29.20	-22.94
	(46.85)	(47.98)	(48.74)	(50.39)	(49.40)	(49.10)
Age	-0.0171	0.0119	0.0205	0.0341	0.0224	0.0135
	(0.0811)	(0.0863)	(0.0878)	(0.0897)	(0.0877)	(0.0882)
Volatility	-7.343	-7.367	-8.365	-6.926	-8.063	-7.122
	(8.114)	(8.272)	(8.477)	(8.647)	(8.622)	(8.485)
Log Board size*Leverage					-1.339	
					(6.216)	
Log Board size*Cash lag1						6.950
						(5.311)
Cash lag1						-10.82
						(8.428)
Constant	4.776**	13.11*	15.70**	43.84*	15.60**	13.79*
	(2.327)	(7.490)	(7.813)	(26.30)	(7.875)	(7.917)
Observations	130	130	130	130	130	130
Number of Index	26	26	26	26	26	26
Wald Chi-squared	21.07**	21.67**	22.09**	23.26**	21.94*	23.22*

Table 94 GMM-type dynamic panel regression models for Romania TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of TSR	-0.114	-0.104	-0.102	-0.100	-0.102	-0.0450
	(0.0863)	(0.0878)	(0.0885)	(0.0886)	(0.0889)	(0.0957)
Log Board size	0.974*	0.969*	1.777	11.76	1.967	1.078
	(0.507)	(0.514)	(1.844)	(10.06)	(1.903)	(2.081)
Log Board size*Firmsize			-0.160	0.0814	-0.148	-0.0153
			(0.354)	(0.421)	(0.357)	(0.398)
Outside director ratio		12.60	11.70	47.96	11.75	10.85
		(7.877)	(7.996)	(37.31)	(8.028)	(8.163)
Log Board size*Outside dir.r.				-22.24		
				(21.99)		
Firm size	0.0836	0.126	0.352	0.0230	0.349	0.0609
	(0.187)	(0.191)	(0.535)	(0.619)	(0.537)	(0.625)
Net Fixed Assets	-1.029	-0.943	-1.045	-1.147	-1.148	-0.805
	(0.730)	(0.742)	(0.776)	(0.777)	(0.814)	(0.819)
Leverage	1.322	1.323	1.371	1.439	3.676	1.039
	(0.959)	(0.972)	(0.985)	(0.988)	(5.418)	(1.019)
CAPEX	1.319	1.413	1.516	1.782	1.370	0.263
	(2.052)	(2.079)	(2.110)	(2.129)	(2.143)	(2.318)
One-tiered management	-0.272	1.150	0.921	2.621	0.848	1.627
	(0.684)	(1.128)	(1.214)	(2.122)	(1.239)	(1.310)
Minority	-2.441	-2.351	-2.377	-2.459	-2.489	-1.891
	(1.755)	(1.781)	(1.798)	(1.800)	(1.817)	(1.845)
Age	0.0611	0.0482	0.0540	0.0447	0.0494	0.0215
	(0.0384)	(0.0398)	(0.0421)	(0.0432)	(0.0438)	(0.0434)
Volatility	-0.534	-0.557	-0.492	-1.149	-0.304	-2.100
	(4.552)	(4.613)	(4.657)	(4.708)	(4.692)	(5.433)
Log Board size*Leverage					-1.294	
					(3.032)	
Log Board size*Cash lag1						-3.176
						(3.629)
Cash lag1						6.822
						(5.911)
Constant	-2.006	-9.738*	-10.25**	-28.20	-10.52**	-8.774*
	(1.375)	(5.032)	(5.169)	(18.85)	(5.214)	(5.287)
Observations	147	147	147	147	147	138
Number of Index	28	28	28	28	28	26
Wald chi-squared	11.41	13.65	13.60	14.53	13.75	14.98

Table 95 GMM-type dynamic panel regression models for Romania ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	-0.111	-0.110	-0.144	-0.150	-0.149	-0.165*
	(0.0933)	(0.0942)	(0.0926)	(0.0943)	(0.0925)	(0.0938)
Log Board size	0.224***	0.223***	0.776***	1.357	0.733***	0.777***
	(0.0753)	(0.0758)	(0.239)	(2.034)	(0.239)	(0.238)
Log Board size*Firm size			-0.119**	-0.118**	-0.140***	-0.116**
			(0.0485)	(0.0511)	(0.0508)	(0.0478)
Outside director ratio		-0.182	-0.381	1.728	-0.373	-0.255
		(1.168)	(1.130)	(6.940)	(1.127)	(1.123)
Log Board size*Outside dir.r.				-1.163		
				(4.170)		
Firm size	0.0349	0.0340	0.219**	0.224***	0.256***	0.211**
	(0.0402)	(0.0406)	(0.0855)	(0.0859)	(0.0889)	(0.0838)
Net Fixed Assets	-0.333**	-0.331**	-0.444***	-0.465***	-0.432***	-0.440***
	(0.140)	(0.141)	(0.145)	(0.155)	(0.144)	(0.143)
Leverage	0.479***	0.478***	0.475***	0.477***	-0.784	0.501***
	(0.140)	(0.141)	(0.137)	(0.139)	(0.811)	(0.136)
CAPEX	0.717**	0.718**	0.715**	0.725**	0.752**	0.723**
	(0.324)	(0.326)	(0.317)	(0.320)	(0.318)	(0.315)
One-tiered management	-0.158	-0.178	-0.255	-0.143	-0.225	-0.196
	(0.105)	(0.164)	(0.162)	(0.361)	(0.162)	(0.167)
Minority	0.0593	0.0583	0.0620	0.0740	0.0610	0.0660
	(0.271)	(0.273)	(0.266)	(0.266)	(0.265)	(0.264)
Age	0.00515	0.00543	0.00347	0.00331	0.00334	0.00220
	(0.00606)	(0.00635)	(0.00622)	(0.00623)	(0.00621)	(0.00625)
Volatility	1.784***	1.772***	2.073***	2.074***	1.740***	1.969***
	(0.583)	(0.592)	(0.588)	(0.590)	(0.628)	(0.580)
Log Board size*Leverage					0.722	
					(0.459)	
Log Board size*Cash lag1						-0.254
						(0.427)
Cash lag1						0.553
						(0.667)
Constant	-0.427**	-0.316	-0.930	-2.098	-0.889	-1.028
	(0.218)	(0.741)	(0.753)	(3.713)	(0.752)	(0.755)
Observations	140	140	140	140	140	140
Number of Index	26	26	26	26	26	26
Wald chi-squared	40.50***	40.03***	48.11***	47.90***	50.69***	50.46***

