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## Gender board diversity and its impact on firm performance in the Czech Republic

*Bachelor thesis*

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## Anotace (abstrakt)

Cílem této práce je zaměřit se na genderovou nerovnováhu ve strukturálních orgánech firem a na vliv který má genderová diverzita v představenstvu na rentabilitu aktiv těchto firem v České republice. Použitím panelové série dat, čítající 204 akciových společností různých velikostí během let 2003 až 2011, byla zjištěna značná nerovnováha poměru žen a mužů ve strukturálních orgánech firem a zanedbatelný pokrok v tomto směru v rámci sledovaného období. Výsledky regresní analýzy ukázaly statisticky nevýznamný vliv genderové diverzity na rentabilitu aktiv pro všechna použitá měřítka zastoupení žen ve strukturálních orgánech firem i přesto, že jsme vzali v potaz endogenitu hlavní proměnné použitím metody fixních efektů a 2SLS. Čistě ekonomické odůvodnění potenciálních změn, které by přinutily podniky začlenit více žen do strukturálních orgánů firem, tedy nalezeno nebylo. Pokud by byly navíc započítány výdaje související se zavedením takovýchto změn, tak by mohlo v krátkém období dojít i k rovnou negativnímu vlivu na finance firem.

## Abstract

The purpose of this study is to examine the extent of gender inequality on boards of joint-stock companies and the relationship between gender diver-

sity on board of directors and the return on assets in the Czech Republic. Using a panel data set of 204 Czech companies of various sizes over the years 2003-2011, we discovered that women are considerably underrepresented on corporate boards and that the gender board diversity has not significantly changed over the observed time period. The results of regression analysis showed a non-significant effect on return on assets for all our gender diversity measures, even after we accounted for endogeneity of the gender diversity variable in the form of fixed effects method and two-stage least squares estimator. Economic justification of potential legislation that should force the companies to appoint more women into board positions was therefore not found. Moreover, if companies account for underlying cost of implementing such measures, firm performance might be negatively affected in the short term.

## **Klíčová slova**

Genderová diverzita, Finanční výsledek společnosti, Vedení společnosti, Představenstvo, Dozorčí rada

## **Keywords**

Gender diversity, Firm performance, Corporate governance, Executive board, Non-executive board

## **Declaration of Authorship**

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## Acronyms

<b>ROA</b>	Return on assets
<b>EU</b>	European Union
<b>BoD</b>	Board of directors
<b>SB</b>	Supervisory board
<b>CEO</b>	Chief executive officer
<b>OLS</b>	Ordinary least squares
<b>2SLS</b>	two-stage least squares
<b>IV</b>	Instrumental variable
<b>GII</b>	Gender inequality index

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# Introduction

Gender diversity in decision-making positions has been a widely discussed topic in the past decades. The main reason is that women are statistically underrepresented in the politics and especially as board members in corporate world. Even though the share of women on boards is increasing, the number is still somewhat inadequate. For example, the European Commission yearly survey of 615 European publicly listed companies showed that at the end of 2015 women sat on only 15% of executive seats and on 25% of non-executive seats and acted as CEO's in only 4% of cases<sup>1</sup>. It is 2 percentage points increase in executive and 3 percentage points increase in non-executive positions as opposed to the previous year, but still clearly tilted in favour of men. Given the distribution of females and males in population and the number of women that graduate from universities in comparison to men, which is significantly tilted in women's favour <sup>2</sup>, it is expected that there are enough qualified women in the job market to fill the positions of board members. Nevertheless, the numbers suggest that almost half of the workforce might not be in serious considerations for decision-making positions in corporate world.

Attention to this important issue has already sparked legislative changes when Norway, Spain, Belgium, France and several other countries passed the bill that set quota for a minimal representation of women on boards. In case of Norway the penalty for not complying with the quota is a dissolution of the company. The Czech Republic is reluctant to introduce the quotas, even though the gender diversity on boards is below the EU average at 9% for ex-

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<sup>1</sup>Database of European commission covering largest publicly traded companies in each European country. available at: [http://ec.europa.eu/justice/gender-equality/gender-decision-making/database/business-finance/executives-non-executives/index\\_en.htm](http://ec.europa.eu/justice/gender-equality/gender-decision-making/database/business-finance/executives-non-executives/index_en.htm)

<sup>2</sup> 143.2 women graduates per 100 men graduates in EU by September 2015 (EuroStat). Information for individual countries available at: <http://ec.europa.eu/eurostat/web/equality/data/database>

ecutive positions and 11% for non-executive positions<sup>3</sup>. Arguments in favour of setting gender quotas for businesses and politics are usually in the realm of ethics and social justice. Many politicians also maintain the position that gender diverse boards are beneficial to the companies because they improve firm performance and governance. They also argue that companies should not be forced into meeting quotas just to fulfil regulations but should actively promote diversity on their boards to gain competitive advantage and create more just workplace (European Commission, 2012). Number of studies were conducted to observe the relationship between gender board diversity and economic performance but only with mixed results. For instance, Adams and Ferreira (2009) found no connection between gender diversity on boards and firm performance, Carter et al. (2007) found positive connection and Daunfeldt and Rudholm (2012) showed negative connection in their paper.

The purpose of this thesis is to analyse the extent of inequality on Czech corporate boards and contribute into the pool of already existing papers on gender board diversity with probably first empirical analysis of relationship between gender diverse boards and firm performance in the Czech Republic. Given that the majority of work has been written about companies from the USA, Scandinavian countries and Spain, another approach towards this issue from a country with different corporate structure could offer a new perspective of viewing gender diversity on boards and help policy-makers to make informed decisions and consider all advantages and disadvantages of the recently discussed (and in some countries implemented) solutions.

This thesis is structured as follows: previous literature concerning this topic is reviewed in the first section followed by theoretical arguments for and against gender board diversity. Second section contains broad description of the legislative situation in the Czech Republic along with the initiatives proposed by European Union and flaws in the methodology that was used to describe this issue. Section three provide data description and is followed by

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<sup>3</sup> see footnote 1

methodology description in section four. Obtained results are presented in the fifth section. The final section contains conclusion and possible directions of future research.

# 1 Literature Review

Perhaps the most influential work regarding the issue of the gender board diversity is the study conducted by Adams and Ferreira (2009). The reason is the scope of the work. Apart from the effect of gender diversity on firm performance, authors had chosen to study the effect of gender diversity on governance of the company. Having extensive data set of director's attendance and committee assignments, authors found that more women on boards have positive influence on characteristics that possibly affect corporate governance. The results showed that women are more likely to join monitoring committees than men and have positive influence on the attendance of other board directors.

Their analysis of the impact on firm performance joined the rank of authors that did not find any evidence of link between the gender diversity and performance measures. Adams and Ferreira (2009) used as their performance measure two of the most used variables - return on assets and Tobin's Q ratio. Return on assets (ROA) is an accounting measure that shows how efficiently the company is using their assets to create profit. Tobin's Q ratio is a financial measure and is usually preferred by researchers that study the impact of gender diverse boards on firm performance, although the application of it is possible only when one has access to a reliable evaluation of the companies, which was the case in their sample of publicly listed S&P 500 companies during the years 1996 – 2003. It is calculated as market value of equity divided by corresponding book value of equity.

