



Top management team diversity and firm performance

P.A. Tibben

What is the impact of top management team diversity on firm performance in Western Europe?

Abstract:

This paper examines whether top management team (TMT) diversity has a positive or negative impact on firm performance, based on evidence from Western European firms during a three-year period (2007-2009). TMT diversity is calculated as the equally weighted average of the adjusted Blau indexes on five diversity variables: gender, nationality, age, educational background, and expertise. This research found no clear trend towards more TMT diversity. The amount of TMT diversity is limited especially with respect to the variables gender and nationality. In addition, female and foreign directors are not only underrepresented in the TMT, they also hold less important TMT positions than male and domestic directors. A panel data analysis is applied in order to investigate the influence of TMT diversity on firm financial performance (measured by Tobin's Q). This study found an inverted U-shape curvilinear relationship between TMT diversity and firm performance which indicates that there is an optimal amount of TMT diversity.

Key words: demographic diversity, firm performance, top management team.

Preface

This master's thesis is the final project for receiving the Master of Science degree in International Economics and Business at the Utrecht School of Economics, University of Utrecht.

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Executive summary

This study contributes to the literature on top management team (TMT) diversity and firm financial performance. While most studies concentrate on firms from the United States or on one diversity variable in a single time period, this study focuses on the impact of TMT diversity on the financial performance of 126 Western European companies during 2007-2009. TMT diversity is calculated as the equally weighted average of five diversity variables: gender, nationality, age, educational background and expertise. As a result, this study offers new insights into the relationship between TMT diversity and financial performance.

Within the last few decades, there has been a growing interest in TMT diversity and its effects on financial performance. Based on recent debates and government considerations one would expect an increasing trend. However, this study found no trend in the Netherlands and Belgium at all and the total TMT diversity is slightly decreasing in Spain. Only in Germany and France the TMT diversity increased over the three-year period. In addition, the amount of total diversity is rather limited in all countries, especially with respect to gender and nationality diversity. Female and foreign directors are underrepresented in the TMT and they hold less important TMT positions than male and domestic directors.

TMT diversity is often seen as a double edged sword: there are positive, negative and also non-findings. There is no clear theoretical position supporting either overall positive or negative effects of diversity on performance. On the one hand, greater TMT diversity is associated with more imaginative company strategies and decisions of a better quality. But on the other hand, greater TMT diversity could lead to more conflicts on the TMT which results in a more time-consuming and less effective decision-making process.

This study found an inverted U-shape curvilinear relationship between TMT diversity and firm performance, measured by Tobin's Q, which indicates that there is an optimal amount of TMT diversity. This optimal amount is reached by an adjusted Blau index of 0,5240. When TMT diversity is lower than the optimal amount of diversity the appointment of a top manager that increases diversity is seen as positive. The increase in diversity leads to new insights and increases the decision quality. However, the financial effects of an increase in diversity are negative when the TMT diversity is equal or higher than the optimal amount of diversity. In this case, conflicts starts to dominate unique insights which result in a less effective decision-making process.

1. Introduction

Within the last few decades, there has been a growing interest in diversity and its effects on firm financial performance. As result, more and more companies announce diversity policies to make their top management team (TMT) a better representation of the society. But does diversity really matter? On the one hand, TMT diversity can bring additional perspectives on decision-making and thereby increasing the quality of the decision (Harrison & Klein, 2007). But on the other hand, diversity generates more conflicting opinions which result in a more time-consuming and less effective decision-making process (Campbell & Minguez Vera, 2009). Therefore, the answer concerning the financial effects of diversity management is, based on theory, undetermined a priori.

The empirical evidence on the impact of TMT diversity on firm performance is thin and concentrated on organizations from the United States. Most research has focused on only one diversity variable based on data for a single year, for instance on gender or nationality diversity. The purpose of this paper is to complement and deepen the existing literature based on the business argument of diversity. Therefore this paper will investigate the impact of TMT diversity, which is the average of five diversity variables, on firm financial performance during 2007-2009. The diversity variables are gender, nationality, age, educational background and expertise. This will lead to more robust and reliable results that can be valuable for organizations with respect to the selection of their TMT members. The research question underlying this paper is as follows:

*What is the impact of top management team diversity
on firm performance in Western Europe?*

The paper proceeds as follows. The first section gives an overview of the theoretical background and recent empirical findings. This section results in the hypothesis that will be tested in the empirical research. Then, the results of this research are presented and analysed. The last section concludes.

2. Theoretical background

This section gives an overview of the theoretical background and recent empirical findings. A distinction is made between three different types of diversity: separation, variety and disparity. Each type has its own advantages and disadvantages with respect to financial performance. This section concludes with a hypothesis which will be tested in section 3.

2.1 Upper echelon theory

Before elaborating on the possible advantages and disadvantages of top management team (TMT) diversity for firm financial performance, an outline of the influence of managers in general will be given. Some theories state that external factors are the only or at least most influential determinants for firm performance. Donaldson (1995) presents in his book theories which follow this approach: structural contingency theory, population-ecology theory, institutional theory and resource dependence theory. These theories have been criticized at both the theoretical and empirical level in the mid 1980s. Since then, managers are seen as an influential factor with an important impact on organizational decisions, actions and outcomes (Kiefer, 2005).

One of the theories that contributed to this view is the upper echelon theory which states that the organization is a reflection of its top managers. The members of the top management team exercise their power in a personal way through which strategic choices and firm performance are associated with the characteristics of the top managers in a firm (Marimuthu & Kolandaisamy, 2009). The managerial discretion at senior levels allows executive directors more freedom to influence strategy than lower level managers (Mintzberg, Ahlstrand & Lampel, 2009). As a result, the values, beliefs and attitudes of executive managers shape the decision-making process (Talke, Salomo & Rost, 2010). These cognitive variables (values, beliefs, perceptions, judgements, etc) are hard to access and difficult to measure. Hambrick and Mason (1984) suggest, therefore, that demographic characteristics can be used to approximate cognitions. This is based on the assumption that variation in demographics are a reliable proxy for variations in underlying cognitive variables.

This assumption is widely accepted and used (Glick, Miller & Huber, 1993), and therefore this study will also draw upon this assumption. Demographic diversity is assumed to be positively related to cognitive diversity (Kiefer, 2005).

2.2 Diversity

Based on the upper echelon theory, it can be concluded that top managers have an important influence on firm financial performance. This subsection describes the effect of different types of TMT diversity on firm performance.

Harrison and Klein (2007) describe diversity as follows: *“the distribution of differences among the members of a unit with respect to a common attribute, such as tenure or ethnicity”*. The distribution of these differences depends on the common attribute and therefore it is possible to distinguish three different types of within-unit diversity. These types differ in substance, pattern, method of measurement and consequences. Figure 1 shows the different types of diversity and its underlying distribution (Harrison & Klein, 2007).