Table 96 GMM-type dynamic panel regression models for Slovakia Tobin's Q as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of Tobin's Q	0.252	0.244	0.249	0.272	0.426**	0.235
	(0.175)	(0.190)	(0.197)	(0.201)	(0.214)	(0.220)
Log Board size	-0.243	-0.248	3.370	-1.788	0.610	3.603
	(0.365)	(0.377)	(3.181)	(5.322)	(3.438)	(3.582)
Log Board size*Firm size			-0.520	-0.276	-0.258	-0.554
			(0.454)	(0.503)	(0.468)	(0.513)
Outside director ratio		-0.283	0.243	-12.84	-3.293	0.260
		(2.107)	(2.229)	(10.95)	(2.818)	(2.488)
Log Board size*Outside dir.r.				7.172		
				(5.874)		
Firm size	0.141	0.126	0.842	0.315	0.409	0.874
	(0.121)	(0.171)	(0.650)	(0.789)	(0.679)	(0.729)
Net Fixed Assets	-0.00381	0.0422	-0.119	0.372	0.714	-0.0900
	(0.777)	(0.869)	(0.910)	(1.010)	(0.993)	(0.995)
Leverage	-0.590	-0.534	-0.655	-0.767	-6.574**	-0.617
	(0.526)	(0.685)	(0.717)	(0.735)	(3.011)	(0.830)
CAPEX	-1.802	-1.875	-1.464	-1.574	-1.543	-1.601
	(1.681)	(1.813)	(1.910)	(1.945)	(1.895)	(2.150)
Minority	0.108	0.0498	0.0812	-0.654	-0.234	0.115
	(0.422)	(0.616)	(0.638)	(0.885)	(0.651)	(0.708)
Age	0.0131	0.0129	0.0212	0.0249	0.0207	0.0171
	(0.0224)	(0.0230)	(0.0249)	(0.0255)	(0.0247)	(0.0292)
Volatility	-3.545	-3.067	-2.596	0.0760	5.077	-2.240
	(5.265)	(6.479)	(6.718)	(7.177)	(7.667)	(7.448)
Log Board size*Leverage					3.923**	
					(1.939)	
Log Board size*Cash lag1						1.845
						(6.941)
Cash lag1						-1.817
						(10.63)
Constant	0.485	0.707	-4.371	5.262	0.974	-4.600
	(0.587)	(1.758)	(4.791)	(9.274)	(5.437)	(5.363)
Observations	33	33	33	33	33	33
Number of Index	5	5	5	5	5	5
Wald chi-squared	9.88	9.36	10.05	11.20	14.31	8.63