In order to tackle the issue of simultaneity, Adams and Ferreira (2009) selected the ratio of men who are accompanied with women directors on other boards within their sample as an instrumental variable. Their claim is that the number of women on boards is affected by their connectedness in professional and social networks. These networks created as a result of male directors sitting on other boards can affect the social connections of women on the same boards. Moreover, it is not believed that it directly affects firm

performance, and thus might serve as valid instrument.

In comparison, Daunfeldt and Rudholm (2012) in their working paper for the HUI Research accounted for unobserved heterogeneity by implementing random-effects random-coefficients model. Using the broad sample of over 20,000 Swedish limited companies in the 1997-2005 time span, they found outright negative effect of gender diversity on ROA with the time lag of two years.

Additionally, Daunfeldt and Rudholm summarised all major papers that studied this issue and concluded that researchers who accounted for the possibility of endogeneity and especially simultaneity predominantly obtained negative or not significant results. It could mean that despite the fact that there are several studies with positive results, they should not be taken into account with the same importance because they either forget or decided not to consider possible sources of endogeneity of the gender board diversity that might discredit their results.

Smith et al. (2006) in their empirical analysis looked away from the standard performance measures and used four alternative measures - gross value added/net turnover, profit on ordinary operations/net turnover, ordinary result/net assets and net result after tax/net assets. Gross value added/net turnover was affected most positively and with the highest significance. Results for other three measures were either slightly positive or non-significant. Furthermore, obtained results showed that education of the female CEO's is positively correlated with the firm performance. This seems to follow the intuition that CEO's with university degree will perform better and have higher impact on company's performance.

In order to address the potential endogeneity, Smith et al. (2006) used mean length of education of director's spouses as instrumental variable. Their claim is that the directors who married well-educated spouses are also well-educated and therefore are more liberal and progressive toward the issue of gender diversity on boards. Also the education of spouses is not

considered to directly influence firm performance, and therefore can serve as valid instrument. Unlike most other researchers, Smith et al. (2006) obtained their most significant results from pooled OLS. Usually it is fixed effects method that provides the most promising outcome because it can capture time-independent company-specific characteristics that can affect firm performance.

A study by Marinova et al. (2010) ranks among the papers that did not find any link between the gender diversity and the firm performance. Following the data-set of 186 Dutch and Danish publicly listed companies in the year 2007, they estimated the system of two simultaneous equations with Tobin's Q ratio as dependent variable. Marinova et al. (2010) observed their sample in only one year which raises question whether simple cross-sectional analysis can provide enough information to explain such complex relationship. Moreover, relatively small countries such as Denmark and Netherlands do not have large number of publicly listed companies, and thus provide limited number of observations.

Spain is one of the few countries that passed the quota for women on boards. Although companies in Spain do not seem to benefit from mere presence of women on boards per se, diversity on boards can have positive impact on firm performance (Campbell and Mínguez-Vera, 2007). By using two diversity indices (Blau index and Shannon index) which take the maximum value when the board is perfectly diversified, they find that the gender diversity can indeed have positive effect on the company's value as measured by approximation of Tobin's Q. As well as Smith et al. (2006), Campbell and Mínguez-Vera (2007) exclude the possibility of reverse causality.

Campbell and Mínguez-Vera (2007) in their theoretical part mention not only the economical arguments but also the ethical arguments in favour of the gender diversity on boards. They raise concerns that many researchers view the gender diversity as a resource for creating more value rather than desirable outcome itself.

Similar study was performed by Gallego-Álvarez et al. (2010). Observing close to 100 Spanish companies in the years 2004 - 2006, authors examined the effect of female stockholders along with the gender diversity on boards. Nevertheless, the effect on corporate performance in the terms of corporate efficiency, market value and accounting measures has shown to be non-significant or even negative in small number of scenarios.

In the context of legislative changes in Spain, Gallego-Álvarez et al. (2010) claim that economic reasons for the legislative does not seem to prevail. They also mention that even though the financial measures do not appear to be affected by increasing gender diversity in the top management, from the sociological point of view it might be beneficial.

Another innovative work, highlighting the importance of gender diversity on committees rather than on corporate boards, has been written by Carter et al. (2007). They claim that results from analysing boards can be less likely to show causality because of the tokenism. On the other hand, significant committees are too important to include women as a token, and thus have more corresponding value in studying the effect of the gender diversity on company performance.

In the empirical model, the decision of Carter et al. (2007) was to use three-stage least squares (3SLS) method instead of common two-stage least squares method (2SLS) for simultaneous equations model. Their argument was that 3SLS method accounts for the cross equation correlation, and thus is more convenient. Obtained results showed positive link between gender diversity on board and firm performance measured by Tobin's Q. The direction of causation seemed to be in line with majority of all other works, that is from the gender diversity to the firm performance. Sample in this case consisted of unbalanced panel of 641 Fortune 500 companies between the years 1998 – 2002.

From the previous literature it can be concluded that results are highly polarising and usually depends on the type of measure that was used as a

proxy for firm performance or what data was available for the researchers. Nevertheless, no single paper is considered significantly more acclaimed than other. It causes that there is no unanimous position on economic justification of gender quotas among the academia.

## **1.1 Theoretical arguments for and against gender board diversity**

European Central Bank (2004) defines corporate governance as:

"procedures and processes according to which an organisation is directed and controlled. The corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organisation – such as the board, managers, shareholders and other stakeholders – and lays down the rules and procedures for decision-making."

Therefore, gender diversity on boards can be seen as an modern-day issue of corporate governance because women on boards affects characteristics of corporate governance such as the attendance of other members at the board meetings (Adams and Ferreira, 2009) or increase in creativity and progressiveness (Singh and Vinnicombe, 2004).

First of all, the gender diversity on boards is seen as desirable in the terms of social justice. The longstanding presence of inequality is creating a challenge for modern companies that are under pressure to include more women in decision-making positions, despite the fact that the economic motivation is not perfectly straightforward. The advantages of achieving diversity are often highlighted, but the issue of gender diverse boards consists of both advantages and disadvantages that may influence the means and willingness to achieve such a goal.

Possible benefits of the gender diverse boards can stem from many different theories that can help find a link between the performance and gender

diversity on boards. The most frequently used in many previous works is agency theory, also known as principal-agent theory. Agency theory works under assumption of distrust between principals and agents because of different interests that each of the subjects follow (Grundei, 2008). In terms of gender diversity it argues that more independent boards and increased oversight of managers can be achieved by appointing women as board members (Gallego-Álvarez et al., 2010). Other theories that can be applied are resource dependent theory and resource-based view. However, as Rose (2007) points out, the application of economic models is questionable in describing well enough the human interaction and behaviour of members of such small groups in the environment of corporate boards. Apart from the economic models, sociology and psychology might provide us with important insights into the issue of the gender board diversity.

Potential effect of the gender diversity on firm performance could be intuitively obtained by comparing homogenous and heterogeneous boards. Among the benefits of heterogeneous boards belong that they consider more possibilities (Carter et al., 2003), do not incline toward stagnant thinking (Stephenson, 2004), and thus overall strengthen decision-making of the company. The output from diverse boards can be more creative and innovative (Jackson, 1992) which can attract potential investors and improve the brand. Also diverse markets can be better understood and explained by diverse boards (Robinson and Dechant, 1997), which can help the companies to gain significant competitive advantage over their competitors. On the other hand, considering more possibilities can slow down the effectiveness of boards and their reaction time to unexpected events and market shocks (Hambrick et al., 1996). Furthermore, cooperation is considerably improved in homogenous groups (Williams and O'Reilly III, 1998) and homogenous groups are less likely to encounter conflict in their midst (Ancona and Caldwell, 1992, Williams and O'Reilly III, 1998). Although all of these effects apply for women on boards, they can be also acquired by diversity in the

form of ethnicity or age.