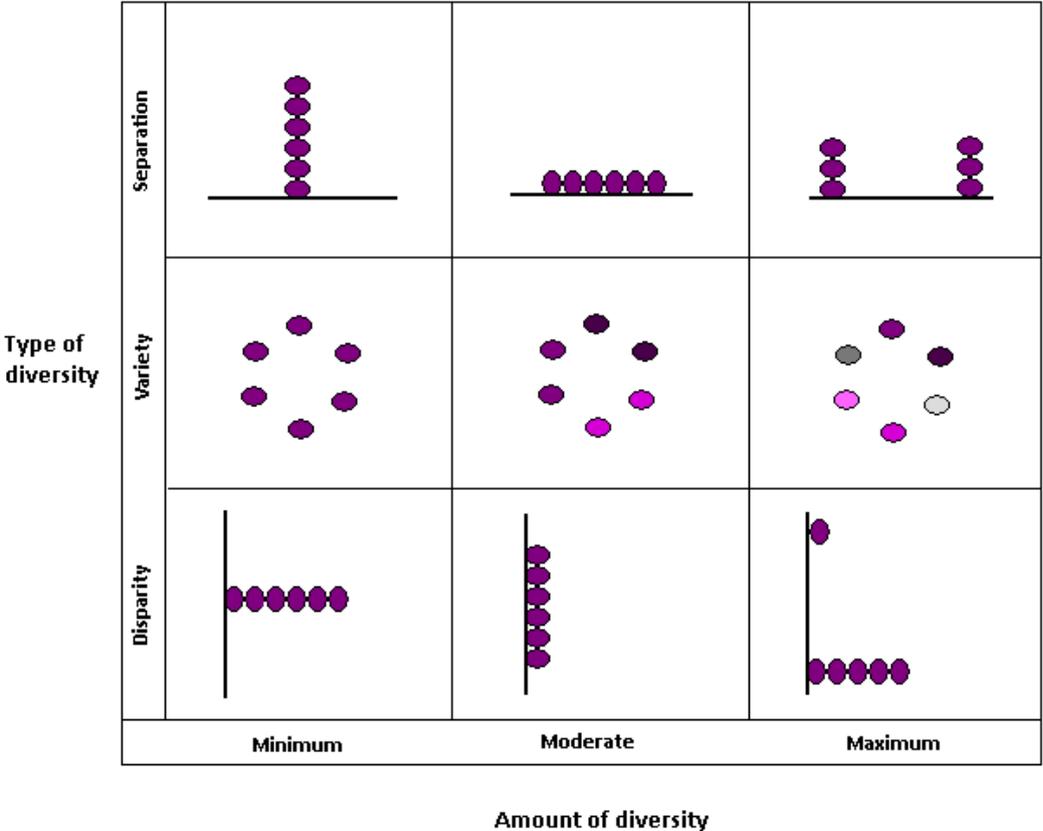


Figure 1: Types and amounts of diversity (Source: Harrison & Klein, 2007).

There are three different types of diversity, namely separation, variety and disparity (represented on the Y-axis). These types differ in their pattern and expected impact on firm performance. The X-axis represents different amounts of diversity, varying from minimum to moderate to maximum diversity. The combination of a particular type of diversity with a particular amount of diversity results in a unique pattern. In this pattern, each circle represents a top manager. The following sub-subsections will describe the different types of diversity, including its specific pattern and effect on firm performance.

2.2.1 Diversity as separation

The first type of diversity is separation. Separation means the composition of differences in position or opinion on a particular task-relevant issue among top managers. These differences are mainly based on values, beliefs and attitudes. Minimum separation happens when all top managers choose the same position or opinion anywhere on the continuum of interest. This is the case, for instance, when all managers share the same values and beliefs. There are no horizontal differences, so all managers share the same position (see figure 1). There is moderate separation when managers do not share exactly the same values and beliefs, but differ from each other. All managers have a unique position, but close to each other, on the continuum of interest. Maximum separation occurs when top managers are equally split at opposing end-points of the continuum. In this case, the TMT is divided into two teams with total different values, beliefs and opinions (Harrison & Klein, 2007).

Diversity as separation is closely related to process theory. Process theory states that diversity influences group processes, through communication and conflict, which in turn influence strategic decisions and firm performance. The process theory is based on the similar-attraction-theory (Schneider, 1987) and social categorization theory (Turner, et al, 1987). According to the similar-attraction-theory, organizations tend to choose employees who fit to their organization's character. This selection increases the homogeneity in the TMT. Campbell and Minguez Vera (2009) argue that homogeneous groups are more cooperative with less emotional conflicts. More diversity generates more conflicting opinions which results in a more time-consuming and less effective decision-making process, in other words diversity can be seen as a disruptive factor in the group process. The social categorization theory suggests that people prefer to interact with people who belong to

their 'group' instead of people who they define as out-group-members, these people are seen with mistrust. Both theories emphasise that more TMT diversity has a negative influence on the group process and decrease performance.

In sum, diversity as separation is expected to lead to a less effective decision-making process, through communication breakdowns and interpersonal conflict, and has therefore a negative influence on firm performance.

2.2.2 Diversity as variety

The second type of diversity is variety. Variety means the composition of differences in knowledge and experience among top managers. Minimum variety occurs when all top managers belong to the same category (for instance when they have the same scholarly background). Therefore all managers have the same colour in figure 1. There is maximum variety when all top managers are evenly spread across all possible categories. This is the case when each top manager has a different background and knowledge base. In this situation all managers are open for other views and cannot form coalitions (Harrison & Klein, 2007). This type of diversity is seen as having a positive impact on firm performance: differences among top managers result in unique insights and increase the decision quality (Carter, Simkins & Simpson, 2002). It is argued that variety creates fresh thinking and leads to enhanced creativity and innovation (Arfken, Bellar & Helms, 2004). Further, diversity as variety can increase the quality for team problem-solving. A more diverse TMT leads to a wider variety of ideas, alternatives and solutions which improves the quality of decision-making (Randøy, Thomsen & Oxelheim, 2006; Richard & Shelor, 2002; Boone & Hendriks, 2009). In addition, more variety increases marketplace understanding by matching the TMT diversity to the diversity of potential consumers and employees (Robinson & Dechant, 1997). It also provides legitimacy to the corporation with external and internal constituencies (Carter, Simkins, D'Souza & Simpson, 2007).

In sum, diversity as variety is expected to lead to new insights which increases the decision quality and thereby firm financial performance.

2.2.3 Diversity as disparity

The third type of diversity is called disparity (or inequality) and represents vertical differences, for instance differences in rank or status. There is minimum disparity when all members have the same rank and there are no vertical differences. All TMT members have the same position on the continuum of interest. There is moderate disparity when top managers differ in rank to a small extent. All top managers have a unique position, but close to each other, on the continuum of interest. Maximum disparity occurs when only one member of the TMT outranks all others in power, wealth, contacts, or other resources (see figure 1). Maximum disparity has detrimental effects on voice, participation, and information sharing among team members (Klein & Harrison, 2007). Disparity is often used for measuring diversity in terms of pay, income or decision-making authority and therefore less relevant for this study than diversity as separation or variety (Harrison & Klein, 2007). Diversity as disparity is only mentioned for the sake of completeness.

2.3 Empirical findings

The answer concerning the financial effects of diversity management is, based on theory, undetermined a priori. Diversity as separation is expected to have a negative impact on firm performance and diversity as variety a positive impact. There is no clear theoretical position suggesting either overall positive or negative effects of diversity on performance. This subsection gives an overview of previous diversity studies and their findings.

Most studies found support for the business argument of diversity. A considerable amount of diversity studies is originating from the United States, where the results seem to be predominantly positive. For instance, Adams and Ferreira (2009) found that Tobin's Q is positively related to the percentage of women in the TMT. They used a sample of 638 *Fortune 1000* firms for the year 1997. Dezsó and Ross (2008) found the same evidence based on panel data (1992 – 2006) of *Fortune 1500* companies. In addition, Carter, Simkins and Simpson (2003) found that nationality diversity is positively related with firm performance, measured by Tobin's Q, based on a sample of 1.066 listed US firms in 1998. These results do not depend on the performance measure, because Erhardt, Werbel and Shrader (2003) found evidence for a positive influence of gender and nationality diversity on financial performance measured by return on equity and return on assets. Finally, Jehn, Northcraft

and Neale (1999) found that informational diversity (differences in knowledge bases and perspectives) positively influences firm performance.

The studies above measure firm performance by market-based or accounting-based ratio's. Another way of measuring the impact of diversity on firm performance is to investigate the investor reaction. Investors seem to value diversity when the appointment of a director who increases the board or TMT diversity results in abnormal returns. Welbourne, Cychota and Ferrante (2007) examined the impact of female directors in the TMT on short-term and long-term financial performance. They used data from 534 initial public offering (IPO) firms in the United States. They found that female top managers have a positive influence on the initial pricing for the IPO, which is measured by Tobin's Q, three-year stock price growth, and growth in earnings per share. Welbourne, Cychota and Ferrante argue that including female top managers in the TMT leads to better innovation and problem-solving processes. Francoeur, Labelle and Sinclair-Desgagné (2007) found that firms operating in complex environments generate positive and significant abnormal returns of 0,17% monthly when they have a high proportion of female directors. The gender diversity leads to more diverse knowledge bases and perspectives that are needed to develop and evaluate solutions to complex problems. Francoeur, Labelle and Sinclair-Desgagné used a sample of 500 Canadian firms during the four-year period 2001-2004. Kang, Ding and Charoenwong (2010) investigated the stock market reaction to female directors in an Asian context by using a sample of 45 Singaporean firms. They found that publicly-listed firms experience positive abnormal returns (1,22% in a two-day event window) when they announce the appointment of a female director. The stock market reaction is more positive when the female director is appointed for a non-CEO executive or independent board position.