Table 97 GMM-type dynamic panel regression models for Slovakia MB ratio as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1of MB ratio	-0.432***	-0.413***	-0.385***	-0.369**	-0.412**	-0.341**
	(0.129)	(0.140)	(0.145)	(0.155)	(0.181)	(0.169)
Log Board size	0.821	0.742	6.864	12.12	7.522	6.947
	(0.566)	(0.615)	(4.351)	(8.427)	(5.131)	(4.807)
Log Board size*Firm size			-0.903	-1.155	-0.955	-0.931
			(0.635)	(0.753)	(0.686)	(0.705)
Outside director ratio		-2.397	-1.620	11.72	-0.536	-2.070
		(3.035)	(3.154)	(18.23)	(5.190)	(3.543)
Log Board size*Outside dir.r.				-7.196		
				(9.665)		
Firm size	-0.241	-0.361	0.943	1.466	1.011	0.987
	(0.218)	(0.279)	(0.961)	(1.236)	(1.027)	(1.058)
Net Fixed Assets	0.845	1.052	0.601	0.229	0.633	0.179
	(1.532)	(1.665)	(1.733)	(1.901)	(1.800)	(1.944)
Leverage	0.760	1.240	1.041	1.071	2.251	1.411
	(0.751)	(1.009)	(1.042)	(1.104)	(4.632)	(1.279)
CAPEX	-5.007*	-5.388*	-4.495	-4.315	-4.665	-4.193
	(2.595)	(2.828)	(2.961)	(3.144)	(3.132)	(3.308)
Minority	7.104***	6.440***	6.295***	7.113***	6.695***	5.818***
	(1.224)	(1.560)	(1.599)	(2.018)	(2.227)	(1.868)
Age	-0.0532	-0.0538	-0.0391	-0.0445	-0.0376	-0.0498
	(0.0327)	(0.0351)	(0.0373)	(0.0402)	(0.0392)	(0.0427)
Volatility	12.22	17.06	18.76	16.33	15.03	22.74
	(10.00)	(12.36)	(12.71)	(13.84)	(19.13)	(14.94)
Log Board size*Leverage					-0.898	
					(3.341)	
Log Board size*Cash lag1						2.275
						(10.66)
Cash lag1						0.247
						(16.18)
Constant	1.445	3.286	-5.518	-15.41	-6.908	-5.330
	(0.911)	(2.528)	(6.710)	(15.06)	(8.665)	(7.410)
Observations	33	33	33	33	33	33
Number of Index	5	5	5	5	5	5
Chi-squared	351.72***	305.89***	294.16***	262.92***	273.94***	258.42***

Table 98 GMM-type dynamic panel regression models for Slovakia TSR as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of TSR	-0.169	-0.169	-0.167	-0.165	-0.201	-0.0545
	(0.196)	(0.202)	(0.216)	(0.224)	(0.211)	(0.239)
Log Board size	-0.292	-0.298	-0.474	0.903	-2.841	-0.0976
	(0.897)	(0.977)	(4.205)	(8.159)	(4.325)	(4.275)
Log Board size*Firm size			0.0262	-0.0469	0.177	0.0419
			(0.610)	(0.730)	(0.601)	(0.628)
Outside director ratio		-0.0704	-0.106	3.261	-5.158	0.490
		(3.347)	(3.558)	(17.27)	(4.557)	(3.597)
Log Board size*Outside dir.r.				-1.873		
				(9.383)		
Firm size	-0.0401	-0.0430	-0.0803	0.0786	-0.398	-0.0573
	(0.240)	(0.281)	(0.916)	(1.239)	(0.912)	(0.943)
Net Fixed Assets	1.287	1.304	1.330	1.250	2.729	1.105
	(1.519)	(1.753)	(1.911)	(2.020)	(2.034)	(1.891)
Leverage	-0.0922	-0.0800	-0.0610	-0.0218	-8.347*	-0.204
	(0.752)	(0.968)	(1.094)	(1.150)	(4.967)	(1.160)
CAPEX	4.136*	4.119	4.091	4.162	3.439	5.063*
	(2.317)	(2.517)	(2.685)	(2.804)	(2.643)	(2.796)
Minority	-0.306	-0.319	-0.314	-0.104	-0.787	-0.159
	(0.774)	(1.003)	(1.043)	(1.510)	(1.053)	(1.027)
Age	0.0947***	0.0947***	0.0936**	0.0919**	0.0900**	0.111***
	(0.0285)	(0.0294)	(0.0403)	(0.0427)	(0.0394)	(0.0422)
Volatility	-8.278	-8.150	-8.098	-8.593	3.872	-12.55
	(8.685)	(10.79)	(11.22)	(11.89)	(12.99)	(11.68)
Log Board size*Leverage					5.501*	
					(3.221)	
Log Board size*Cash lag1						-10.11
						(11.40)
Cash lag1						9.830
						(16.80)
Constant	-0.931	-0.879	-0.629	-3.236	5.141	-1.635
	(1.017)	(2.653)	(6.445)	(14.67)	(7.130)	(6.592)
Observations	32	32	32	32	32	32
Number of Index	5	5	5	5	5	5
Wald chi-squared	20.39**	19.21**	18.00*	16.81	21.88**	20.45*

Table 99 GMM-type dynamic panel regression models for Slovakia ROA as dependent variable