If we specifically consider gender diversity on boards, researchers reached the conclusion that having at least one woman on board can diminish the risk of bankruptcy (Wilson and Altanlar, 2009). Women are also considered to improve a marketing strategy (Yun, 2012), and are less probable to be involved in a fraud (Beasley, 1996). Moreover, women on boards attract more female employees in lower positions, support each other in corporate environment Matsa and Miller (2011) and increase the productivity of women in lower position, and therefore improve their career development. Additionally, it is costly for companies to not provide the women with opportunities Cox and Blake (1991) because they might lose the potential talent of almost the half of the workforce. Unclear is the behaviour in terms of risk. Adams and Funk (2012) claims that woman on boards have risk-seeking tendencies, but Byrnes et al. (1999) and Graham et al. (2002) suggest the opposite.

In terms of managing company, McKinsey & Company (2012) report based on the survey of companies concluded that directing style of women is much more focused on promoting career opportunities for employees, mentoring, rewarding accomplishments, finishing tasks and building strong ethical standards. In comparison male directors focus more on individualistic behaviour and thorough monitoring of employees. Therefore women tools of managing are more team-oriented while men rather prefer individualism. Team-oriented managing style can translate within the company environment in the way that employees will more identify with the brand and the company that they are working for and potentially perform better. Bird and Brush (2002) adds that women in management prioritise long-term development of the company over short-term growth.

Arguments can be found both for and against the gender board diversity, and therefore the ultimate direction of the effect is difficult to determine based solely on the theoretical information that we have at our disposal.

## 2 Gender board diversity and legislation in the Czech Republic

Czech Republic does not belong among the countries with the most progressive approach to gender diversity. The participation of women in decision-making positions is below the European average. Gender diversity on board can find legislative support only in generic anti-discrimination laws that are hard to enforce in the case of the board positions in companies. Other source of support for increasing the number of women in boardrooms consist of non-legislative public initiatives and private initiatives. In case of non-legislative public initiatives the most recent is the Strategy for equality between women and men in the Czech Republic which states the main target of women in decision-making positions at 40% (The Office of the Government of the Czech Republic, 2014). 40% solution is in line with many legislative initiatives passed in European countries and especially with the direction of European Commission that pushes for setting quotas at this exact number for women on supervisory boards in public listed companies with more than 250 employees by the year 2020. This number also raises concern in terms of size of the boards, because with most frequent number of directors being 3, it would most likely lead to increase number of board-members in companies, and thus bring more costs for the companies.

Ranking the Czech Republic in the international context is difficult given the methodology that is often used. Usual comparison is conducted on the basis of – gender diversity on boards of publicly listed companies registered in the given country. Czech Republic has only 14 companies that meet this criterion, thus the sample is somewhat small to draw conclusion. For instance, Deloitte (2015) provide information about gender diversity on boards of TOP 100 companies in the Czech Republic based on revenue. Nevertheless, they do not disclose whether they considered only public limited company from said list or also private limited company and eventually how did they

approach different board positions of private limited company. Based on the comparison of these two statistics we can show the discrepancy in reporting board diversity on boards for the Czech Republic. Deloitte (2015) for data from 2014 showed 6.14% of women on board of directors and 3.24% of women on supervisory boards of publicly listed companies, but the percentage for TOP 100 was considerably higher, especially for supervisory boards. This example showed that it is difficult to draw conclusion as the data reported by European Union usually consider only small number of companies. Nevertheless, no matter what data we take into consideration, the results always lead to underrepresentation of women in decision-making positions in the Czech companies.

Only few studies of gender diversity on board were conducted for the Czech Republic. Janský and Krottil (2015) conducted analysis of representation of women on boards using the sample of Czech publicly listed companies and companies where the majority shareholder is a public institution (municipality, state, region). Results showed that representation of women on board of directors and supervisory boards is highest (24%) in public companies where region is majority shareholder. On the other hand, lowest number of women in boardroom can be found in state-owned companies with 15% share of women on supervisory board and only 5% share of women on board of directors, which is significantly lower than the 40% target set by government in above mentioned strategy. However small the numbers turned out to be in public companies, 13 companies listed on Prague stock exchange and registered in the Czech Republic had only 9 out of 127 (7.1%) positions on boards of directors and supervisory boards occupied by women. The room for improvement in the Czech Republic is significant, especially if the target is set at 40%.

Another paper studying this topic is report by McKinsey & Company (2012). Based on the information about 23 companies which were participating on voluntary basis, authors concluded that women in the Czech

Republic are underrepresented on all levels of management with downward sloping tendency as the level increases. Inability to incorporate women into management on lower levels is considered one of the foremost issues that causes absence of women in higher levels. Given the scarce diversity on boards they could not draw conclusion about individual industries, even though it is believed that some industries such as retail and banking attract more women.

At the end of March 2016, Jiří Dienstbier, Czech minister for human rights, equal opportunities and legislative, has announced new action plan that was outlined in the Strategy for equality between women and men in the Czech Republic as one of the specific goals that should improve the equality of men and women in decision-making positions (Hospodářské noviny, 2016). Aim of the plan is the 40% target of gender diversity on boards. The plan consists of 38 assignments for ministers to improve the gender inequality in the Czech Republic. However, this plan is in its early stage, and thus the final form is unclear.

## **2.1 European Union initiative**

First serious attempt to promote gender diversity started in September 2010 with Strategy for equality between Women and Men by European Commission. Since then, gender diversity on boards throughout the European Union has been increasing on average by 2.1 percentage points every year. Nevertheless, Czech Republic did not contribute much toward the trend with 0,7 percentage point decrease over the period of 2010 to 2015 (European Commission, 2015). At the end of 2012, a new Directive was proposed to enhance the increase. This Directive sets the target at least at 40% proportion of underrepresented gender in non-executive board positions by the year 2020. Under this directive, priority in appointing non-executive directors should be given to the member of underrepresented gender if other criteria such as equal qualification are met. Sanction and penalties are solely in the control

of the member states. This directive has been already passed by European Parliament at the end of 2013 and has been discussed by Council of the EU. Czech Republic has been for a long time reluctant to support this directive but with the appointment of Věra Jourová as Commissioner for Justice, Consumers and Gender equality, the position has started to change.

## **2.2 Corporate board system in the Czech Republic**

Legislation which corporations in the Czech Republic has to abide is collected in Business Corporations Act (2012) . Joint-stock companies can be established with either two-board tier system or one-board tier system depending on their preference. Nevertheless , vast majority of the companies uses two board tier system. Czech board system shares similarities with Germany which also uses two board tier system. On the other hand USA, UK and Sweden are among other countries the ones that use one board tier system. The two boards system is characterised by dividing duties into executive board (board of directors) and non-executive board (supervisory board). The company can set the number of board members at will and does not have to include employee representatives in decision-making which is usual for companies with higher number of employees in other European countries such as Germany, Denmark and Sweden.

