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## EDUCATED PROFESSIONALS ON BOARDS AT BORSA ISTANBUL

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### ABSTRACT

This study aims to investigate the educational backgrounds and professional expertise of the directors in firms quoted at Borsa Istanbul. The findings of the study reveal that, a higher percentage of directors with advanced degrees such as PhDs, serve on various board committees, and a higher percentage of them are assigned as independent directors to the boards, compared to directors of lower educational qualifications. In addition, the findings suggest that a higher percentage of directors, who are professional experts such as accounting experts, lawyers or professors, serve on various committees of the boards, and a higher percentage of them are assigned as independent directors to boards. In contrast, a lower percentage of professional experts with advanced educational degrees serve as CEOs or chairmen of boards. These results suggest that technical skills and knowledge of directors are valued highly by companies, whereas they are not as highly valued in top managerial positions.

## 1. INTRODUCTION

The aim of this study is to investigate various aspects of non-observable diversity such as educational background or professional expertise of directors of boards (Erhardt et al., 2003) of firms quoted at Borsa Istanbul, with an emphasis on the characteristics of directors, as well as their independence, busyness, share ownership and committee appointments. Educational backgrounds and expertise of directors would be expected to signal their *professionalism*, which is an important topic in emerging economies, where the majority of public firms are controlled by families or business groups (Ararat et al., 2010). These families and groups are often governed by family members that could potentially lack a professional management perspective. Thus, decisions in the boardroom would be made in the interest of families or groups. This situation could adversely affect the confidence of investors in companies and financial markets. Consequently, economic development of financial markets, which is vital for emerging economies, could be impaired. Therefore, an investigation of the level of professionalism emerges as an important topic for financial markets in emerging economies, such as the Turkish economy.

There is extensive research in management and corporate governance literature investigating the potential effects of the existence of directors with different educational backgrounds and professional expertise, on issues such as diversity and firm value. For instance, studies such as Carpenter and Westphal (2001), Westphal and Bednar (2005), Ruigrok et al. (2006), Jalbert et al. (2010), Anderson et al. (2011) and Dalziel et al. (2011) investigate topics related to the educational background of directors and top executives. On the other hand, Rosenstein and Wyatt (1990), Agrawal and Chadha (2005), DeFond et al. (2005), Jiang and Murphy (2007), Guner et al. (2008), Ferreira (2010), Anderson et al. (2011), Sili-Ciamarra (2012), Francis et al. (2014), and Litov et al. (2014) investigate topics related to the professional expertise of directors. However, the summary of discussions in these and other related studies regarding potential benefits and costs of existence of directors with different educational and occupational backgrounds are left to the following sections. One point that is noteworthy is the reason underlying the choice for the sample years covered in the study. The Principles of Corporate Governance (PCG) of Turkey, which introduced various mandatory requirements for public firms in terms of their corporate governance applications, improved the disclosure of public information by firms. Thus, following the effectiveness of PCG, it is possible to acquire detailed information about the directors of firms through the annual reports and official web pages of these firms.

In section 3, educational backgrounds of directors are investigated. The findings show that a lower percentage of directors with PhD degrees are females and are the chairmen of boards of directors, compared to directors with no PhDs. In addition, a higher percentage of these directors have degrees earned from institutions not located in Turkey. Also, a higher percentage of them are financial experts, lawyers, or professors. The findings also show that a higher percentage of these directors serve on audit, governance and risk committees of firms, and a higher percentage of them are independent directors. These results support arguments that advanced degrees could provide the directors with unique skills, which could lead them to be effective monitors. In terms of share ownership, these directors own fewer shares in firms. The findings in section 3 also show that substantially high percentage of directors with only a high school degree or lower are chairmen, compared to directors with higher degrees of education. In addition, a lower percentage of them are financial experts, accounting experts, lawyers or professors. Also, a lower percentage of them serve on audit, governance or risk committees, and a lower percentage of them are independent directors.