Although most diversity studies focus on the diversity and firm performance relationship, some studies investigated the impact of moderating variables on this relationship. Miller and Triana (2009) investigated the impact of two moderating factors, innovation and firm reputation, based on a sample of *Fortune 500 firms*. They found that innovation and firm reputation have a positive influence on the relationship between nationality diversity and firm performance (measured by the ratios return on investment and return on sales). Further, gender diversity is positively related to innovation. Increasing diversity on the board leads to more varied ideas, perspectives and networks which increase innovation. However, innovation and firm reputation have no influence on the relationship between gender

diversity and firm performance. Camelo-Ordaz, Hernández-Lara and Valle-Cabrera (2005) found a positive influence of the level of education on innovation. They argue, based on a sample of 100 Spanish firms, that a higher level of education results in the generation of more creative ideas and solutions. Further, they investigated the impact of functional background diversity on innovation. Although differences in background are commonly linked with the development of strategies of innovation and change, no significant relationship between functional background and innovation was found. Cannella, Park and Lee (2008) investigated the impact of the collocation of TMT members and environmental uncertainty on the TMT diversity and financial performance relationship, based on a sample of 207 US firms. They found that the diversity and financial performance relationship becomes more positive when the proportion of TMT members with offices in the same location increases or when environmental uncertainty increases. Cannella, Park and Lee argue that a team is only able to gain value from diversity when they share the unique and relevant information they hold with the team. It is easier to share this information when the TMT members hold office at the same location. Further, geographically dispersed TMTs are less likely to be a team at all, because they rarely meet, do not develop group identities, and therefore do not function as a team. In this case, a team is merely a collection of different individuals each with different responsibilities.

Whereas the results of US studies investigating the relationship between diversity and financial performance are mostly positive, the results from European studies appear to be mixed. Smith, Smith and Verner (2005) examined the impact of gender diversity in the TMT on firm performance, based on a sample of 2500 Danish firms from 1993-2001. They found that positive performance effects are mainly related to female managers with a university degree. Female top managers who do not hold a university degree have a smaller or insignificant impact on financial performance. Wilson and Altanlar (2009) investigated the impact of gender diversity in the United Kingdom and found that having at least one female board director reduces the risk of bankruptcy. Nielsen (2010) investigated the impact of nationality diversity on foreign market entry and financial performance, based on a sample of 165 Swiss listed companies. Nielsen found that an increase in nationality diversity in the TMT increases the ability of the team to deal with the challenges of foreign operations. TMT internationalization leads to foreign market entries, which in turn have a positive impact on firm financial performance. Other studies found that greater TMT homogeneity in terms of

tenure (O'Reilly, Snyder & Boothe, 1993) or gender (Bøhren & Strøm, 2007; Shrader, Blackburn & Iles, 1997) are associated with higher firm performance. Bøhren and Strøm (2007) used a sample of 203 listed Norwegian firms during 1989-2002 and Shrader, Blackburn and Iles (1997) used a sample of 200 *Fortune 500* firms. Both studies measured financial performance in a different way; the former used Tobin's Q as a measure, while the latter used return on equity and return on assets. Eklund, Palmberg and Wiberg (2009) investigated the impact of gender and age diversity on investment performance, based on a panel of Swedish listed firms. They found that age diversity has no significant effect on firm performance. Further, gender diversity has a negative influence on firm performance when diversity leads to larger boards. The effect of gender loses significance after controlling for board size. Ancona and Caldwell (1992) investigated the impact of group demography on performance in high-technology companies. They found that diversity in the top management team produces processes that facilitate performance, but has high coordination costs. The direct costs of more diversity outweighed the positive and indirect effects of diversity. Therefore the overall effect of diversity on firm performance is negative. In addition, Hambrick and D'Avendi (1992) found that conflicts through TMT diversity are a central element in the downward spiral of large corporate failures.

Finally, there are studies who found no significant relationship between diversity and firm financial performance. Farrell and Hersch (2005) found that adding a woman to the board of directors does not result in value creation or destruction. Their study results suggest that there is no wealth effect associated, measured by abnormal stock returns, with the announcement of a woman being added to the board of directors. Further, the likelihood of a firm adding a woman to its board is negatively affected by the number of women already on the board. This indicates that board selection is not gender neutral. They used a sample of 300 unregulated Fortune 1000 firms from 1990 to 1999. Nüesch (2009) investigated the effects of age, race and tenure diversity for all games played in the German soccer league 'Bundesliga' over six seasons. He found that demographic diversity has no significance influence on the outcome of the game. Marinova, Plantenga and Remery (2010) examined the business case for gender diversity, based on evidence from 102 Dutch and 84 Danish firms. However, they found no support for the business case of board gender diversity in their sample. Also Rose (2007) found no significant link between gender, nationality, and educational diversity and firm performance, measured by Tobin's Q. This study used a

sample of Danish firms during the period of 1998-2001. Van der Walt, Ingley, Shergill and Townsend (2006) investigated if the level of diversity in board composition and the type of strategic environment within the organization operate, influences financial performance. They used a sample of 59 publicly listed companies on the New Zealand Stock Exchange during the five-year period of 1997-2001. They expected that homogeneous boards perform better in relatively stable operating environments and that more diverse boards would have a comparative advantage in turbulent operating environments characterized by greater strategic complexity. More diverse boards possess more diverse knowledge bases and the perspectives necessary to develop and evaluate solutions to complex problems. However, all their regression results are statistically insignificant. According to their research, more diverse boards do not perform better and the strategic environment has no impact on the relationship between board diversity and financial performance. Kiefer (2005) found the same results with respect to the impact of strategic environment for 80 German companies. Also, Richard and Shelor (2002) found that environmental complexity has no influence on the relationship between TMT age heterogeneity and firm performance for 1.035 firms in the United States.

2.4 Double edged sword

TMT diversity is often called a “double edged sword”, because there are positive, negative and also non-findings. There are several reasons for these mixed findings: (1) the exclusion of mediating and moderating contextual factors, (2) weak or wrong conceptualization of diversity (Harrison & Klein, 2007), or (3) missing consideration of non-linear effects (Nüesch, 2009). The relationship between diversity and financial performance is more complex than most previous studies suggested (Richard, Barnett, Dwyer, Chadwick, 2004). Some studies hinted at a possible nonlinear relationship, but most of them did not test for it (Kiefer, 2005; Luis-Carnicer, Martínez-Sánchez, Pérez-Pérez & Vela-Jiménez, 2008). Frink et al (2003), however, did test for a nonlinear relationship and found an inverted U-shape curvilinear relationship between gender diversity and firm performance. Their study suggests that there exists an optimal amount of gender diversity. Greening and Johnson (1997) and Kiefer (2005) found the same results with respect to tenure and age diversity. In addition, Richard and

Shelor (2002) found a curvilinear relationship between TMT age heterogeneity and sales growth.

This study will test for a curvilinear relationship between TMT diversity and firm financial performance. In contrast with the studies mentioned above, this study will investigate the impact of TMT diversity - based on gender, nationality, age, educational background and expertise diversity - on firm performance over a three-year period. The hypothesis is as follows:

*There is an inverted U-shape curvilinear relationship
between TMT diversity and firm financial performance.*

3. Empirical research

3.1 Data description

The sample is comprised of listed firms in Western Europe during the period 2007-2009. The focus lies on the main stock exchange of the selected countries as can be seen in the table below:

Country	Stock Exchange	Number of companies (in final sample)
The Netherlands	AEX	24
Belgium	BEL20	18
France	CAC40	30
Germany	DAX30	28
Spain	IBEX35	26
		126

Table 1: Composition dataset.

The dataset consists of 126 large companies, so there are 378 observations over the three-year period. A Dutch and a German company are excluded from the sample due to having extreme values for firm financial performance. As can be seen in appendix III, these observations deviate markedly from the other observations of the sample. Therefore both outliers are removed from the sample. The other excluded companies are left out due to dual listings (each company appears only once in the dataset) and missing information about the TMT members. A company is only removed from the dataset when more than 20% of the information on a particular diversity variable is missing. It is assumed, based on a sensitivity analysis, that a good indication of TMT diversity can be made when at least 80% of the information is known. For example, a TMT has five members and for one member the type of education is unknown. In this case Blau's index¹ for education will be calculated based on four TMT members or on 80% of the data. The deviation of this approximation from the *real* Blau index² is 0,163 on average. The impact on the total diversity measure,

¹ See subsection 3.3: *Methodology* for a description of Blau's index.