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
Lag 1 of ROA	0.00708	0.0105	0.0310	0.0302	0.0309	0.0144
	(0.179)	(0.186)	(0.200)	(0.207)	(0.206)	(0.221)
Log Board size	-0.0794	-0.0813	-0.275	-0.228	-0.252	-0.235
	(0.0813)	(0.0848)	(0.546)	(1.063)	(0.666)	(0.593)
Log Board size*Firm size			0.0277	0.0250	0.0255	0.0210
			(0.0769)	(0.0943)	(0.0860)	(0.0840)
Outside director ratio		-0.0470	-0.104	0.00543	-0.0765	-0.0613
		(0.384)	(0.426)	(2.132)	(0.613)	(0.466)
Log Board size*Outside dir.r.				-0.0588		
				(1.121)		
Firm size	0.0152	0.0132	-0.0257	-0.0206	-0.0225	-0.0172
	(0.0264)	(0.0318)	(0.113)	(0.152)	(0.127)	(0.125)
Net Fixed Assets	-0.251**	-0.246**	-0.224	-0.230	-0.231	-0.225
	(0.112)	(0.122)	(0.140)	(0.179)	(0.180)	(0.150)
Leverage	0.00513	0.0146	0.0348	0.0354	0.0733	0.0165
	(0.0973)	(0.126)	(0.142)	(0.146)	(0.618)	(0.159)
CAPEX	0.370	0.364	0.351	0.353	0.354	0.314
	(0.335)	(0.347)	(0.360)	(0.372)	(0.373)	(0.398)
Minority	-0.0391	-0.0499	-0.0528	-0.0462	-0.0503	-0.0482
	(0.0808)	(0.121)	(0.125)	(0.181)	(0.135)	(0.134)
Age	0.00495	0.00500	0.00384	0.00379	0.00386	0.00381
	(0.00332)	(0.00342)	(0.00476)	(0.00502)	(0.00490)	(0.00530)
Volatility	-0.479	-0.392	-0.258	-0.283	-0.316	-0.311
	(1.033)	(1.276)	(1.366)	(1.487)	(1.666)	(1.491)
Log Board size*Leverage					-0.0258	
					(0.402)	
Log Board size*Cash lag1						0.455
						(1.297)
Cash lag1						-0.741
						(1.940)
Constant	0.156	0.190	0.475	0.390	0.432	0.412
	(0.104)	(0.297)	(0.847)	(1.842)	(1.099)	(0.930)
Observations	35	35	35	35	35	35
Number of Index	5	5	5	5	5	5
Wald chi-squared	17.15**	16,32*	15.51	14.61	14.69	13.90

Table 100 Women on management board for Bulgaria

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOMB	-11.45	-289.5		0.750	-9.619	
	(13.95)	(676.8)		(1.308)	(34.24)	
lag MBoardSize	0.254	-1.842	0.440	-0.337	1.062	-0.332
	(1.061)	(5.837)	(1.055)	(0.325)	(4.796)	(0.326)
FirmSize	5.435*	15.55	5.619*	-0.695	-1.170	-0.693
	(2.819)	(25.71)	(2.814)	(0.507)	(2.834)	(0.511)
lag2 Leverage	5.341	14.17	5.253	0.602	4.095	0.618
	(6.433)	(27.55)	(6.396)	(1.002)	(12.28)	(1.003)
minority	-13.17	-86.21	-14.92	0.248	-7.735	0.427
	(20.37)	(185.7)	(20.41)	(1.925)	(27.46)	(2.155)
lag is_ceo_woman	2.052	5.419	2.142	-	-	-
	(6.141)	(18.41)	(6.116)			
lag WM			-2.674			0.143
			(2.416)			(0.263)
Constant	-22.92	-11.86	-24.08*	5.135	0.178	5.115
	(13.74)	(45.66)	(13.69)	(2.677)	(20.41)	(2.688)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
YearFE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	98	98	98	16	16	16
R-squared	0.128		0.136	0.803		0.801
Number of comp_id	21	21	21	4	4	4
F test	1.40	0.20	1.35	9.55**	0.18	8.40*
Hausman test	24.04**		23.31**	5.43		5.36

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 101 Women on management board for the Czech Republic

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOMB	-26.13	-198.6		-1.133	0.00773	
	(42.14)	(141.1)		(2.393)	(6.605)	
lag MBoardSize	0.662	-0.357	0.817	-0.0910*	-0.0847	-0.0847*
	(0.870)	(1.316)	(0.826)	(0.0495)	(0.0604)	(0.0472)
FirmSize	-3.746	-3.090	-3.845	-0.650***	-0.654***	-0.654***
	(3.166)	(3.900)	(3.134)	(0.179)	(0.181)	(0.177)
lag2 Leverage	-4.893	-36.08	-0.167	-1.879**	-1.665	-1.667**
	(15.78)	(30.59)	(13.69)	(0.911)	(1.472)	(0.784)
minority	92.17	82.61	93.62	10.26	10.88	10.87
	(239.4)	(292.6)	(237.3)	(17.36)	(17.74)	(17.12)
lag is_ceo_woman	-	-	-	-	-	-
lag WM			-			-
Constant	28.28	43.32*	26.00	4.974***	4.869***	4.870***
	(18.55)	(25.39)	(18.02)	(1.053)	(1.197)	(1.019)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	54	54	54	53	53	53
R-squared	0.281		0.273	0.570		0.567
Number of comp_id	8	8	8	8	8	8
F-test	4.61***	3.22**	13.05***	21.45***	20.61***	42.55***
Hausman test	19.96***		17.92***	32.79***		32.85***