Lastly, the findings in section 3 show that a higher percentage of directors with degrees earned from institutions located outside of Turkey have PhDs and masters degrees, compared to directors with no degrees earned from foreign institutions. In addition, a higher percentage of these directors are financial experts. However, a lower percentage of them are accounting experts. Also, a lower percentage of directors with foreign education sit on audit and governance committees. Lastly, a lower percentage of them are independent directors. Based on these figures, it could be argued that companies do not value foreign education higher, compared to education in Turkey, and do not consider directors with degrees earned from foreign institutions as potentially better monitors.

In section 4, the professional expertise of directors is investigated. The findings show that a lower percentage of financial experts are CEOs, compared to directors that are not financial experts. In addition, a lower percentage of professional experts are chairmen of companies. In terms of the education degrees earned, a higher percentage of financial experts and professors, and a lower percentage of accounting experts have degrees earned from institutions located outside of Turkey, compared to other directors. Also, a higher percentage of financial experts, lawyers and professors have PhD degrees.

The findings in section 4 also show that a higher percentage of directors that are accounting experts, lawyers or professors sit on all three committees of the boards, compared to other directors. This evidence could be considered to suggest that companies potentially value professional expertise in committee appointments and a higher percentage of professional experts are assigned to committees. Similar patterns are observed for director independence. Also, a higher percentage of directors that are accounting experts, lawyers, or professors are assigned to boards as independent directors, who are expected to be more effective monitors compared to other directors. However, a similar situation is not observed for financial experts. Overall, the evidence could be considered to suggest that companies value professional experts, who have technical knowledge and skills, when they assign independent directors to their board. In terms of director busyness, a higher percentage of financial experts, accounting experts and professor are busy directors compared to other directors. On the other hand, professional experts have lower percentage of share ownership in firms.

The findings in section 4 also reveal that a lower percentage of directors with professional expertise are CEOs or chairmen of companies, compared to directors who do not have the professional expertise. In addition, a higher percentage of them have degrees earned from institutions located outside of Turkey, and a higher percentage of them have advanced educational degrees such as PhDs. Also, a higher percentage of professional experts are assigned to committees of the boards, and a higher percentage of them are independent directors. Overall, the findings in the study highlight the importance of advanced educational degrees and the expertise of directors on boards of public companies.

## **2. DATA**

In this study, hand-collected data gathered from the annual reports of firms and the official web pages of companies, is employed. Banks in Turkey are subject to different corporate governance related regulations, compared to other firms. Thus, banks that are quoted at Borsa Istanbul are excluded from the sample. This leaves a sample of 2079 board members for the end of year 2012, and 2066 board members for the end of year 2013. In addition, data for some of the variables employed in this study were not available for all the directors on the board of directors.

**Table 1: Descriptive Statistics for Directors**

<b>Director Characteristics</b>		
	<b>2012</b>	<b>2013</b>
<b>Number of Directors</b>	2079	2066
<b>PhD Degree</b>	181	186
<b>Masters Degree</b>	567	543
<b>College Degree</b>	1006	1016
<b>High School Degree or Lower</b>	91	86
<b>Foreign education</b>	778	753
<b>No Foreign education</b>	1062	1072
<b>Financial Expert</b>	745	769
<b>Not a Financial Expert</b>	1153	1105
<b>Accounting Expert</b>	210	213
<b>Not an Accounting Expert</b>	1675	1653
<b>Lawyer</b>	126	111
<b>Not a Lawyer</b>	1844	1825
<b>Professor</b>	119	119
<b>Not a Professor</b>	1850	1816
<b>Audit Committee Member</b>	551	559
<b>Governance Committee Member</b>	628	664
<b>Risk Committee Member</b>	236	487
<b>Average Membership Number</b>	3.32	3.45
<b>Independent Member</b>	607	613
<b>Busy Director</b>	171	195