### 3 Data Description

In order to analyse the impact of the gender board diversity on firm performance, we will be using a data set of 204 companies between the years 2003 and 2011. Data was obtained by matching companies from 2 large representative samples. The first sample contained data about the number of women and men on boards of Czech companies and was collected by Czech non-governmental organisation Centre for Applied Economics <sup>4</sup> from ARES, information system of the Czech Ministry of Finance. ARES provides data about all companies registered in the Czech Republic which are gathered for the purposes of state administration. Minor part of the data was not accessible because of the technical issues in the ARES database, nevertheless, the sample is still considered representative. The second data set contained financial data about Czech companies, and the source is the database of Bureau van Dijk. Final match of the companies was subsequently subjected to following treatment. Selected were only companies that had observations for all years 2003 – 2011, turnover in those years was at least 100 000 CZK and profit and loss before taxation was nonzero in at least two following years. The motive for such treatment was to eliminate inactive companies and companies that were in the database of Bureau van Dijk but missed crucial financial data. If we compare the final data set with the table in (Daunfeldt and Rudholm, 2012, p. 31), it would rank 4th out of 15 based solely on the number of observations. Contrary to majority of other studies, public limited companies of all sizes are included in the data set, so that the analysis is as representative sample of the corporate sector as possible. Because of the decision not to limit the research only on publicly traded companies, the data set we have at our disposal is larger but still consists of

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<sup>4</sup> Nowadays known as Econlab. More information available at: <http://www.econlab.cz/en/>

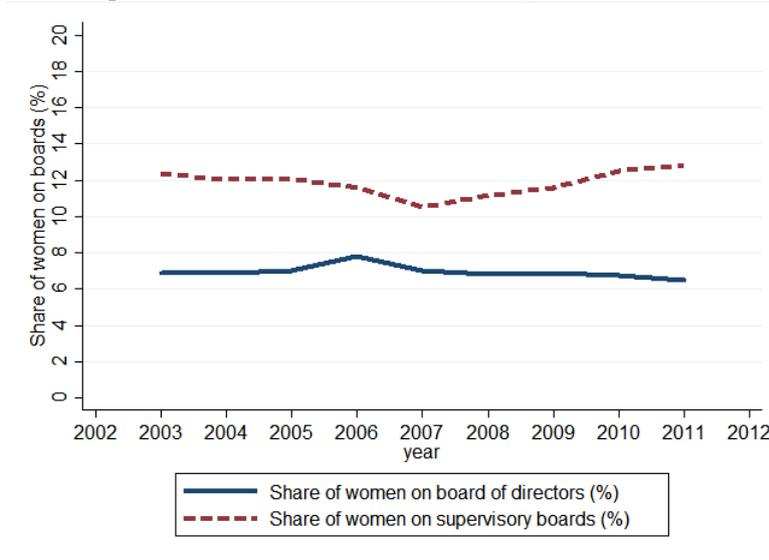
only 0.824% of all public limited companies in the Czech Republic <sup>5</sup> . This decision also means that we are unable to use the Tobin's Q ratio as a measure of the firm performance because there is no reliable method of obtaining the market value of company's equity.

From the graph in Figure 1, it can be concluded that share of women on boards of directors in our sample of 204 companies is without significant change within the range from 6.5% to 8% with peak in 2006. Since then, the share of women on board of directors begun to slowly decline to 6.5% in 2011. No dramatic shifts in the number of women on boards is probably caused by lack of legislative or other changes that would force the companies to appoint women on boards or convince them about the benefits of having gender diverse boards. If we compare it with the share of women on supervisory boards, we can conclude that women are more likely to hold non-executive duties on boards. It does not necessarily mean that women are excluded from decision-making in companies, but they are more likely to be put in charge of a monitoring rather than strategy of the company. The graph suggests that the share of women on supervisory boards evolves throughout the years in the opposite direction than the share of women on board of directors. When the number of women on board of directors was decreasing, the number of women on supervisory slowly rising and the minimum and maximum respectively are only one year apart. It might be caused by moving the women from boards of directors to supervisory boards, although why would the companies do so is quite unclear. One possibility is the suggested European initiative that aim at gender diverse supervisory boards, however it would affect only few companies in the Czech Republic (publicly traded companies with more than 250 employees).

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<sup>5</sup>Total number public of limited companies in the Czech Republic was 24 714 in 2011 (Bisnode, 2015)

Figure 1: Share of women on corporate boards.

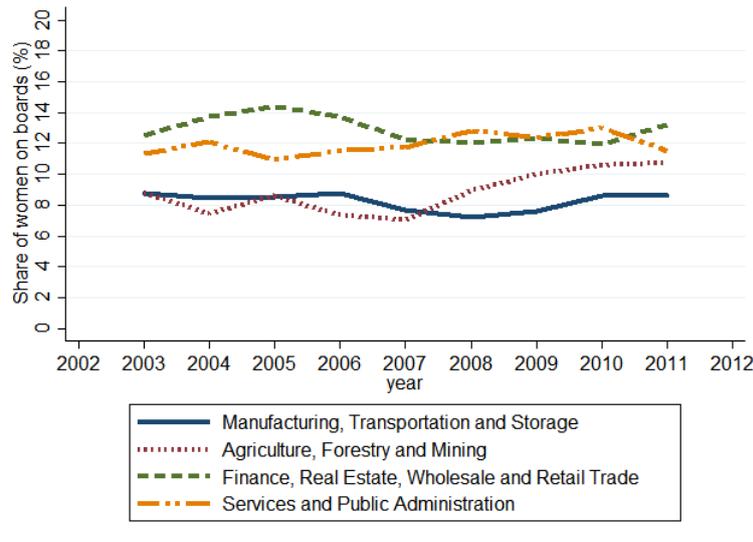


Graph in Figure 2 depicts combined share of women on both boards for each industry classification<sup>6</sup> in our sample. Highest share of women on boards are in industries where the work is more office-related although the differences are narrowing. At the end of 2011, industries with the most women on boards were in finance, real estate, wholesale and retail trade with 13.2% followed by services and public administration with 11.5%. Significant jump in the share of women on boards can be noticed in agriculture, forestry, mining and construction. Since 2007 the share increased from 7% to 10.7% in 4 years. Companies oriented on the manufacturing, transportation and storage are involving women in decision-making the least often. Out of all board position in this industry, only 8.2% was held by women in 2011 with essentially no improvement since 2003.

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<sup>6</sup>companies were divided into industries based on NACE codes that were subsequently merged into 4 groups with regard to similar industry characteristics. The 4 groups are 1) Manufacturing, Transportation and Storage 2) Agriculture, Forestry and Mining 3) Finance, Real Estate, Wholesale and Retail trade 4) Services and Public Administration

Figure 2: Share of women on corporate boards by industry.



If we look at the number of chairwomen on the boards of directors, only 21 distinct companies out of 204 has had a woman in the lead of the board of directors. In 2011, 9 of them were still in charge and 4 out of the 9 were in companies oriented in manufacturing, transportation and storage, even though it is industry with the lowest share of women on boards. Chairwomen on supervisory board were far more frequent in our data set. 48 distinct companies has appointed women as chairwoman on non-executive boards, with 25 of them in charge at the end of 2011.