Table 102 Women on management board for Hungary

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOMB	37.20**	39.67		2.955**	9.565*	
	(14.73)	(41.97)		(1.246)	(5.464)	
lag MBoardSize	0.576	0.591	0.244	0.0385	0.0151	0.0335
	(0.858)	(0.890)	(0.905)	(0.0547)	(0.0738)	(0.0570)
FirmSize	7.027***	7.040***	6.956***	-0.238	0.180	-0.328
	(2.056)	(2.067)	(2.165)	(0.265)	(0.478)	(0.267)
lag2 Leverage	18.91*	18.87*	19.56*	0.591	1.286	0.454
	(10.02)	(10.04)	(10.53)	(0.689)	(1.053)	(0.704)
minority	-5.498	-5.701	-2.182	3.977**	3.256	4.197**
	(24.62)	(24.84)	(25.86)	(1.624)	(2.195)	(1.669)
lag is_ceo_woman	-1.351	-1.752	3.299			
	(4.807)	(7.977)	(4.642)			
lag WM			2.446			0.279*
			(2.700)			(0.163)
lag is_ceo_woman	-	-	-	-	-	-
Constant	-41.03***	-41.31***	-37.15***	1.512	-0.839	2.090
	(12.65)	(13.43)	(13.18)	(1.534)	(2.730)	(1.540)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	77	77	77	60	60	60
R-squared	0.387		0.322	0.327		0.284
Number of comp_id	12	12	12	8		8
F-test	8.25***	7.92***	6.80***	0.48	0.43	0.87
Hausman test	39.53***		36.62***	3.33		6.06

Table 103 Women on management board for Poland

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag MBoardSize	-0.406	-0.321	-0.356	0.0426**	0.0432**	0.0415*
	(0.303)	(0.325)	(0.310)	(0.0213)	(0.0216)	(0.0217)
FirmSize	1.763**	1.529*	1.733**	-0.126**	-0.107	-0.120**
	(0.832)	(0.893)	(0.832)	(0.0575)	(0.0706)	(0.0575)
lag2 Leverage	1.171	-2.867	1.126	-0.345*	-0.281	-0.326
	(2.818)	(4.095)	(2.821)	(0.205)	(0.247)	(0.206)
minority	-3.347	-10.09	-3.477	0.204	0.420	0.266
	(6.561)	(8.369)	(6.557)	(0.532)	(0.702)	(0.533)
lag is_ceo_woman	-0.124	-13.90	-0.688	-0.0552	0.322	0.0649
	(2.528)	(9.973)	(2.306)	(0.209)	(0.814)	(0.196)
lag WOMB	-2.134	24.72		0.260	-0.465	
	(2.503)	(18.91)		(0.170)	(1.519)	
lag WM			-0.556			0.0162
			(0.797)			(0.0525)
Constant	-3.108	-3.462	-3.173	1.099***	1.039***	1.083***
	(3.759)	(3.974)	(3.760)	(0.276)	(0.307)	(0.277)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	1,235	1,235	1,235	797	797	797
R-squared	0.022		0.022	0.109		0.106
Number of comp_id	206	206	206	130	130	130
F test	4.64***	4.18***	4.65***	13.20***	12.77***	13.14***
Hausman test	30.07***		29.85***	20.79*		21.27*

Table 104 Women on management board for Romania

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOMB	-29.38	35.38		1.127	8.232	
	(18.67)	(66.34)		(1.319)	(8.156)	
lag MBoardSize	0.395	1.371	0.895	-0.0638	-0.110	-0.0703
	(1.738)	(2.144)	(1.708)	(0.0996)	(0.143)	(0.103)
FirmSize	-4.988	-4.666	-6.515	-0.401	-1.278	-0.316
	(8.734)	(9.663)	(8.750)	(0.645)	(1.310)	(0.635)
lag2 Leverage	-4.564	-1.477	-2.267	-0.932	-1.549	-0.960
	(11.20)	(12.74)	(11.13)	(0.666)	(1.131)	(0.699)
minority	-28.04	-26.10	-30.06	-7.064	-10.32	-6.988
	(91.38)	(101.1)	(91.00)	(5.237)	(7.925)	(5.294)
lag is_ceo_woman	5.135	26.29	12.05	1.208	3.662	0.867
	(16.22)	(27.30)	(15.04)	(0.911)	(3.009)	(0.798)
lag WM			-7.395*			0.146
			(4.295)			(0.266)
Constant	28.48	13.51	32.98	3.294	7.234	2.983
	(43.75)	(50.52)	(43.84)	(3.374)	(6.328)	(3.363)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	86	86	86	64	64	64
R-squared	0.128		0.135	0.334		0.326
Number of comp_id	19	19	19	15	15	15
F-test	0.23	0.23	0.43	12.27	6.79	12.30
Hausman test	3.06		4.83	9.11		8.89

Table 105 Women on management board for Slovakia

VARIABLES	(1) ROA	(2) ROA	(3) ROA
lagWOMB	36.95	944.7	
	(50.78)	(2,884)	
lagMBoardSize	1.601	47.88	1.601
	(5.554)	(150.0)	(5.554)
FirmSize	2.341	65.98	2.341
	(16.34)	(224.0)	(16.34)
lagLeverage2	5.569	3.550	5.569
	(13.85)	(83.94)	(13.85)
minority	8.396	31.11	8.396
	(20.87)	(145.1)	(20.87)
lag is_ceo_woman	-	-	-
lag WM			4.619
			(6.347)
Constant	-26.94	-731.5	-24.46
	(105.1)	(2,315)	(103.8)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Model	FE	FE+IV	FE
Observations	26	26	26
R-squared	0.386		0.386
Number of comp_id	5	5	5
F-test	0.02	0.03	0.11
Hausman test	0.09		0.61