In terms of the variables throughout the paper, share ownership states the percentage of shares owned by a director alone. The highest level of degree earned by a director is defined by the education level. Foreign education states whether a director has a degree earned from an institution not located in Turkey. A financial expert is a director who has been or currently is the CEO, or was/is on the board of a financial institution. A director is defined as an accounting expert if she is certified as a CPA or equivalent. Professor defines whether the director officially has or had a professor title, either on a tenure track or clinical position. Lawyer defines that a director is or was performing as an attorney in law. Membership number states the total number of firms that are not non-profit, on whose boards the director sits. A director is defined as an independent director if she meets the independence requirements defined in PCG. A busy director is an individual who is an independent director on the focal firm and is on the board of at least three different firms that are not non-profits (Fich and Shivdasani, 2006). The descriptive statistics regarding the sample are presented in Table 1. The Table shows that 186 of the directors have PhD degrees, whereas 543 have masters and 1016 have college degrees as the highest level of educational degree earned, at the end of 2013. 86 of the directors have high school degrees or lower education. The figures are similar for the end of 2012. In addition, among the directors in the samples, 769 are financial experts at the end of 2013. 213 are accounting experts, 111 are lawyers and 119 are professors.



These directors hold, on average, 3.45 and 3.32 board seats in for-profit firms, at the end of 2013 and 2012, consecutively. In addition, around 30 % of the directors are independent directors according to the PCG standards. At the end of 2013, approximately 9.43 % of the directors in the sample are busy directors. The average age of the directors in the sample, at the end of both years, is around 54.

### **3. EDUCATION**

Directors from various educational backgrounds could potentially provide positive effects of diversity in the boardroom such as enhanced creativity, different perspectives on important corporate issues, and distinct and unique sets of skills and leadership (Burgess and Tharenous, 2002; Carter et al., 2003; Arfken et al., 2004; Peterson and Philpot, 2007; Anderson et al., 2011; Dobbin and Jung, 2011). They could also provide the negative effects such as board members treating other boards members as out-group individuals, or the existence of potential conflicts and communication problems (Shin, 2012; Arioglu, 2014).

Other than these effects, the educational backgrounds of directors could be an important resource for firms in terms of potential external connections, which directors establish during their education or through their educational associations. However, as argued by Westphal and Bednar (2005), these affiliations could also potentially serve during the director appointment process as a result of in-group biases, which could potentially tend to increase pluralistic ignorance that in return might lead to poor firm performance.

In addition, levels of education and expertise gained by directors could affect their quality of advising and monitoring and scope of the input they bring to boardrooms (Ruigrok et al., 2006), as well as their actions in boardrooms. This, in return, could affect firm performance. In support of this argument, Anderson et al. (2011) show that even though managers prefer homogenous boards, shareholders value diversity in terms of educational background and there is a positive relationship between board heterogeneity and firm performance. Jalbert et al. (2010) provide evidence highlighting the importance of education of top executives in their career paths to the top. However, Gottesman and Morey (2006), and Bhagat et al. (2010) show that firms, whose CEOs have more prestigious educational backgrounds, do not outperform other firms.

What would be important is not only homogeneity of education in the boardroom, but also the highest levels of degrees earned by board members. Audretsch and Lehmann (2006) argue that an academic degree such as PhD could signal to superior quality of human capital of board members. A PhD could indicate that a director had spent a substantial amount of time in the academic environment, which had provided the director with valuable knowledge necessary for strategic decision making (Carpenter and Westphal, 2001). In accordance with this view, Dalziel et al. (2011) argue that advanced degrees such as PhDs could equip directors with extra skills that could be beneficial for the firm, especially in their R&D efforts.

Lastly, whether or not directors earned their degrees in institutions located in countries other than the home country, could be an important factor in the quality of decisions that they make.

When directors earn degrees in countries with cultural dynamics different from those of the home country, they could earn different cultural perspectives, which could potentially have positive effects on the way they think and solve problems. It should also be kept in mind that the education levels of directors would be important determinants of the occupational differences and expertise of the board members.