Table 1: Number of chairwomen on boards of directors and supervisory boards.

year	2003	2004	2005	2006	2007	2008	2009	2010	2011
board of directors	7	7	6	11	11	9	9	6	9
supervisory board	20	17	18	18	13	15	17	24	25

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21 distinct companies had a chairwoman on board of directors in 2003-2011

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48 distinct companies had a chairwoman on supervisory board in 2003-2011

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Subsequent variables along with the share of women on boards and number of chairwomen on boards were observed. Return on assets (ROA) as the only firm performance measure that will be used in analysis. ROA measures

how well is company doing in creating profit relative to the total amount of company's assets. Some researchers express their concern with this variable because it depends on the book-keeping method that the companies use and some companies are not completely honest in reporting the total number of assets. In the terms of management it shows how efficient are they in allocation of their resources. Apart from the share of women on board of directors and presence of woman on board of directors, we will use two diversity indices to study their effect on firm performance as presented in Campbell and Mínguez-Vera (2007). The reason for using diversity indices in addition to the simple percentage expression is that we expect the positive effect to be caused more likely by gender diverse board rather than by sheer number of women on boards. These indices reach highest value when there is perfect balance between men and women on board of directors. The first is the Shannon index calculated by  $-\sum_{i=1}^n p_i \log p_i$ , where  $p_i$  is the proportion of  $i$ -th specie in population (in our case proportion of gender on board) and  $n$  is the number of species (males and females). Highest possible value for Shannon index is  $\approx 0.69$  in the event of perfect diversity. The second index is called Blau index and its formula is  $1 - \sum_{i=1}^n p_i^2$ , where  $p_i$  and  $n$  represent the same variables as with Shannon index. In case of perfect diversity, Blau index reaches value 0.5.

Turnover<sup>7</sup> and the amount of total assets, were other two observed financial characteristics of companies. In the empirical model, they are often used in natural logarithm as a proxy for the size of the company (Campbell and Mínguez-Vera, 2007, Marinova et al., 2010). Logarithm of sales, or in our model turnover, is usually preferred to the logarithm of assets, although both can be seen in previous work. This thesis will include both variables. In addition to the logarithms we will use growth of the turnover as explanatory variable.

List of variables is concluded with the size of board of directors and

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<sup>7</sup> by turnover is meant the amount of sales without discounts and sales taxes

supervisory board and binary variables that equal one when the company is registered in Prague; woman is in the charge of board of directors and the country of the company's owner ranks higher in the Gender Inequality Index<sup>8</sup> than the Czech Republic respectively. Summary statistics of all observed variables are in the following Table 2.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
ROA	0.036	0.113	-0.857	1.331	1836
Shannon index	0.155	0.242	0	0.693	1836
Blau index	0.101	0.161	0	0.5	1835
Women on BoD (%)	0.07	0.119	0	0.5	1836
Woman present on BoD	0.301	0.459	0	1	1836
turnover	54232.266	117476.411	184.204	1260000	1836
total assets	170383.954	938552.586	157.882	14880000	1836
turnover growth	3643.585	30567.874	-279100	405500	1632
BoD size	5.556	2.175	1	18	1836
SB size	5.264	2.484	0	18	1836
BoD Chairwoman	0.041	0.198	0	1	1836
Prague	0.333	0.472	0	1	1836
GII	0.284	0.451	0	1	1836
Women on SB (%)	0.118	0.145	0	0.5	1826

The effect of foreign owner can be seen in the Graph 3 although it is not as we expected. Contrary to our belief, data support the claim that companies under Czech owners are more likely to show higher extent of gender diverse boards. Even when the foreign owner is from a country where the gender inequality is not such strong issue, they do not follow the corporate diversity structures that are more common in their respective countries as can be seen in the Graph 4. This statistic seems quite counter-intuitive. One of the reason might be that these foreign owners are from countries where companies are subject to quotas that force them to have gender diverse

<sup>8</sup>GII is index measured by UN as a part of their human development report. available at: <http://hdr.undp.org/en/content/gender-inequality-index-gii>

boards. As a result, high GII ranking might be result of legislative rather than the preference of the firm owners and their preference is reflected in their non-domestic companies. Moreover, gender board diversity is only small part of GII. In the end, poor result from gender board diversity can be outweighed by exceptional results in other gender areas.

Figure 3: Share of women on corporate boards by owner's nationality.

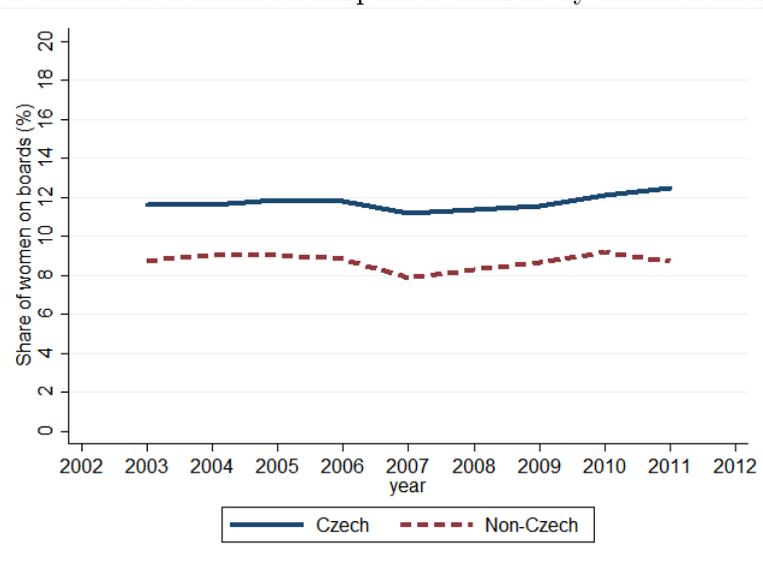
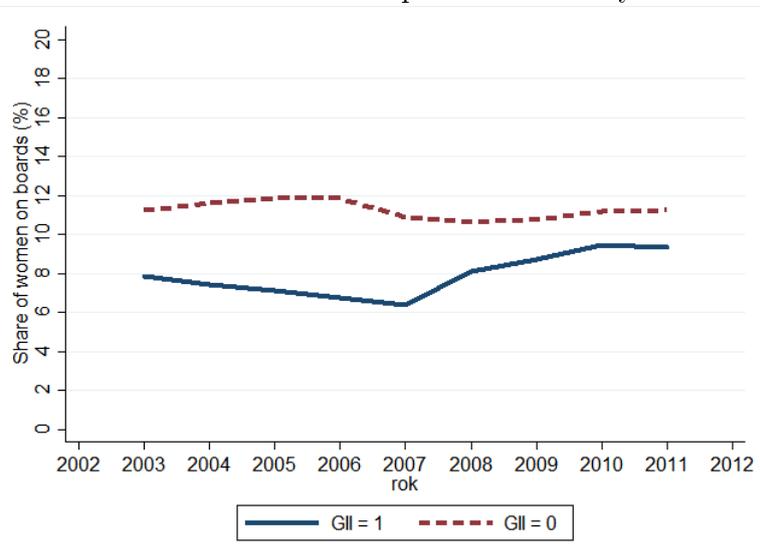


Figure 4: Share of women on corporate boards by GII ranking.



Difference between the regions is shown in Graph 5 where we divided companies into two groups. The first group consists of companies regis-

tered in Prague and the second group consists of non-Prague companies. Assumption is that companies registered in the Czech capital city are more likely to follow European trends and want to be seen in the eyes of public as more progressive and gender diverse boards are one of the way how to do so. Another reason might be that there is a higher concentration of talented female candidates and thus companies in prague might have more female board members. Graph suggests that Prague companies were indeed leading in the gender board diversity over all other regions from 2003 until 2010. However, in the last few years the share of women on boards balanced at around 10.5% for both group.