Table 106 Women on supervisory board for Bulgaria

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOSB	-0.621	-30.35		-0.158	-1.263	
	(2.963)	(24.07)		(0.691)	(1.409)	
lag SBoardSize	0.540	4.057	0.480	-	-	-
	(1.063)	(3.271)	(0.996)			
FirmSize	5.063*	6.658	5.427*	-0.852	-1.077	-1.093
	(2.785)	(4.644)	(2.785)	(0.514)	(0.695)	(0.577)
lag2 Leverage	5.145	8.489	5.251	0.311	-1.774	0.786
	(6.459)	(10.70)	(6.402)	(1.561)	(2.878)	(0.832)
minority	-11.57	-44.78	-12.08	-0.642	-4.206	-1.224
	(20.28)	(41.88)	(19.89)	(2.761)	(5.004)	(2.055)
lag is_ceo_woman	1.954	2.357	2.196	-	-	-
	(6.164)	(9.893)	(6.120)			
lag WS			-2.944			-0.283
			(2.845)			(0.358)
Constant	-24.14*	-37.69	-22.79*	4.174	5.810	5.381
	(13.70)	(24.47)	(13.57)	(2.630)	(3.739)	(2.907)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	98	98	98	16	16	16
R-squared	0.121		0.135	0.736		0.769
Number of comp_id	21	21	21	4	4	4
F-test	1.54*	0.65	1.41	39.40***	5.51*	14.36**
Hausman-test	18.20*		21.70**	5.57*		3.46

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 107 Women on supervisory board for Czech Republic

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOSB	-3.712	15.08		-0.249	-0.0720	
	(4.917)	(19.76)		(0.282)	(0.953)	
lag SBoardSize	0.109	0.214	0.135	0.0153	0.0163	0.00937
	(0.312)	(0.388)	(0.317)	(0.0179)	(0.0187)	(0.0163)
FirmSize	-2.622	-5.933	-3.442	-0.861***	-0.893***	-0.687***
	(3.580)	(5.420)	(3.779)	(0.205)	(0.262)	(0.195)
lag2 Leverage	1.954	5.241	2.530	-2.242***	-2.209***	-2.140***
	(13.62)	(16.61)	(13.71)	(0.788)	(0.810)	(0.709)
minority	145.4	-18.45	119.5	11.68	10.26	-2.715
	(247.9)	(338.9)	(252.2)	(17.95)	(19.48)	(16.60)
lag is_ceo_woman	-	-	-	-	-	-
lag WS			0.155			-0.201***
			(1.325)			(0.0686)
Constant	22.18	40.58	26.69	5.661***	5.835***	4.775***
	(21.11)	(31.27)	(22.02)	(1.212)	(1.510)	(1.132)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	54	54	54	53	53	53
R-squared	0.268		0.256	0.549		0.633
Number of comp_id	8	8	8	8	8	8
F-test	12.76***	9.07***	11.56***	44.00***	41.87***	55.11***
Hausman-test	29.69***		28.87***	36.13***		36.85***

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 108 Women on supervisory board for Hungary

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOSB	0.573	324.2		0.00498	-17.69	
	(3.227)	(3,299)		(0.233)	(140.6)	
lag SBoardSize	1.324	7.420	1.339	0.0377	-1.302	0.0359
	(0.941)	(63.49)	(0.923)	(0.0716)	(10.67)	(0.0695)
FirmSize	6.872***	30.70	6.914***	-0.370	1.960	-0.389
	(2.149)	(244.7)	(2.099)	(0.279)	(18.81)	(0.287)
lag2 Leverage	22.34**	-77.45	20.95*	0.387	14.75	0.414
	(10.70)	(1,028)	(10.53)	(0.760)	(114.4)	(0.741)
minority	-1.963	241.0	-4.614	4.298**	-32.99	4.346**
	(25.72)	(2,502)	(25.22)	(1.806)	(297.0)	(1.751)
lag is_ceo_woman	4.293	-64.88	5.541	-	-	-
	(4.387)	(707.6)	(4.336)			
lag WS			-2.408			0.0332
			(1.761)			(0.125)
Constant	-43.30***	-243.5	-41.65***	2.337	1.058	2.435
	(13.03)	(2,048)	(12.69)	(1.767)	(23.56)	(1.804)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	77	77	77	60	60	60
R-squared	0.335		0.358	0.224		0.225
Number of comp_id	12	12	12	8	8	8
F-test	7.50**	0.04	8.06***	4.36***	0.03	4.21***
Hausman-test	38.28***		25.68***	19.59***		9.43

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 109 Women on supervisory board for Poland

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOSB	2.175	-137.5		-0.0641	-3.547	
	(1.533)	(137.7)		(0.113)	(4.450)	
lag SBoardSize	0.254	0.775	0.233	-0.0477**	-0.0282	-0.0478**
	(0.304)	(1.054)	(0.303)	(0.0197)	(0.0397)	(0.0197)
FirmSize	1.504*	3.326	1.666**	-0.0947*	-0.0131	-0.0975*
	(0.814)	(3.050)	(0.813)	(0.0562)	(0.136)	(0.0563)
lag2 Leverage	0.508	11.28	0.737	-0.298	-0.0237	-0.305
	(2.795)	(13.58)	(2.784)	(0.205)	(0.475)	(0.205)
minority	-4.212	24.60	-3.248	0.299	0.837	0.293
	(6.538)	(34.61)	(6.514)	(0.530)	(1.078)	(0.530)
lag is_ceo_woman	-0.807	-1.445	-0.405	0.00207	-0.102	0.000120
	(2.167)	(6.591)	(2.165)	(0.187)	(0.322)	(0.188)
lag WS			1.254***			-0.00782
			(0.444)			(0.0311)
Constant	-5.084	-3.289	-6.412	1.405***	1.159**	1.421***
	(4.153)	(12.70)	(4.168)	(0.300)	(0.565)	(0.303)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	1,235	1,235	1,235	797	797	797
R-squared	0.022		0.028	0.108		0.108
Number of comp_id	206	206	206	130	130	130
F test	4.69***	0.5	4.64***	13.45***	5.48***	13.44***
Hausman-test	37.01***		42.73***	15.28		15.35