² The *real* Blau index represents the case when all information is known.

which is the equally weighted average of Blau's index on five diversity variables, will be minimal.

This study takes only executive directors into account, because these directors take corporate decisions and set the strategic directions. The non-executive directors are responsible for monitoring and advising the TMT. Without underestimating the importance of this role, executive directors are seen as having a larger influence on the actions of a firm (Kiefer, 2005; Ping, 2007; Cannella, Park & Lee, 2008; Marimuthu & Kolandaisamy, 2009; Talke, Salomo & Rost, 2010). Therefore non-executive directors are excluded.

The main source of information is each company's annual report, supplemented by the Amadeus (Bureau van Dijk) and Datastream (Thomson Reuters) databases. The Amadeus database contains financial information on European companies and information about the top managers currently in office. The Datastream database is used to collect the relevant financial and accounting information.

3.2 Variables

There are three categories of variables important for this research: variables to measure diversity, variables to measure firm performance and control variables. Demographic diversity may or may not be measured as variety, separation, or disparity. For instance, men and women may or may not differ in their knowledge and perspectives (variety), in their values and beliefs (separation), or in their status and influence (disparity). These three forms of diversity may co-occur within groups, because individuals who differ in their knowledge (variety) might also differ in their attitudes (separation) (Klein & Harrison, 2007). In this study, diversity will be measured as variety³. Whereas separation and disparity measure horizontal and vertical differences, respectively, variety measures the within-unit diversity of categorical data (Nüesch, 2009; Boone & Hendriks, 2009). The top manager characteristics are collected and coded in order to be able to calculate the Blau index and to measure the within-unit diversity of each TMT. This within-unit diversity is the equally weighted average of all diversity variables. In addition to the collection of information to measure diversity, the

³ The expected benefits of variety may not materialize, because diversity as variety might co-occur with diversity as separation (or disparity). This impact is not ignored in this study, because an curvilinear relationship is expected.

TMT position of each top manager is collected. A specification of the codes can be found in appendix I.

Firm performance can be measured by market-based ratios or accounting-based measures. A disadvantage of accounting-based measures, like return on assets (ROA) or return on equity (ROE), is that they are sensitive to management's choice of asset valuation principles. For instance, the use of accelerated depreciation results in a lower net income and therefore in a lower ROA or ROE ratio than straight line depreciation (Brealey, Myers & Marcus, 2007). The market-based measure Tobin's Q is used in comparable studies and can be seen as the predominant measure. Tobin's Q is the ratio of the market value of a firm to the replacement cost of its assets. The replacement cost of an asset is the cost of acquiring a comparable asset with identical characteristics. An advantage of Tobin's Q is that it focuses on expectations of future performance, while accounting results are based on events that have already occurred. A disadvantage of Tobin's Q is that it values a company too high when the stock market is overvalued (Campbell & Minguez Vera, 2008).

Following Rose (2007), Campbell and Minguez Vera (2008), and others, the Tobin's Q that is collected from the Datastream database is calculated as follows:

$$(Market\ value\ of\ equity + Book\ value\ of\ debt) / Book\ value\ of\ total\ assets.$$

Tobin's Q is larger than one when the firm has certain intangible assets or growth opportunities. Investors expect that the firm is able to create value by using the available resources effectively which results in a higher market value than book value. When Tobin's Q is smaller than one, the firm is worth less than its book value (or recorded assets) and is associated with poor utilisation of the available resources (Sudarsanam, 2003).

Last, it is necessary to control for other variables that affect firm performance and are correlated with the diversity variables. The control variables are: TMT size, age of the firm, industry, firm size, and country. It is important to correct for TMT size, because a larger TMT has a higher potential for increasing diversity and generating better ideas than a smaller TMT. Omitting the variable TMT size would lead to systematically underestimating variety in smaller top management teams (Biemann & Kearney, 2009). However, a trade-off with respect to TMT size can be made, because large TMT tend to be inert and less effective (Kiefer, 2005). Age of the firm, industry, firm size and country are standard control variables. In comparable diversity studies, firm size is measured in logarithmic form. The advantage of

measuring firm size in logarithmic form is that for larger values of firm size, a 1% increase represents a larger absolute increase. For instance, from 500 to 505 instead of from 100 to 101. Each 1% increase in size has the same effect on the dependent variable (Albright, Winston & Zappe, 2008). The variable definitions are given in table 2:

Variable	Definition
TMT size	The total number of top managers in the TMT.
Age of the firm	Year of annual report - year of establishment.
Industry dummy 1	Dummy variable = 1 indicating a firm is in the agriculture, mining, construction or manufacturing industry; 0 otherwise (Standard Industrial Classification codes 01 – 39).
Industry dummy 2	Dummy variable = 1 indicating a firm is in the transportation, communications, electric, gas, wholesale- or retail trade industry; 0 otherwise (SIC codes 40 – 59).
Industry dummy 3	Dummy variable = 1 indicating a firm is in the finance, insurance, services or public administration industry; 0 otherwise (SIC codes 60 – 99).
Firm size	The natural logarithm of total sales.
Country dummies	Dummy variable = 1 indicates whether the firm is Dutch, Belgian, German, French or Spanish; 0 otherwise.

Table 2: Definitions of the control variables (Source SIC codes: OSHA, 2010).

3.3 Methodology

The most commonly employed measure for diversity as variety is Blau's index (Harrison & Klein, 2007; Pitts, 2003; Campbell & Minguez Vera, 2008; Miller & Triana, 2009). Blau's index (1977) has been suggested as an optimal measure of diversity to capture variations within a group of people (Miller & Triana, 2009). Blau's index is calculated by the following formula:

$$1 - \sum(p_k^2),$$

where variety can take $k = 1, \dots, K$ possible categories and p represents the proportion of TMT members in the k^{th} category. When TMT diversity increases, Blau's index gets larger. The minimum of this index is always equal to zero and the maximum depends on the number of categories of a particular variable. The theoretical maximum can be calculated with the following formula: $(K - 1) / K$, where K refers to the number of categories of the variable (Biemann & Kearney, 2009). This means that the maximum of Blau's index is higher when there are more qualitatively different categories. The number of categories and theoretical maximum for each diversity variable can be found in table 3:

Diversity variable	Categories (K)	Theoretical maximum
Gender	2	0,5
Nationality	15	0,9333
Age	9	0,8889
Education	6	0,8333
Expertise	9	0,8889

Table 3: Number of categories and theoretical maximum of the diversity variables.

As can be seen in table 3, the maximum Blau index is higher for educational diversity (0,83) than for gender diversity (0,50). The results are only comparable across the different diversity variables when they are corrected for this difference in the number of categories. Agresti and Agresti (1978) introduced a method that makes this correction possible: the Index of Qualitative Variation. This method multiplies Blau's index by $K / (K - 1)$ to get a standardized range from zero to unity. The maximum of this adjusted Blau index depends no longer on the number of categories of a particular variable and is, for all diversity variables, equal to unity.

Another issue that has to be taken into account is possible endogeneity of the relationship between TMT diversity and firm performance. Therefore the estimation will be carried out with panel data using two-stage least squares (2SLS)(Wooldridge, 2006). Further, a causality test will be employed to test whether TMT diversity really affects firm performance or whether better performing firms select more diverse TMT members (Marinova, Plantenga & Remery, 2010). The models that will be estimated are:

$$(1) \quad \text{Firm performance}_{it} = \alpha_0 + \alpha_1 \text{TMT diversity}_{it} + \sum \alpha x_{it} + \varepsilon_{it},$$

$$(2) \quad \text{TMT diversity}_{it} = \beta_0 + \beta_1 \text{Firm performance}_{it} + \sum \beta z_{it} + \varepsilon_{it},$$

where x and z are vectors of control variables, and ε the error term. TMT diversity has a causal impact on firm performance when α_1 is a significant coefficient estimate, and β_1 not. Stata statistical software was used to conduct the analysis.

4. Research results

This section represents the results of the empirical research. First, the development of TMT diversity during 2007 – 2009 will be discussed. Then a comparison is made between the TMT positions of directors who differ with respect to gender and nationality. Last, the business argument for TMT diversity is examined: does a higher level of TMT diversity result in increased firm profitability?