Figure 5: Share of women on corporate boards by location.

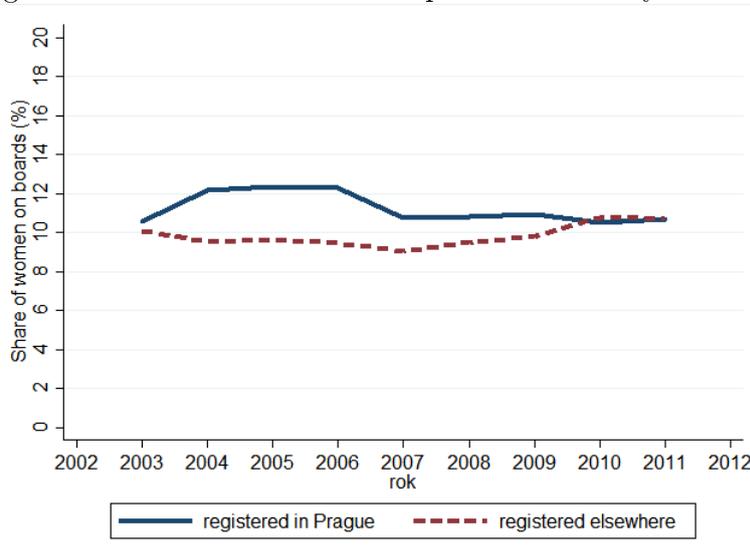


Table 3 compares the means of two subsamples of our data. One subsample consists of companies that are without a woman on board of directors. The other subsample consists of companies where at least one woman is present on the board of directors. Parametric test is then used to test the significance of mean differences. From the table we can see that companies with women on board of directors are worse in return on assets. Nevertheless, the difference is almost negligible and statistically insignificant, suggesting that the gender of board member probably does not have any large effect on financial performance. If we look at the means of all other financial data,

we can notice significantly smaller numbers in variables that should represent the size of the company in the subsample with at least one woman on board of directors. It suggests that there might not be simultaneity issue and more successful and large companies do not incorporate more women into their board structure. Both differences are significant at 5% significance level. Growth of the turnover on the other hand is larger by almost 29% for the companies with women present on board of directors, however the parametric test does not classify the difference as significant. High level of significances are assigned to the differences of the sizes of both executive and non-executive boards. Size of the board is seemingly larger in companies with female board members. This conclusion is in line with studies of previous authors which show that companies in order to appoint women in board position rather increase the size of board than replace some member (Kini et al., 1995). Another explanation might be that larger board are under larger shareholder's and public scrutiny and thus appoint women in their midst in order to look better in the eye of public. Companies with gender diverse boards were more likely to be found in Prague which could mean that Prague as a capital city was more progressive toward this issue than other regions but it can be seen in Graph 5 that the gap disappeared toward the end of the observed period. Significant difference in GII rankings dummy variable only supports the information that was gathered from Graph 4. The difference in the proportion of women on supervisory board suggests that the number of women on supervisory board and board of directors are linked which might indicate that women in corporate structures are through social connections helping each other to achieve board positions.

Table 3: Comparison of companies that have and do not have women on board of directors

Variable	Subsample	Mean	Difference	t-test
<b>ROA</b>	absence	0.0384	-0.00624	1.113
	presence	0.0320		
<b>Turnover</b> (in thousands)	absence	58048	-12691	2.125**
	presence	45357		
<b>Total assets</b> (in thousands)	absence	202958	-108343	2.271**
	presence	94615		
<b>Turnover growth</b> (in thousands)	absence	3355.2	964.5	-0.584
	presence	4319.7		
<b>Executive board size</b>	absence	4.95	2.02	-20.177***
	presence	6.97		
<b>Non-executive board size</b>	absence	5.12	0.48	-3.793***
	presence	5.60		
<b>Prague</b>	absence	0.319	0.049	-2.053**
	presence	0.368		
<b>GII</b>	absence	0.334	-0.166	7.315***
	presence	0.168		
<b>Women on SB</b> (%)	absence	0.114	0.016	-2.124**
	presence	0.130		

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 4 Methodology

The main objective, finding a causal impact of gender board diversity on return of assets, will be studied using panel data regression models. In panel data, cross-sections are observed for certain number of periods and therefore increase the number of observations. By doing so, we receive more informative data set with higher number of degrees of freedom that should help us obtain better results. In this thesis, relatively wide timespan was used in

order to slightly narrow the inequality between the cross-section dimension and time dimension. Moreover, there is usually low variation in number of woman on boards for individual companies because board members tend to stay in their positions for many subsequent years. Therefore this decision allows us to capture more changes on corporate boards and thus explain more reliably the effect of gender board diversity on firm performance. In this empirical study we will analyse only the effect that executive boards have on ROA. Executive boards are responsible for day to day operations and strategy of the company and therefore are deemed to be more important in this aspect, hence significant effect is more likely to become apparent if there is any.

The model that is used is similar to the one used by (Adams and Ferreira, 2009) and its structure is presented as follows:

$$\begin{aligned}
 ROA_{it} = & \alpha_0 + \alpha_1 WOMEN_{it} + \alpha_2 growth\_turnover_{it} \\
 & + \alpha_3 turnover_{it} + \alpha_4 assets_{it} + \alpha_5 Prague_{it} \\
 & + \alpha_6 BoD\_SIZE_{it} + \sum_{t=2005}^{2011} \zeta_t Y_t + \sum_{j=1}^3 \eta_j Ind_{jit} + \epsilon_{it}
 \end{aligned} \tag{1}$$

WOMEN is proxy for one of our four gender diversity measures that we use in this thesis.

SWOMEN	Share of women on board of directors.
PWOMEN	Presence of women on board of directors.
Shannon_index	Shannon diversity index.
Blau_index	Blau diversity index.

$\sum_{t=2005}^{2011} \delta_t Y_t$  represent time-specific binary variables. Since it is possible that data are influenced by time-occurring events such as business cycles or trends in financial characteristics, we use it to eliminate such effects. Addition of industry-specific binary variables  $\sum_{j=1}^3 \gamma_j Ind_{jit}$  allows us to capture the effect caused by different industries, various levels of competition for instance. Another variable is the size of the board of directors. Its relevance stems

from Cheng (2008), that claim that size of the board negatively affects firm performance.

The composite error term is  $\epsilon_{it} = a_i + u_{it}$ , where  $a_i$  is individual specific, unobserved effect that is fixed over time and  $u_{it}$  is idiosyncratic error. All other variables were introduced in data description.

Main concern with this model is caused by possible endogeneity of the gender diversity variable. It is safe to assume that women on boards are not assigned randomly but rather by their education, experience and merit. Moreover, company culture can be considered as important characteristics that affects number of women on boards because some companies might be considered more progressive and forward-looking than others. Unobserved company culture would then cause that error term is correlated with our independent variable that represents gender diversity. This problem has been usually solved by using random or fixed effects model. By assumption that company culture does not change over time, we may consider  $a_i$  in our model as this unobserved individual heterogeneity. Decision whether to use FE or RE will be made on the basis of Hausman test. Null hypothesis of Hausman test is that  $a_i$  is uncorrelated with our explanatory variables and thus RE is more efficient.