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 110 Women on supervisory board for Romania

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) logQ	(5) logQ	(6) logQ
lag WOSB	-2.544	241.7		-0.226	-34.87	
	(11.35)	(261.9)		(0.581)	(563.1)	
lag SBoardSize	0.941	13.71	1.812	-0.0673	-1.797	-0.0660
	(1.966)	(14.87)	(1.821)	(0.104)	(28.13)	(0.102)
FirmSize	-4.833	-80.57	-9.461	-0.205	2.784	-0.271
	(9.718)	(85.91)	(8.826)	(0.644)	(49.00)	(0.647)
lag2 Leverage	-2.448	14.36	0.289	-0.926	-8.559	-0.995
	(11.67)	(40.27)	(11.19)	(0.698)	(124.2)	(0.723)
minority	-30.63	-77.95	-39.56	-6.369	-29.28	-6.548
	(94.02)	(295.2)	(89.96)	(5.212)	(375.9)	(5.230)
lag is_ceo_woman	15.41	4.640	20.68	0.731	-1.692	0.633
	(14.49)	(46.28)	(14.05)	(0.737)	(40.06)	(0.768)
lag WS			-11.17**			0.134
			(4.942)			(0.264)
Constant	21.20	312.9	41.44	2.468	0.461	2.783
	(45.97)	(341.0)	(42.68)	(3.331)	(46.59)	(3.379)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Model	FE	FE+IV	FE	FE	FE+IV	FE
Observations	86	86	86	64	64	64
R-squared	0.090		0.168	0.323		0.325
Number of comp_id	19	19	19	15	15	15
F-test	0.55	0.10	0.75	10.97***	0.10	11.80***
Hausman-test	5.38		8.84	11.42		10.52

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 111 Women on supervisory board for Slovakia

VARIABLES	(1) ROA	(2) ROA	(3) ROA
lag WOSB	1.151	274.7	
	(7.179)	(2,826)	
lag SBoardSize	-1.322	14.16	-1.113
	(1.930)	(161.8)	(1.786)
FirmSize	6.593	71.72	2.521
	(18.26)	(711.7)	(17.38)
lag2 Leverage	9.177	-65.12	13.20
	(14.74)	(789.9)	(14.09)
minority	6.444	125.6	5.719
	(21.09)	(1,259)	(19.56)
lag is_ceo_woman	-	-	-
lag WS			-2.717
			(2.415)
Constant	-32.48	-509.1	-6.049
	(100.8)	(5,087)	(96.26)
Observations	26	26	26
R-squared	0.388		0.462
Number of comp_id	5	5	5
F-test	1.71	0.01	2.12
Hausman-test	5.62		6.31

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 112 Female presence on management and supervisory board for Bulgaria

VARIABLES	(1) ROA	(2) logQ	(3) ROA	(4) logQ
lag DM	-0.284	0.334		
	(3.693)	(0.309)		
lag MBoardSize	0.347	-0.361		
	(1.064)	(0.270)		
FirmSize	5.062*	-0.978	4.893*	-1.254*
	(2.843)	(0.506)	(2.799)	(0.462)
lag2 Leverage	5.002	0.457	4.973	-0.148
	(6.459)	(0.885)	(6.450)	(0.803)
minority	-10.66	1.892	-10.10	-26.72
	(21.14)	(2.528)	(20.09)	(16.00)
lag is_ceo_woman	1.940	-	1.733	-
	(6.180)		(6.181)	
lag DS			2.285	-5.331
			(5.686)	(3.198)
lag SBoardSize			0.474	-
			(1.003)	
Constant	-23.43*	6.660	-24.62*	7.927*
	(13.82)	(2.909)	(13.75)	(3.038)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Model	FE	FE	FE	FE
Observations	98	16	98	16
R-squared	0.119	0.843	0.123	0.842
Number of comp_id	21	4	21	4
F-test	1.38	24.78**	1.55*	67.90***
Hausman-test	22.09**	5.77	19.79*	5.65*

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 113 Female presence on management and supervisory board for the Czech Republic