4.1 Development top management team diversity

This section describes the development of TMT diversity, measured by the adjusted version of Blau's index, over 2007 – 2009. The average TMT diversity of the Western European countries together shows a slightly increasing trend over the three-year period: 0,4434 in 2007, 0,4548 in 2008 and 0,4561 in 2009. This average TMT diversity consists of five diversity variables: gender, nationality, age, educational background, and expertise. All diversity variables, except gender, increase during the three-year period (see table 4). In 2007, only 19,53% of the Western European firms had at least one woman in its TMT. In 2008 this number increased to 25%, so more companies appointed a female executive director to its TMT. In 2009 the number of firms decreased to 24,22%. The number of firms with at least one foreign director in its TMT increased from 49,22% in 2007, to 53,13% in 2008 and 53,91% in 2009. However, these results are insignificant. Most Western European firms diversify with respect to age, education and expertise.

Diversity variable	2007	2008	2009
Gender	19,53%	25,00%	24,22%
Nationality	49,22%	53,13%	53,91%
Age	93,75%***	94,53%***	94,53%***
Education	88,28%***	89,06%***	89,06%***
Expertise	96,09%***	96,88%***	98,44%***

Table 4: Percentage of Western European firms with an adjusted Blau index higher than zero (2007-2009). Note: ***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

The development of TMT diversity in Western Europe looks different when each country is examined separately (see figure 2).

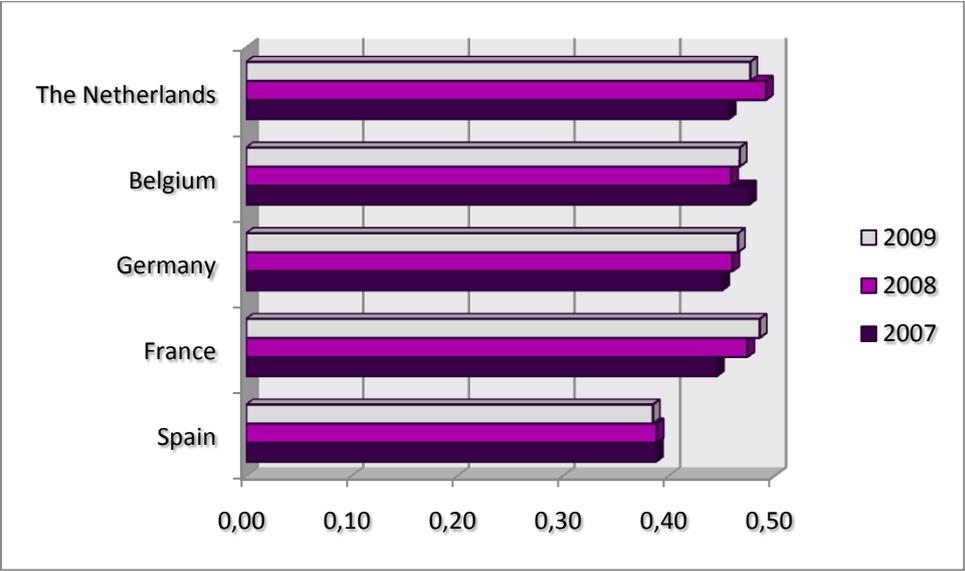


Figure 2: Development TMT diversity in Western Europe during 2007-2009 (see appendix II for more details).

As can be seen in figure 2, there is no trend towards more TMT diversity in the Netherlands, Spain and Belgium during 2007 – 2009. One would expect an increasing trend due to the recent public debate and government considerations, but this is not the case. In fact, there is no trend in the Netherlands and Belgium at all and the total TMT diversity is slightly decreasing in Spain. Only in Germany and France the TMT diversity increased over the three-year period. Note however that a real trend cannot be measured in this short time frame of three years, but it gives an indication of the growth rate towards more top management diversity. Most empirical evidence is based on both executive directors and non-executive directors and report a clear trend towards more board diversity. Heidrich and Struggles (2007) report an increase of 1,1% in gender diversity every two year since 2001. Farrell and Hersch (2004) found that 87% of the *Fortune 1000* firms has at least one female director in its board in 1999 compared with 53% in 1990. However, this increase in diversity is mainly the result of a more diverse supervisory board and not of a more diverse management team. There is much scope for improvement with respect to diversity in the top management team; the adjusted Blau index is on average about 0,45 in Western Europe while the maximum of Blau’s index is equal to unity.

Further, it is remarkable that the total TMT diversity of Spain is distinctly lower than the TMT diversity in the other countries. Heidrich and Struggels (2007) and others also report a lower level of TMT diversity for Spain due to cultural differences. For instance, the participation of women in the Spanish labour force is lower than for other Western European countries, reflecting deeply-rooted societal attitudes towards women (Campbell & Minguez Vera, 2009). Figure 3 shows the distribution of the five diversity variables - gender, nationality, age, education, and expertise - within total TMT diversity. Based on the article of Campbell & Minguez Vera (2009) one would expect a low value for gender diversity in Spain, but the low total diversity value is mainly due to the low level of nationality diversity: only three of the 26 Spanish companies have at least one executive director with another nationality in its TMT during 2007 - 2009.

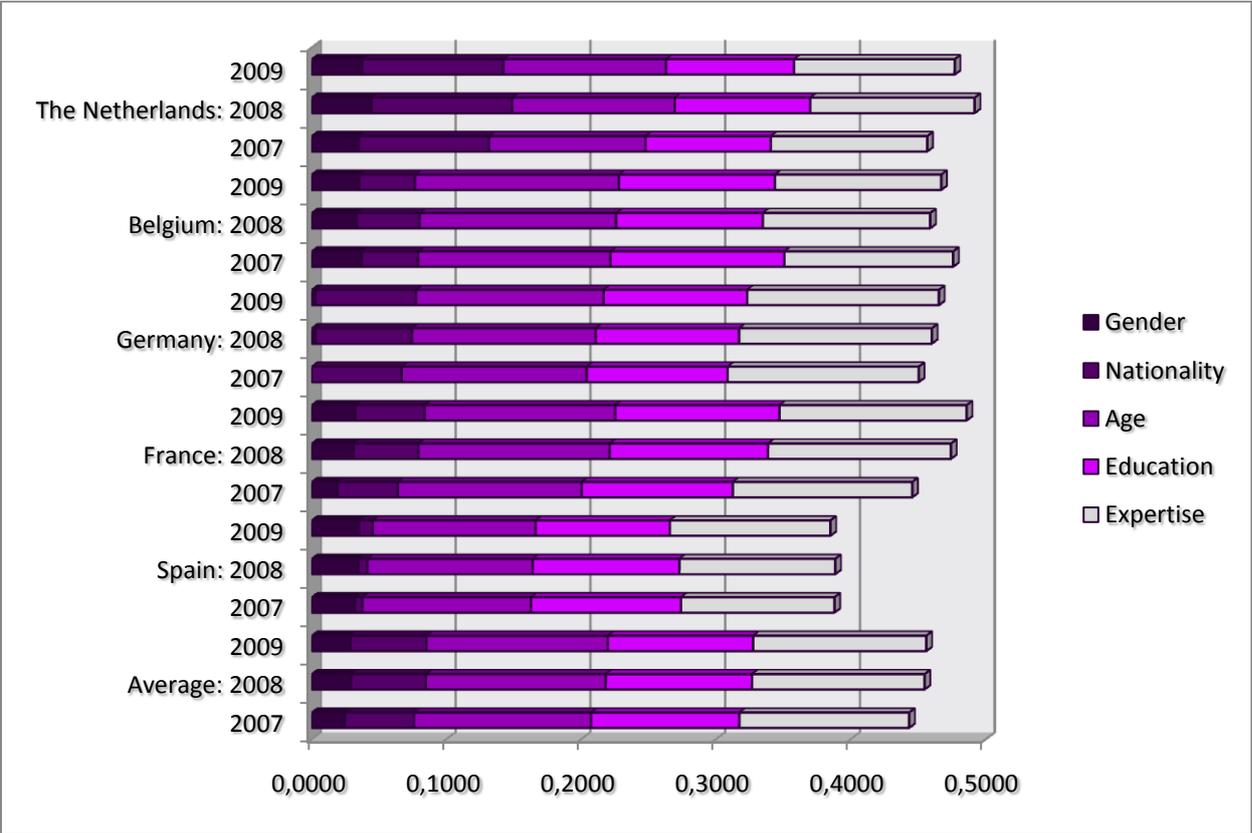


Figure 3: Distribution of diversity variables within total TMT diversity, 2007 – 2009 (see appendix II for more details).