Another possible source of concerns is caused by the reverse causality. Reverse causality or simultaneity in our model would mean that if gender diversity has an impact on firm performance at the same time firm performance can affect gender diversity. Either because women are more likely to look for a job on boards of more successful companies or because more successful companies want to be seen in the eyes of public as more "progressive" and try to include women in the decision-making roles. Although many previous researchers tried to tackle the issue of reverse causality, no significant effect of firm performance on gender board diversity was found and general consensus is that the direction of causality is rather from the gender board diversity to firm performance than the other way. Instrumental variable

method is usually used to address the issue of simultaneity, although finding truly exogenous instrument that is uncorrelated with firm performance is often troublesome. For example Adams and Ferreira (2009) use the ratio of men who are accompanied with women directors on other boards within their sample and Smith et al. (2006) uses the mean education of spouses as their instrument.

Because of the distinctive dual board system in the Czech Republic, we decided to use the share of women on the supervisory board as our first instrument. We believe that this instrument is relevant because women on supervisory board can through social network and connections affect the composition of board of directors. Moreover our data confirms such correlation. Share of women on supervisory board regressed on share of women on board of directors shows positive and significant coefficient. Tougher question to ask is whether women on supervisory board are exogenous in the relationship we examine. Our intuitive reasoning is that as non-executive body, supervisory board does not have the authority to affect the company's operations and their monitoring function does not have any significant impact on the firm performance. Therefore the firm performance is not directly affected by the proportion of women on supervisory board and it can be used as an instrument in this model.

Our second instrument stems from the nationality of owners. Assumption is that owners from countries such as Norway or Sweden will include more women on boards of their companies in the Czech Republic because they are used to the progressive approach to gender equality from their respective countries. On the other hand it is not convenient to consider all foreign owners as more "progressive" because there are huge discrepancies in enforcing equal rights between regions and even countries. Therefore our instrument is dummy variable that equals 1 if the country of company's owner ranks higher in GII than the Czech Republic in 2011. Unfortunately UN started the yearly reporting of GII in 2010 and thus we are not able to use the

actual value of GII for all countries as our instrument. We are aware that ranking from 2011 does not necessarily indicate that the country was ranked higher in the years before but gender equality is an issue that cannot be achieved in the short term and countries that are ranked high had to be on the right track even before the year 2011. Status of gender equality in individual countries is expected not to be correlated with firm performance in the Czech Republic and therefore does not violate the second requirement for instrument.

Therefore the second equation in our set of simultaneous equations is expressed as:

$$\begin{aligned}
\text{WOMEN}_{it} = & \beta_0 + \beta_1 \text{ROA}_{it} + \beta_2 \text{GII}_{it} + \beta_3 \text{WOMENSB}_{it} \\
& + \beta_4 \text{ltturnover}_{it} + \beta_5 \text{lassets}_{it} + \beta_6 \text{Prague}_{it} \\
& + \beta_7 \text{BoD\_SIZE}_{it} + \sum_{t=2005}^{2011} \delta_t Y_t + \sum_{j=1}^3 \gamma_j \text{Ind}_{jit} + \nu_{it}
\end{aligned} \tag{2}$$

where GII and WOMENSB are instrument mentioned above.

The overall hypothesis for our respective model is that the gender board diversity has positive impact on ROA. It will be reflected in  $\alpha_1$  coefficient. Second hypotheses is that there is no reverse causality. Thus we are interested in significance of  $\beta_1$  coefficient. Third hypotheses concerns individual industries. We will run our estimation for individual industries and expect that there is higher effect in some of them, under condition that the results will be significant.

## 5 Empirical results

Results of regression analysis are presented in Tables 4 – 6. Hausman test for the first equation confirmed the expected rejection of the random effects in favour of the fixed effect method, suggesting that the unobserved company culture is correlated with our explanatory variables. Nevertheless, the fixed effects 2SLS regression does not show very convincing results. The resulting impact that proportion of women on board of directors have on ROA appears to be insignificant even at 20% confidence level which is consistent with findings of Gallego-Álvarez et al. (2010) who also reported insignificant results for the effect of gender board diversity on ROA. The only significant coefficient is reported for logarithm of turnover which is variable that represents the size of a company. All other variables are insignificant, including the board size which contrary to (Cheng, 2008) show insignificant coefficient. Heteroskedasticity and autocorrelation were addressed by the form of clustering data across the cross-sectional identifiers.

Replicating the regression for all other gender diversity measures somewhat lowers the negative coefficient, although the insignificance still remains which suggests that our results are robust to the choice of gender diversity measure. The application of fixed effects in our model means that we had to omit variables which do not change within the cross-sections with time. Therefore we could not estimate the effect of Prague and industry variables. Furthermore, GII dummy could not be used as instrument for the same reason as the previous variables and therefore we cannot test for overidentifying restrictions because we have only one instrument left, the share of women on supervisory board.

Table 4: Estimation results (equation 1).

Industry variables and Prague were omitted because they do not change over time which lead to violation of FE assumption.

	(1)	(2)	(3)	(4)
	ROA	ROA	ROA	ROA
Share of women on board of directors	-0.768 (-1.18)			
Presence of women on board of directors		-0.279 (-0.89)		
Blau index			-0.641 (-1.08)	
Shannon index				-0.447 (-1.04)
Turnover growth	-5.81e-11 (-0.73)	-4.71e-11 (-0.61)	-5.32e-11 (-0.69)	-5.13e-11 (-0.67)
log(Total assets)	-0.00716 (-0.45)	-0.00880 (-0.42)	-0.00714 (-0.41)	-0.00731 (-0.41)
log(Turnover)	0.0551*** (4.17)	0.0655*** (3.02)	0.0587*** (3.85)	0.0602*** (3.67)
Number of directors	0.0153 (0.93)	0.0284 (0.78)	0.0198 (0.90)	0.0216 (0.87)
Time dummies	yes	yes	yes	yes
Industry dummies	no	no	no	no
Regression type	2SLS with FE	2SLS with FE	2SLS with FE	2SLS with FE
<b>N</b>	1624	1624	1624	1624
<b>R<sup>2</sup></b>	0.0171	0.0112	0.0146	0.0137

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The coefficients  $\beta_1$  from the second equation of simultaneous equations model are reported in table 5. The results are consistent with findings of Campbell and Mínguez-Vera (2007), Smith et al. (2006) who also concluded that there is no significant effect in the direction from firm performance to gender board diversity. More profitable and successful companies are not

likely to have more women on board of directors. Based on these results we can reject the first of our three hypotheses regarding empirical model because our findings suggest that there is no significant effect of gender board diversity on ROA. The second hypotheses cannot be rejected because we indeed could not find significant reverse causality in our results.

Table 5: Coefficients  $\beta_1$  (effect of ROA on gender board diversity).

	(1)	(2)	(3)	(4)
	SWOMEN	PWOMEN	Shannon	Blau
ROA	2.314	4.480	3.246	2.412
	(0.30)	(0.24)	(0.27)	(0.28)
<b>N</b>	1624	1624	1624	1624

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

In table 6 are reported the estimates of share of women on board of directors on ROA for individual industries. Nevertheless, the results are similar in the context that we could not find that women on boards in certain industries have significant impact on ROA. Third hypothesis can therefore be rejected as well.

Table 6: Coefficients  $\alpha_1$  (effect of gender board diversity on ROA) in individual industries.