Results regarding the education levels of directors are presented in Appendix 1. In Appendix 1, comparisons in terms of significance are conducted in a manner that values of variables for the directors in the PhD, masters and college categories, as the highest level of degree earned, are compared with values of those variables for directors, who have a lower level of education. For example, the values of variables for directors with master degrees are compared with values of the same variables for directors, who have only college degrees or lower degrees. For the category of directors with high school degree or lower levels of education, values are compared with the values for directors, who have either PhDs, masters or college degrees.

What is observed in Appendix 1 is that at the end of 2013, 186 directors had PhD degrees, whereas 543 directors had master degrees as the highest degree earned. 1016 of directors in the sample, at the end of 2013, had college degrees as the highest level of degree earned, and 86 of them had high school degree or a lower degree. Appendix 1 also shows that a significantly lower percentage of directors with PhD degrees, 3.23 %, are females, compared to other directors. This could be an outcome of the fact that, women did not have the opportunity to follow academic careers as often as men did in the past. The Table also shows that a significantly lower percentage of directors with PhD degrees, 5.98 %, are the chairmen of boards of directors, compared to other directors. This could be an outcome of the fact that a higher percentage of directors with PhDs are appointed to the boards as independent directors, who are expected to be more effective monitors, which is also a trait expected from directors with high levels of education (Ruigrok et al., 2006). Thus, their effectiveness in monitoring the chairmen of boards might be highly valued.

Compared to the group of directors with no PhD degrees, a higher percentage of directors with PhDs have degrees earned from institutions not located in Turkey, 60.75 %. In addition, a higher percentage of them are financial experts, 55.91 %, and a higher percentage of them are lawyers, 11.83 %. Also, a higher percentage of them are professors, 50.00 %. However, a lower percentage of them are accounting experts, 6.99 %. The observation that significantly higher percentage of them is financial experts could be considered in support of the argument that advanced degrees help directors become better qualified. On the other hand, the fact that half of directors with PhDs are professors could also be considered in the same manner. However, it should be noted that a PhD is traditionally required to become a tenure track professor, and thus, this observation should not be surprising.

Appendix 1 also presents the percentage of directors with PhDs that serve on various board committees. 50.27 % of directors with PhDs serve on audit committees, whereas 47.03 % of them serve on governance committees, and 37.30 % of them serve on risk committees. All three of these boards exist in companies in order to provide oversight over boards and these results suggest that directors with advanced degrees are considered to have unique skills that would help them be more effective monitors.

In addition, Appendix 1 shows that directors with PhDs serve on fewer boards, 2.68 boards on average, compared to other directors. They are also, on average, older than other directors.

This could be an outcome of directors spending longer periods of time on their educational careers and joining workforce at older ages. In addition, half of these directors are professors and in academia, it takes long time for professors to set their reputations and thus, they could be appointed to boards at older ages. As mentioned earlier, a significantly higher percentage of directors, 53.22 %, are independent directors. This could be an outcome of the view that these directors with advanced degrees are highly qualified, and therefore, could serve as more effective monitors, compared to other directors. In terms of share ownership in firms, these directors own significantly fewer shares in firms, 0.46 %, compared to other directors. Since the PCG requires a director not to own more than 1.00 % of shares of companies, in order to be considered as independent, and almost half of the directors with PhDs are independent directors, this could be considered as a natural outcome.

In addition, Appendix 1 presents findings regarding directors with masters degrees as the highest level of educational degree earned. 543 of the directors, at the end of 2013, in the sample have master degrees. In terms of the ratio of these directors that are female, foreigner, or CEOs and chairmen in the focal firms, they do not differ significantly from directors with lower levels of education. However, a significantly higher percentage of them have degrees earned from foreign institutions, around 70 %. This could be an outcome of directors joining highly reputable executive MBA programs in other countries, especially in the US, at some point during their careers. In addition, a higher percentage of them are financial experts, 44.92 %. This figure, in addition to the observation regarding directors with PhDs, could be considered to suggest that directors with high levels of education are valued highly, and thus, are hired by financial institutions, where technical skills would be expected to be more vital. Also, a lower percentage of these directors are accounting experts, 8.12 %, and a higher percentage of them are professors, 2.58 %. Surprisingly, what is observed in Appendix 1 is that a higher percentage of directors with master degrees are not appointed to either audit committees, governance committees or risk committees of firms.