Notes: In order to calculate the proportion of each diversity variable within TMT diversity, each diversity variable is multiplied by 0,2. Formally, total TMT diversity is measured as follows: $\sum (0,2 \cdot gender + 0,2 \cdot nationality + 0,2 \cdot age + 0,2 \cdot educational\ background + 0,2 \cdot expertise)$.

In Germany the variable gender diversity has an extremely low value. The German companies in our sample (28 companies) have a total of 547 TMT positions over three years and women occupy only two director seats. In other words, one of the 28 German companies has a female executive director in 2008 and 2009 and none of the companies had a female director in 2007.

As can be seen in figure 3, the diversity variables gender and nationality have a lower value than the other diversity variable. It could be the case that firms are more willing to appoint top managers that are similar with respect to gender or nationality, but differ with respect to age, educational background, or expertise. Or in other words, firms may prefer the diversity variables age, educational background, and expertise over the diversity variables gender and nationality.

4.2 Top management team positions

There are several positions within the top management team, like Chief Executive Officer (CEO), Chief Financial Officer (CFO), and Chief Operating Officer (COO). Each manager of the top management team, regardless of its position, is able to influence strategic decisions and thereby firm performance. However, some positions are seen as more important than others. The highest position is the position of CEO, who is responsible for overseeing all activities of the company. Other positions that are commonly considered to be part of the TMT are the CFO, who is responsible for overseeing the financial activities of the company, and the COO, who is responsible for managing the company's day-to-day operations. Both managers report directly to the CEO. Other TMT positions are, for instance, Chief Technical Officer, Chief Marketing Officer, and Chief Information Officer.

As can be seen in the code book (appendix I), the position within the TMT is collected for each top manager. Based on this information, a comparison is made between top managers who differ with respect to gender and nationality. The results are presented in table 5.

	Chief Executive Officer	Chief Financial Officer	Chief Operating Officer	Other TMT position
Male	17,67%	11,88%	3,95%	66,50%
Female	3,82%	17,88%	1,67%	76,64%
<i>Difference (Male-Female)</i>	+ 13,85%	- 5,99%	+ 2,28%	- 10,14%
Home	18,62%	12,58%	4,13%	64,67%
Foreign	12,57%	10,24%	3,34%	73,85%
<i>Difference (Home-Foreign)</i>	+ 6,05%	+ 2,34%	+ 0,79%	- 9,18%

Table 5: Distribution of TMT positions by gender and nationality (average of Western European firms during 2007-2009).

Section 4.1 found that a lot of top management teams only consist of male and domestic directors. In other words, the amount of gender and nationality diversity is limited in Western Europe (see figure 3). In addition to this result, table 5 shows that male directors have, on average, a more important function than female directors in the TMT. Over 17% of all male directors is Chief Executive Officer, while only 3,82% of all female directors has this position. The difference between the percentage male and female directors that has the function of CEO is 13,85%. The percentage of female Chief Financial Officers is almost 6% higher than the percentage of male directors that has this function. Female directors are more likely to be appointed as CFO than CEO or COO. Only 1,67% of the female directors is Chief Operating Officer, which is 2,28% less than its male counterpart. Finally, female directors have a larger share (76,64%) in remaining board positions than male directors (66,50%).

The second part of table 5 shows the results for domestic and foreign directors. The percentage of domestic directors that has the position of CEO, CFO or COO is higher than the percentage of foreign directors with the same function. Over 18% of all domestic top managers is CEO, while 12,57% of all foreign directors has this position. The percentage of domestic Chief Financial Officers and Chief Operating Officers is also higher than foreign, respectively 2,34% and 0,79% more. Consequently, foreign top managers have a larger share (73,85%) in remaining board positions than domestic top managers (64,67%).

These results indicate that female and foreign directors are not only underrepresented in the TMT, but also hold less important positions than male and domestic directors.

4.3 Top management team diversity and firm performance

The dataset that is used for testing the impact of TMT diversity on firm performance comprises a strongly balanced panel of 378 observations. The descriptive values of key variables are shown in table 6.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total diversity	378	0,4497	0,1311	0	0,7897
Tobin's Q	378	2,1074	1,5197	0,22	8,92
TMT size	378	5,9418	2,9056	2	15
Firm age	378	78,8413	64,0805	6	344
Firm size	378	16,3993	1,4631	12,2495	19,5583

Table 6: Descriptive values of key variables.

The amount of TMT diversity is limited and has, on average, a value of 0,45 in Western Europe. The maximum value of TMT diversity is 0,79 and the minimum value is zero in this sample. The average value of Tobin's Q is 2,11 with a standard deviation of 1,52. After the exclusion of two outliers, the maximum value of Tobin's Q is 8,92 and the minimum value is 0,22. The average TMT consists of six directors, with a minimum of two and a maximum of 15 members. Further the average firm age is 79 years and average firm size 16,4 (measured as the natural logarithmic of sales).

The estimation of model (1) and (2) is carried out with panel data using two-stage least squares (2SLS) to take the possibility of joint endogeneity into account. The 2SLS estimator is less efficient than ordinary least squares (OLS) when there is no endogeneity and all explanatory variables are exogenous. It is therefore important to test for endogeneity with the Hausman-Wu test. The Hausman-Wu test shows that the coefficients on the residuals are not statistically different from zero which indicates that there is no endogeneity and OLS should be used instead of 2SLS (Wooldridge, 2006). The results of the pooled OLS estimation are presented in table 7, the estimates are corrected for heteroskedasticity and autocorrelation.

	Tobin's Q	Total diversity
Constant	5,5652*** (1,0454)	0,3040*** (0,0915)
Total diversity	4,5249** (2,0735)	
Total diversity squared	-4,3183* (2,4500)	
Tobin's Q		0,0036 (0,0042)
Firm size	-0,2771*** (0,0621)	0,0021 (0,0051)
Firm age	-0,0020* (0,0012)	0,000004 (0,0001)
TMT size		0,0188*** (0,0020)
Dummy The Netherlands	-0,0323 (0,2266)	0,0526** (0,0210)
Dummy Belgium	-1,0184*** (0,2220)	0,0216 (0,0212)
Dummy Germany	0,0900 (0,1927)	0,0061 (0,0159)
Dummy Spain	0,2930 (0,2553)	-0,0389** (0,0191)
Industry dummy 2	0,5816*** (0,1915)	0,0206 (0,0141)
Industry dummy 3	-0,3290** (0,1580)	-0,0560*** (0,0142)
Year dummy 2007	0,7934*** (0,1750)	-0,0221 (0,0147)
Year dummy 2008	-0,2474 (0,1596)	-0,0017 (0,0136)
N	378	378
F-statistic	10,24	15,32
R ²	0,2588	0,1104

Table 7: Results pooled OLS estimation.

*Notes: The standard errors are reported in parentheses and ***, **, * denote significance at the 1%, 5% and 10% levels, respectively. The country dummy France, industry dummy 1 and year dummy 2009 are reference categories.*

The OLS estimation method found a significant influence of TMT diversity on firm performance. The direction of causality is from TMT diversity to firm performance and not the other way around. As can be seen in table 7, Tobin's Q has no significant effect on total diversity (p -value = 0,399). So better performing firms do not select more diverse TMT members, but TMT diversity affects firm financial performance. Campbell and Minguez Vera (2008) found the same direction of causality with respect to the diversity variable gender.