	(1)	(2)	(3)	(4)
	ROA	ROA	ROA	ROA
SWOMEN	-0.183	1.467	13.37	0.581
	(-0.57)	(0.66)	(0.13)	(0.25)
<b>N</b>	631	376	385	232

(1) Manufacturing, Transportation and Storage

(2) Services and Public Administration

(3) Finance, Real Estate, Wholesale and Retail Trade

(4) Agriculture, Forestry, Mining and Construction

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

For comparison purposes, results of pooled OLS and pooled 2SLS are reported in table 7. These results emphasizes the need for addressing potential omitted variable bias. Contrary to the initial results, coefficients with gender diversity measure were significant at 5% significance level even after we included the instrument in the form of the share of women on supervisory boards. However, omitting the time-invariant industry-specific effect fundamentally affects the final results.

Overall, the model based on the one that was presented in (Adams and Ferreira, 2009) showed considerably different results. The differences might be caused by the nature of the data. (Adams and Ferreira, 2009) used data from US publicly traded companies that are usually larger than companies in our sample. The focus in this model was on including companies of all sizes in order to have as representative sample of companies in the country as possible. Furthermore, other specifications of the Czech Republic might be the cause of quite different results. For instance, the pool of skilled women is much smaller in smaller country and therefore it is more difficult for company to find appropriate candidate. On the other hand, our result are quite similar to those of (Gallego-Álvarez et al., 2010) who also obtained insignificant effect of gender board diversity on net return on assets after accounting for endogeneity of the gender board diversity.

Table 7: Estimation results - pooled OLS and 2SLS.

	(1)	(2)
	ROA	ROA
Share of women on board of directors	-2.107**	-0.0631**
	(-2.40)	(-2.38)
Prague	0.0282	-0.0231***
	(1.08)	(-2.96)
log(Turnover)	0.0460***	0.0237***
	(3.98)	(9.20)
Turnover growth	1.64e-10	8.77e-11
	(0.96)	(1.35)
log(Total assets)	-0.0602***	-0.0145***
	(-2.98)	(-5.86)
Number of directors	0.0421**	-0.00141
	(2.23)	(-1.05)
Intercept	0.142	-0.0963***
	(1.20)	(-3.55)
Time dummies	yes	yes
Industry dummies	yes	yes
Regression type	2SLS	OLS
<b><i>N</i></b>	1624	1632
<b><i>R</i><sup>2</sup></b>	.	0.064

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Conclusion

The discussion about the issue of gender inequality in decision-making positions and especially on corporate boards has lately reached the highest political levels. The resulting general consensus among politicians is that addition of more women on boards would be beneficial for the companies, and that governments should actively support and implement measures that

would promote equality in corporate sector.

Studies has shown that heterogeneous boards are more creative, innovative (Singh and Vinnicombe, 2004, Jackson, 1992) as well as less vulnerable to bankruptcy and fraud (Wilson and Altanlar, 2009, Beasley, 1996). Such improvements in corporate governance could bring valuable resources to the companies and help them gain competitive advantage.

On the other hand, heterogeneous board can become the source of conflict among its members (Ancona and Caldwell, 1992). Moreover, diverse boards can have increased reaction time to the market shocks and other unexpected events because of the slow decision-making processes (Hambrick et al., 1996). Overall, the extent of both advantages and disadvantages does not contribute to the clarification of the resulting effect.

Czech Republic is not yet set on the path to implement meaningful legislation for improving gender board diversity despite it ranks below the European average, although some initiative has already started to emerge.

Observing the sample of 204 joint-stock companies of all sizes during the years 2003–2011, supports the claim that the Czech Republic belongs among the countries with low proportion of women on boards. Furthermore, the subsequent comparison of companies with and without women on board of directors showed no significant difference between the growth of turnover and especially return on assets which served as our only firm performance measure. These result were also supported by the panel data regression analysis. The coefficient with the gender diversity on board of directors was statistically non-significant even at confidence levels as high as 20% for all diversity measures that were used. Potential omitted variable bias and reverse causality are among the usual drawbacks of studying this relationship. Unobserved company culture is considered as important omitted variable and was treated by fixed effects. Potential effect of firm performance on gender board diversity was addressed by estimating simultaneous equations model, however the results rejected the possibility of reverse causality. We

used the opportunity of the characteristic Czech two board system and applied the share of women on non-executive board (supervisory board) as our instrument.

The results show that the benefits of gender diverse board do not prevail over the negatives and that the companies appointing women on boards should not expect any boost in their return on assets. Furthermore, possible quota are more likely to be costly for domestic companies because it would force them to increase or decrease the number of board members. With the most common size, which is 3 members, the company cannot achieve 40% representation of less represented gender. Additional costs may be related to the financial compensation for leaving board members.

From purely financial perspective, there is no compelling evidence in the Czech Republic to support the efforts for gender board diversity. Nevertheless, the social motivation and possible presence of the discrimination stand often in the shadow of economic justification but should also be part of the debate.

## **Further research**

The complexity of the relationship between corporate structure and firm performance is one of the more difficult problems to tackle. Possible solutions might be to study the intermediary targets that diverse gender board could achieve. Instead of the firm performance, future studies could focus on the effect that the gender board diversity has on specific characteristics of corporate governance. For example how good are gender diverse boards in meeting the set objectives such as capital plans or annual budgets. Nevertheless, one of the drawbacks of such approach is that corporate governance characteristics are often difficult to express in numbers.

One of the most important issue to address in this topic is the endogeneity issue of the main variable. This issue was acknowledged by almost all of the newest studies which introduced instruments such as the mean

education of spouses (Smith et al., 2006) and connections of boards between the companies (Adams and Ferreira, 2009). Finding proper instrument is the key to proper explanation of the relationship. In our study we tried to use the share of women on non-executive board and GII rankings in 2011 as instruments. Researchers could obtain proper instruments by collecting and applying some of the personal data about board members such as age, education, family status and experience in managerial position but these types of data are sensitive and rarely reported. Further studies that would start with the data from the year 2010 could also use the actual value of GII as instrument.

Regarding government-owned companies, interesting topic to study might be whether increase of the gender board diversity in government-owned companies causes increase in gender diversity in private companies. Government-owned companies could therefore act as a role model for private companies and government could this way enforce its agenda in the issue of gender diversity on boards.

Another major problem is the low variation in number women on boards. Suggestion for future research is to examine the effect after some significant change in the gender board diversity in companies across the country, for instance as a result of some public policy.

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**Table 8:** Comparison of our results with previous literature.

# Appendix A

Table 8: Comparison of our study with previous literature.

Name	Country	Performance measure	Estimation method	Result
Adams and Ferreira (2009)	USA	Tobin's Q ROA	FE + IV	- 0
Daunfeldt and Rudholm (2012)	Sweden	ROA	RE RC	-
Smith et al. (2006)	Denmark	Tobin's Q	FE + IV	0
Marinova et al. (2010)	Denmark + Netherlands	Tobin's Q	2SLS	0
Campbell and Mínguez-Vera (2007)	Spain	Tobin's Q	FE + 2SLS	+
Gallego-Álvarez et al. (2010)	Spain	Tobin's Q ROA	FE + IV	0 0
Carter et al. (2007)	USA	Tobin's Q	3SLS	+
<b>Our result</b>	<b>Czech Republic</b>	<b>ROA</b>	<b>FE + 2SLS</b>	<b>0</b>

+ positive effect, - negative effect, 0 no effect