Appendix 1 also shows that directors with masters degrees, on average, sit on boards of more companies, 4.17 companies, compared to directors with lower levels of education. Also, a significantly higher percentage of these directors are not appointed to boards as independent directors. In terms of age, directors with master degrees are younger than directors with lower degrees. On average, they are 53.21 years old. Lastly, these directors own, on average, 1.41 % of the shares of the company, which is significantly less compared to the share ownership of directors with lower degrees of education. Average share ownership by directors with high school degree or lower is 8.75 % and this could help explain the observation just mentioned. It could be possible that directors with degrees lower than master degree, especially those with high school degree or lower, are older directors, who are potentially the entrepreneurs who founded the companies, rather than pursuing professional careers.

Thus, their share ownership in companies is significantly higher, compared to directors with more advanced degrees. The last two columns of Panel B of Appendix 1 support this argument.

Appendix 1 also presents findings regarding directors with only college degrees. 1016 of the directors in the sample, at the end of 2013, have only bachelor degrees earned from colleges.

In terms of their professional expertise and appointments in various board committees, the figures suggest that compared to directors with no college degrees, a higher percentage of these directors are professional experts. In addition, a higher percentage of them serve on board committees. Also, a higher percentage of them are independent directors, who are also busy directors. These figures could be considered as evidence suggesting that companies value some form of higher education in their board of director appointments. Also a significantly lower percentage of them are chairmen in companies. Potential causes of this situation are discussed in the following paragraphs. To summarize, 12.52 % of directors with only college degrees are chairmen in firms, 11.22 % of them are foreigners, 25.32 % of them have degrees earned at institutions located outside of Turkey, and 37.52 % of them are financial experts. In addition, 14.97 % of them are accounting experts, whereas 5.74 % of them are lawyers, and 28.15 % of them serve on audit committees. Also, 33.30 % of them serve on governance committees, and 25.33 % serve on risk committees. 30.51 % of them are independent directors and 10.64 % of them are busy. Lastly, the average shares owned by them in companies are 2.13 %.

Lastly, Appendix 1 also presents findings regarding directors with a high school degree or a lower degree. Compared to directors with higher degrees of education, surprisingly, a substantial percentage of directors with only a high school degree or lower education are chairmen of the boards, 30.95 %. Once again, this could potentially be an outcome of them being founders of companies, and elder members of controlling families, who could be considered as lacking technical skills earned through higher education, but still possess valuable entrepreneurial skills and on-the-job experiences and skills. In addition, 25.58 % of them are financial experts, whereas 2.33 % are accounting experts and none of them are professors or lawyers. These figures are significantly lower, compared to directors with higher levels of education.

Appendix 1 also shows that 14.46 % of these directors serve on audit committees. 19.28 % serve on governance, and 14.47 % serve on risk committees. All of these figures are significantly lower, when compared to the figures for remaining directors. These observations could be considered to suggest that companies value higher levels of education of directors when appointing them to various committees of the boards. Also, in support of effective monitoring arguments, a significantly lower percentage of directors with high school degree or lower are independent directors, 13.95 %. As discussed earlier, their average share ownership is 8.75 %. Lastly, none of these directors are busy directors, even though on average, they sit on the boards of 3.45 for-profit companies. Thus, the busyness figure is an outcome of the requirement in the busyness definition, where the director is required to be independent in order to be considered busy. The figures for the end of 2012 are very parallel to the results discussed so far.