The control variables firm size and firm age have a negative influence on firm performance which indicates that small and young companies had a better financial performance than

bigger and older companies during 2007-2009. However, the impact of both variables is small. A 1% increase in firm size (or sales) decreases financial performance (or Tobin's Q) with 0,0028 and an one-year increase in firm age decreases Tobin's Q with 0,0020. TMT size is excluded as control variable in the first equation, because this variable has no effect on firm financial performance (see appendix IV). Although the inclusion of irrelevant variables does not affect the unbiasedness of the OLS estimators, it has undesirable effects on the variances of the OLS estimators (Wooldridge, 2006). Almost all country dummies are insignificant, except the country dummy Belgium. The Tobin's Q of Belgium firms is, on average, 1,0184 lower than the Tobin's Q of French firms. This remarkable difference is due to country differences or factors associated with country differences where the regression does not control for. Both industry dummies have a significant impact on firm performance. Firms in the transportation, communications, electric, gas, wholesale – and retail trade industry perform better than firms in the agriculture, mining, construction and manufacturing industry. The firms in the former industry have a Tobin's Q that is, on average, 0,5816 higher than firms in the latter industry. In addition, firms in the finance, insurance, services or public administration industry had on average a Tobin's Q that is 0,3290 lower than firms in the agriculture, mining, construction and manufacturing industry. The last control variables are the year dummies. These dummies show that Western European firms had a higher financial performance in 2007 than in 2009. On average, the Tobin's Q was 0,7934 higher in 2007 than 2009. The results of year dummy 2008 are insignificant.

The relationship between TMT diversity and firm performance is nonlinear. '*Total diversity*' has a coefficient of 4,5249 (p-value = 0,030) and '*total diversity squared*' has a coefficient of -4,3183 (p-value = 0,079). The relationship between TMT diversity and firm financial performance can be expressed in the following equation (ignoring the other factors):

$$\text{Firm financial performance} = 4,5249 \cdot \text{TMT diversity} - 4,3183 \cdot \text{TMT diversity}^2$$

A graphical representation of this equation is given in figure 4.

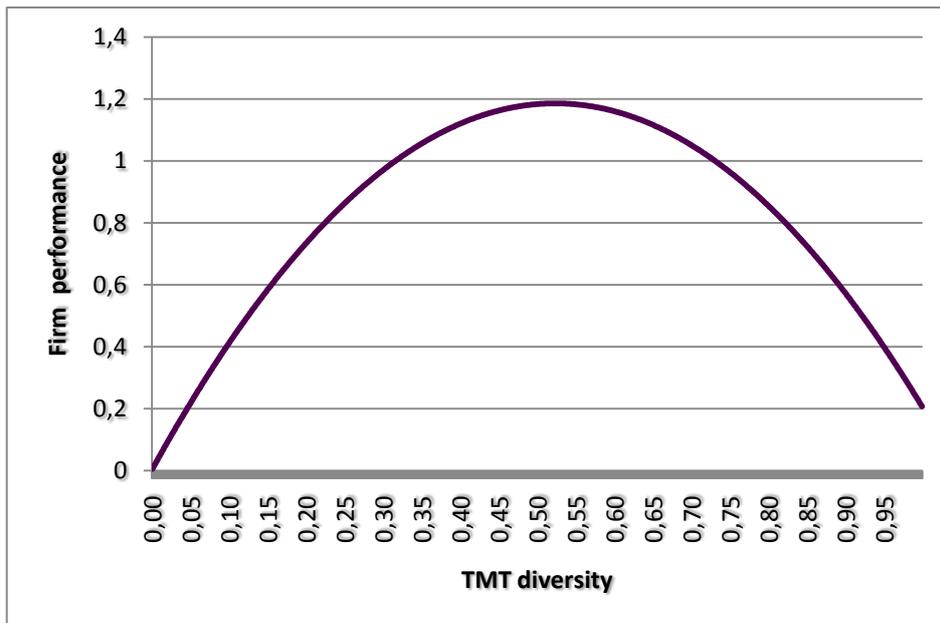


Figure 4: The effect of TMT diversity on firm performance.

With a positive effect of *diversity* and a negative effect of *diversity*² the graph has a parabolic shape for which the maximum equals 0,5240. For every increase in diversity up to 0,5240 the firm performance also increases albeit in a decreasing rate. An increase of diversity above 0,5240 decreases firm performance (see figure 4). The coefficients on *diversity* and *diversity*² are jointly significant at a 5% level (p-value = 0,0357).

The reasoning behind the nonlinear relationship between TMT diversity and firm performance might lie in the ‘double-edged sword’ mentioned in the theoretical background. On the one hand, greater TMT diversity may be associated with more imaginative company strategies and decisions of a better quality. On the other hand, too much TMT diversity may lead to more conflicts on the TMT which results in a more time-consuming and less effective decision-making process. Apparently, when the adjusted Blau index is below 0,5240 the former reason dominates by an increase in diversity. However, the latter reason starts to dominate when the adjusted Blau index is 0,5240 or higher, in this case more diversity leads to conflicts and a less effective decision-making process.

These findings lead to an interesting question: when is the optimal amount of TMT diversity reached in a real-life setting? In other words, which top management team compositions result in an adjusted Blau index of 0,5240? The table below shows the optimal TMT composition for an average TMT of six top managers with respect to the diversity variables gender, nationality, age, educational background, and expertise.

Diversity variable	TMT composition
Gender	One female director and five male directors, or vice versa (adjusted Blau index = 0,56).
Nationality*	1. Three directors with nationality A and three directors with nationality B (adjusted Blau index = 0,54). 2. Four directors with nationality A, one director with nationality B and one director with nationality C (adjusted Blau index = 0,54).
Age*	Four directors in 'age group' I and two directors in 'age group' II (adjusted Blau index = 0,50). In this study each age group consists of five years (see appendix I).
Educational background*	Four directors with education A and two directors with education B (adjusted Blau index = 0,53).
Expertise*	Four directors with expertise A and two directors with expertise B (adjusted Blau index = 0,50).

Table 8: Example of optimal TMT composition for an average TMT of six members.

Note: It is not possible to reach the optimum adjusted Blau index of 0,5240 exactly, so the closest approximation is used.

**When the number of categories increases to infinity, the optimal TMT composition for these diversity variables is as follows: three directors in category A and three directors in category B, or four directors in category A, one director in category B and one director in category C.*

5. Discussion and conclusion

This study investigated the impact of top management team (TMT) diversity on the financial performance of 126 Western European companies during 2007-2009. First the development of diversity is discussed. One would expect an increasing trend due to the recent public debate and government considerations, but this is only the case when no separation between countries is made. In fact, there is no trend in the Netherlands and Belgium at all and the total TMT diversity is slightly decreasing in Spain. Only in Germany and France the TMT diversity increased over the three-year period. The distribution of the five diversity variables within total TMT diversity is quite comparable between companies. In general, gender and nationality diversity have a lower adjusted Blau index than age, educational background, and expertise diversity. Female and foreign directors are not only underrepresented in the TMT, they also hold less important TMT positions than male and domestic directors.

The dataset that is used for testing the impact of TMT diversity on firm performance comprises a strongly balanced panel of 378 observations. TMT diversity is measured by the adjusted Blau index and financial performance by Tobin's Q. This study found a significant influence of TMT diversity on firm performance. This relationship is nonlinear and has an inverted U-shape which indicates that there is an optimal amount of TMT diversity. For every increase in diversity up to an adjusted Blau index of 0,5240 firm performance also increases albeit in a decreasing rate. An increase of diversity above the adjusted Blau index of 0,5240 decreases firm performance. When TMT diversity is lower than 0,5240 the appointment of an executive director that increases the Blau index is seen as positive. For example, the introduction of a female director is positive when the TMT only or mainly consists of men. In this case, greater TMT diversity is associated with more imaginative company strategies and decisions of a better quality. However, greater TMT diversity is not in all cases a positive development. When the adjusted Blau index is above 0,5240 the appointment of a director that increases the Blau index is seen as negative for firm performance. Greater TMT diversity leads to more conflicts on the TMT which results in a more time-consuming and less effective decision-making process. In other words, when the amount of TMT diversity

increases above 0,5240 conflicts start to dominate unique insights and firm financial performance decreases. Rodríguez-Domínguez, García-Sánchez and Gallego-Álvarez (2010) found an inverted U-shape curvilinear relationship between gender diversity and firm performance. They argue that the optimal amount of gender diversity can be found in a balanced board of directors or in a board with a slight majority of female directors. Also Frink et al. (2003) found support for an inverted U-shape relationship between gender diversity and firm performance. Again, the optimal amount of diversity is reached when there are equal proportions of male and female directors. These results are based on both executive and non-executive directors and therefore not perfectly comparable with the results of this study. With respect to gender diversity, this study suggests that an average TMT should have one female (or male) director and five male (or female) directors. The optimal amount of female non-executive directors might be higher than the optimal amount of female executive directors in a team, because of their positive impact on monitoring (Adams & Ferreira, 2009). Litz and Folker (2002) found, based on a sample of US firms, that a female TMT presence higher than 40% has a positive effect on the firm profits. Also this result is higher than the optimal amount found in this study. The reason for this difference might be the consequence of country differences or method of measurement.