VARIABLES	(1) ROA	(2) logQ	(3) ROA	(4) logQ
DM_L1	-	-		
lag MBoardSize	0.817	-0.0847*		
	(0.826)	(0.0472)		
FirmSize	-3.845	-0.654***	-5.067	-0.768***
	(3.134)	(0.177)	(3.707)	(0.212)
lag2 Leverage	-0.167	-1.667**	1.653	-2.164***
	(13.69)	(0.784)	(13.41)	(0.766)
minority	93.62	10.87	215.7	-2.120
	(237.3)	(17.12)	(254.0)	(18.77)
lagis_ceo_woman	-	-	-	-
lag DS			2.667	-0.201
			(2.117)	(0.123)
lag SBoardSize			0.247	0.00758
			(0.320)	(0.0182)
Constant	26.00	4.870***	34.05	5.283***
	(18.02)	(1.019)	(21.28)	(1.210)
Observations	54	53	54	53
R-squared	0.273	0.567	0.289	0.573
Number of comp_id	8	8	8	8
F-test	13.05***	42.55***	12.05***	46.45***
Hausman-test	17.92***	32.85***	29.22***	36.31***

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 114 Female presence on management and supervisory board for Hungary

VARIABLES	(1) ROA	(2) logQ	(3) ROA	(4) logQ
lag DM	-0.202	0.0660		
	(3.508)	(0.209)		
lag MBoardSize	0.367	0.0435		
	(0.932)	(0.0607)		
FirmSize	6.835***	-0.418	6.792***	-0.355
	(2.178)	(0.271)	(2.139)	(0.278)
lag2 Leverage	19.54*	0.304	22.92**	0.334
	(10.61)	(0.725)	(10.76)	(0.743)
minority	-2.511	4.298**	0.314	3.893**
	(26.08)	(1.726)	(27.58)	(1.901)
lag is_ceo_woman	4.664	-	4.403	-
	(4.425)		(4.331)	
lag DS			0.933	-0.111
			(3.538)	(0.221)
lag SBoardSize			1.275	0.0447
			(0.950)	(0.0707)
Constant	-36.84***	2.558	-43.19***	2.297
	(13.34)	(1.567)	(12.91)	(1.763)
Observations	77	60	77	60
R-squared	0.311	0.234	0.335	0.229
Number of comp_id	12	8	12	8
F-test	6.57***	1.29	6.35***	4.35***
Hausman-test	36.08***	8.62	23.98***	5.45

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 115 Female presence on management and supervisory board for Poland

VARIABLES	(1) ROA	(2) logQ	(3) ROA	(4) logQ
lag DM	-1.470	-0.00445		
	(0.913)	(0.0599)		
lag MBoardSize	-0.325	0.0430**		
	(0.306)	(0.0215)		
FirmSize	1.770**	-0.119**	1.576*	-0.0955*
	(0.831)	(0.0576)	(0.811)	(0.0561)
lag2 Leverage	1.487	-0.320	0.670	-0.299
	(2.818)	(0.206)	(2.782)	(0.205)
minority	-3.079	0.286	-3.207	0.290
	(6.544)	(0.534)	(6.510)	(0.529)
lag is_ceo_woman	-0.0346	0.0834	-0.596	0.0131
	(2.296)	(0.194)	(2.161)	(0.187)
lag DS			2.084***	0.0558
			(0.689)	(0.0512)
lag SBoardSize			0.250	-0.0487**
			(0.303)	(0.0197)
Constant	-3.329	1.076***	-6.168	1.381***
	(3.757)	(0.277)	(4.154)	(0.300)
Observations	1,235	797	1,235	797
R-squared	0.024	0.105	0.029	0.110
Number of comp_id	206	130	206	130
F test	4.68***	13.30***	4.65***	13.47***
Hasuman-test	30.57***	20.75*	39.36***	16.20

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 116 Female presence on management and supervisory board for Romania

VARIABLES	(1) ROA	(2) logQ	(3) ROA	(4) logQ
lag DM	-9.157	0.332		
	(5.510)	(0.416)		
lag MBoardSize	0.775	-0.0751		
	(1.711)	(0.102)		
FirmSize	-6.721	-0.376	-11.06	-0.328
	(8.784)	(0.641)	(8.839)	(0.653)
lag2 Leverage	-4.132	-0.981	-2.506	-1.006
	(11.15)	(0.682)	(11.02)	(0.705)
minority	-30.88	-7.140	-43.44	-6.649
	(91.18)	(5.261)	(89.09)	(5.203)
lag is_ceo_woman	11.99	0.890	24.73*	0.471
	(15.08)	(0.795)	(14.21)	(0.824)
lag DS			-17.61**	0.300
			(6.986)	(0.409)
lag SBoardSize			1.908	-0.0664
			(1.804)	(0.101)
Constant	35.42	3.240	50.29	3.063
	(44.20)	(3.375)	(42.83)	(3.407)
Observations	86	64	86	64
R-squared	0.132	0.332	0.185	0.330
Number of comp_id	19	15	19	15
F-test	0.47	12.38***	0.84	11.94***
Hausman-test	5.88	9.35	10.25	10.53

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 117 Female presence on management and supervisory board for Slovakia

VARIABLES	(1) ROA
lag DM	4.619
	(6.347)
lag MBoardSize	1.601
	(5.554)
FirmSize	2.341
	(16.34)
lag2 Leverage	5.569
	(13.85)
minority	8.396
	(20.87)
lag is_ceo_woman	-
Constant	-24.46
	(103.8)
Observations	26
Number of comp_id	5
R-squared	0.386
F-test	0.11
Hausman-test	0.61

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1