Next, I present findings regarding directors with degrees earned in foreign institutions and domestic institutions, in Table 2. What is observed in Table 2 is that at the end of 2012, 778 directors had foreign education, whereas 753 of directors on public firms' boards had degrees earned from institutions located outside of Turkey at the end of 2013. The Table also shows that in terms of chairmen or CEO positions, directors with foreign education do not differ significantly from other directors, at the end of both years. Not surprisingly, a significantly higher percentage of them, 25.9 % are foreigners, at the end of 2013.

Among directors who have foreign educational backgrounds, a significantly higher percentage of them have PhD and masters degrees, 15.01 % and 50.73 %, consecutively. On the other hand, 34.00 % of them have college degrees. These figures should not be surprising as it could be argued that individuals that earn degrees abroad would prefer to do so at further stages of their educational careers.

**Table 2: Foreign Education of Directors**

	2012		2013	
	Foreign Education	No Foreign Education	Foreign Education	No Foreign Education
<b>Number of Directors</b>	778	1062	753	1072
<b>Female</b>	11.05 %	11.21 %	10.62 %	10.63 %
<b>CEO of the Firm</b>	6.30 %	8.29 %	6.77 %	7.84 %
<b>Chairman</b>	13.92 %	15.26 %	13.72 %	14.73 %
<b>Foreigner</b>	***25.19 %	0.28 %	***25.9 %	0.28 %
<b>PhD Degree</b>	***14.78 %	6.21 %	***15.01 %	6.81 %
<b>Masters Degree</b>	***51.80 %	15.35 %	***50.73 %	14.93 %
<b>College Degree</b>	***33.16 %	69.96 %	***34.00 %	70.43 %
<b>High School or Lower</b>	***0.26 %	8.48 %	***0.26 %	7.83 %
<b>Financial expert</b>	***45.78 %	34.54 %	***46.65 %	37.14 %
<b>Accounting Expert</b>	***5.97 %	15.26 %	***7.10 %	14.58 %
<b>Lawyer</b>	5.66 %	7.00 %	5.44 %	6.06 %
<b>Professor</b>	***8.61 %	4.54 %	***8.37 %	4.85 %
<b>Audit Committee Member</b>	***24.47 %	30.75 %	***23.19 %	31.74 %
<b>Governance Committee Member</b>	***27.37 %	35.05 %	***28.15 %	36.52 %
<b>Risk Committee Member</b>	12.68 %	12.61 %	25.07 %	25.24 %
<b>Average Membership Number</b>	**3.66	3.21	**3.84	3.31
<b>Age</b>	*53.61	54.87	54.35	54.97
<b>Independent Member</b>	***26.09 %	32.38 %	***25.23 %	33.76 %
<b>Busy Director</b>	11.26 %	9.14 %	12.34 %	9.92 %
<b>Share Ownership %</b>	***1.15 %	2.65 %	***1.24 %	2.64 %

\*\*\*, \*\*, and \* present significance at 1 %, 5 %, and 10 % levels.

Table 2 also shows that a higher percentage of these directors are financial experts, 46.65 %, compared to directors with no foreign education, whereas a significantly lower percentage of them are accounting experts, 7.10 %.

Surprisingly, the Table also shows that a significantly lower percentage of directors with foreign education serve on audit and governance committees. The figures are 23.19 % and 28.15 %, consecutively. A similar situation is observed in terms of the percentage of directors that are independent. 25.23 % of directors that have foreign educational backgrounds are independent directors. This figure is significantly lower, compared to other directors. Thus, based on these figures, one could argue that companies do not value foreign education more highly and do not consider directors with degrees earned from foreign institutions as potentially better monitors. Similar patterns are observed for the end of 2012.

Overall, the findings presented so far highlight the importance of advanced educational degrees, such as PhDs, as well having at least a college degree, in terms of having professional expertise, committee memberships and director independence. However, the same cannot be stated for degrees earned from institutions located outside of Turkey.