This study is not without limitations. First, the sample used in this study consists of large Western European firms. The reason for this is that measuring diversity requires detailed information about the top managers and their background. This information is easier to collect for larger firms than for smaller firms. However, the focus on larger firms limits the generalizability of the findings, because the relationship between diversity and financial performance might be different in smaller firms. Second, this study contains data originating from five countries – The Netherlands, Belgium, Germany, France, and Spain – and summarizes these five countries as Western Europe. Although these countries cover a large part of Western Europe, caution is needed. It might be interesting for future research to increase the number of Western European countries or to increase the number of observations for each country. In this study, the number of firms is limited for each country, because only firms listed on the main stock exchange are included. Third, this study uses only one measure for TMT diversity and financial performance, respectively the adjusted Blau index and Tobin's Q. Although these measures are commonly used in diversity studies, it might be interesting to investigate the strength of the relationship between diversity and

firm performance by using other measures. Fourth, diversity is conceptualized as variety in this study. Although this study recognizes the influences of diversity as separation and disparity, the measure that is used to calculate diversity (Blau's index) is based on diversity as variety. Blau's index is predominantly used for measuring the within-unit diversity of categorical data and seen as the best, but not perfect, available measure (Nüesch, 2009; Boone & Hendriks, 2009). The final limitation is that the TMTs examined in this research are not, on average, highly diverse. A stronger test of the hypothesized curvilinear relationship requires a sample of TMTs in which the full theoretical range of diversity (from zero to unity) can be assessed. At the management level, however, maximum theoretical diversity is rare in Western European firms.

Despite these limitations, this study contributes to the limited European evidence and reconciles inconsistent and non-conclusive findings from existing diversity studies. This study found some support for the business case for TMT diversity in Western Europe. It appears, however, that more diversity does not always lead to a better performance. Firms need to find a balance between the differences and similarities of top managers to maximize financial performance.

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Appendix I: Code book

The codes used for measuring the within-unit diversity of the TMT are:

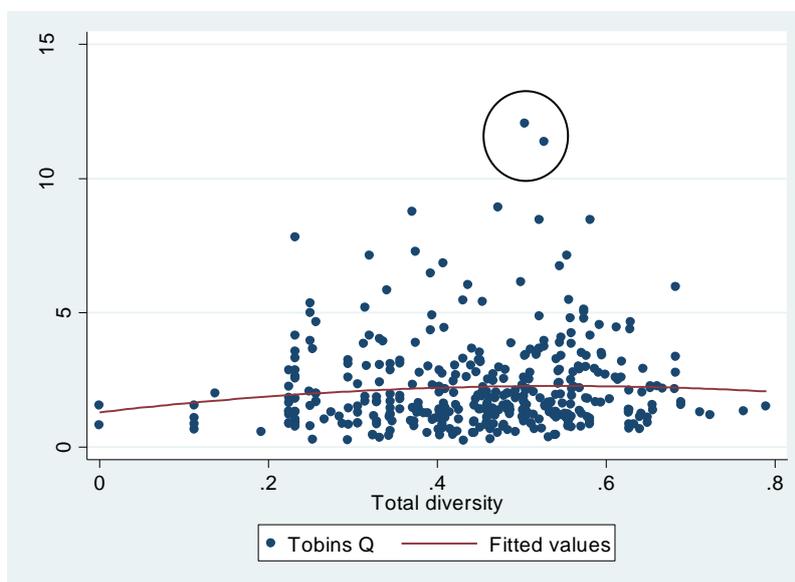
Variable	Code	Interpretation
Year	year	
Company	name company	
Index	name index	
Director	name director	
Current position	1	Chief Executive Officer
	2	Chief Financial Officer
	3	Chief Operating Officer
	4	Remaining TMT positions
Gender	1	Male
	2	Female
Nationality	0	Unknown
	1	Dutch
	2	German
	3	Belgian
	4	British
	5	French
	6	Italian
	7	American
	8	Swedish
	9	Swiss
	10	Spanish
	11	Austrian
	12	Australian
	13	Asian
	14	African
	15	Other
Year of birth	0	Unknown
	1	.. - 1940
	2	1941 - 1945
	3	1946 - 1950
	4	1951 - 1955
	5	1956 - 1960
	6	1961 - 1965
	7	1966 - 1970
	8	1971 - 1975
	9	1976 - ..
Kind of education	0	Unknown
	1	Law
	2	Economics and Business

	3	Technical*
	4	Psychology and sociology
	5	Political
	6	Other
Field of expertise	0	Unknown
	1	Commercial/ Marketing/Business
	2	Politics
	3	Technical
	4	Finance / Accountancy
	5	Banking/ Financial services
	6	ICT
	7	Investments
	8	Law
	9	Other

* Technical education includes: econometrics, mathematics, physics, chemistry, biology and mechanical engineering.

Appendix II: Outliers

The graph below shows the bivariate relation between firm performance and total diversity with a fitted quadratic curve. As can be seen in the graph, two observations deviate markedly from the other observations of the sample. These observations have an extreme value for firm financial performance (Tobin's Q > 10). The outliers are removed from the sample.



(Graph obtained from Stata statistical software)

Appendix III: TMT diversity

The table below shows the numbers underlying figure 2 and 3:

	2007	2008	2009
The Netherlands	0,4568	0,4920	0,4771
Gender	0,0349	0,0444	0,0375
Nationality	0,0967	0,1043	0,1047
Age	0,1161	0,1206	0,1207
Education	0,0931	0,1007	0,0950
Expertise	0,1160	0,1219	0,1192
Belgium	0,4760	0,4590	0,4671
Gender	0,0370	0,0333	0,0354
Nationality	0,0421	0,0469	0,0413
Age	0,1426	0,1458	0,1513
Education	0,1290	0,1088	0,1158
Expertise	0,1252	0,1242	0,1233
Germany	0,4505	0,4602	0,4655
Gender	0,0000	0,0029	0,0029
Nationality	0,0669	0,0716	0,0746
Age	0,1372	0,1363	0,1392
Education	0,1046	0,1064	0,1065
Expertise	0,1418	0,1430	0,1422
France	0,4456	0,4743	0,4860
Gender	0,0192	0,0311	0,0325
Nationality	0,0447	0,0481	0,0514
Age	0,1365	0,1419	0,1414
Education	0,1121	0,1176	0,1218
Expertise	0,1330	0,1356	0,1388
Spain	0,3879	0,3885	0,3849
Gender	0,0321	0,0348	0,0352
Nationality	0,0056	0,0067	0,0102
Age	0,1251	0,1224	0,1209
Education	0,1113	0,1090	0,0997
Expertise	0,1138	0,1155	0,1190
Average	0,4434	0,4548	0,4561
Gender	0,0247	0,0293	0,0287
Nationality	0,0512	0,0555	0,0564
Age	0,1315	0,1334	0,1347
Education	0,1100	0,1085	0,1078
Expertise	0,1260	0,1281	0,1285

Appendix IV: Correlations

The table below shows the correlations between the dependent, independent and control variables.

	1	2	3	4	5	6	7	8	9	10
1. Tobin's Q										
2. Gender diversity	0,0831									
3. Nationality diversity	0,0461	0,0141								
4. Age diversity	-0,0618	0,1488***	0,2061***							
5. Education diversity	0,0851*	0,1956***	0,0202	0,1673***						
6. Expertise diversity	-0,0065	0,1076**	0,1156**	0,2538***	0,2621***					
7. Total diversity	0,0626	0,5443***	0,5546***	0,5909***	0,5688***	0,5461***				
8. TMT size	0,0014	0,1104**	0,2354***	0,4865***	0,3290***	0,3447***	0,5131***			
9. Firm size	-0,2159***	-0,1851***	0,2250***	0,2942***	-0,0738	0,2123***	0,1519***	0,3616***		
10. Firm age	-0,1602***	-0,1210**	-0,0305	0,0140	0,0440	0,0172	-0,0361	-0,0306	0,1239*	

Note: Significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively.