#### **4. PROFESSIONAL EXPERTISE**

Potential benefits and costs of board heterogeneity discussed in the previous section could also apply to diversity in terms of professional expertise. However, there could be some other potential costs and benefits that are unique to the professional expertise of directors. In this section, I first discuss the importance of board members with financial/accounting expertise. After the financials scandals of the last decade, the Sarbanes-Oxley Bill was adopted in the US. Following the Bill, companies in US markets are required to have at least one financial expert in their audit committees. However, in Turkish capital markets, such requirements do not exist.

One could argue that committee members without the financial expertise would be less likely to detect accounting-related problems, such as financial reporting problems (Agrawal and Chadha, 2005). Also, better understanding of accounting principles and financial statements could have a positive effect on the oversight provided by the board (Guner et al., 2008). In addition, directors with financial and accounting expertise could be more sensitive to financial issues of the firm. They could also monitor the financial performance of the company more effectively, compared to non-expert directors (Anderson et al., 2011; Dalziel et al., 2011).

On the other hand, if a banker joins the board of a firm, this could signal to the market the confidence of the bank that the firm is not likely to experience financial distress (Kroszner and Strahan, 2001). In addition, directors with financial expertise could create opportunities for firms to have access to specific investors and could be more involved in supplying capital for companies (Dalziel et al., 2011). If an employee of a financial institution, which has a lending relationship with the firm, joins board of the firm, the financial expert might conduct more effective monitoring that would be beneficial for both the firm and the financial institution (Ferreira, 2010). This situation could alter the financial decisions and the financial outcomes for firms as well. Sisli-Ciamarra (2012) provide evidence suggesting that when an employee of a financial creditor is on the board of a company, this leads to increased debt in the firm's financial mix as a result of increased private debt, as well as decreased cost of debt.

Thus, the characteristics of a financial expert and her external ties would be an important factor on the potential effects of her existence on the firm's board. However, when the financial expert is tied to a financial institution, it is possible that the lending financial institution could have enhanced bargaining power with the firm and could potentially deal for stricter collateral and covenant requirements, as a result of the informational advantage gained through the director (Sisli-Ciamarra, 2012).

If the firm is financially constrained, the financial experts on the board could be beneficial in creating access to more funds for the potential value-creating investments of the firm. However, it should be kept in mind that these extra funds would not necessarily be used in the best interest of shareholders.

They could be provided just in the interest of the financial institution, which would affect the wealth of shareholders negatively (Guner et al., 2008). Another potential downside is based on the argument of Agrawal and Chadha (2005). The researchers argue that existence of financial or accounting experts might lead audit committee members to pay less attention to specific issues. In this case, if the financial expert is not monitoring effectively, this could even lead the audit committee to be less effective in detecting accounting related problems.

In empirical studies, Rosenstein and Wyatt (1990) provide evidence suggesting that significant abnormal returns are observed, when outside directors with financial expertise are added to boards. DeFond et al.'s (2005) evidence is suggestive of positive reactions following the appointment of an accounting or financial expert to the audit committee of the boards. Krishnan and Gnanakumar (2008) show that accounting expertise of members of audit committees leads to enhanced monitoring and accounting conservatism. Chan and Li (2008) show that financial experts have a positive effect on firm value. Guner et al. (2008) find that financial experts in the boardroom affect corporate decisions. However, the effects are in the interest of their own institutions. In addition, firms that have investment bankers on the boards do worse in terms of acquisitions. Anderson et al. (2011) find that occupational heterogeneity has a positive influence on firm performance and that shareholders value this type of heterogeneity. On the other hand, Van Ness et al. (2010) provide evidence suggesting that as the number of financial and accounting experts on boards increase, firm performance is affected negatively.

Next, I discuss the importance of the existence of another type of professional expertise in boards: academicians. Based on the view that independent board members have positive influence on firm value (Hermalin and Weisbach, 1991; Arioglu and Kaya, 2014), academic directors could be likely to affect corporate governance and firm value positively, since they are mostly outside directors by nature (Francis et al., 2014). In addition, academic directors' knowledge of specific concepts in their fields of expertise could lead them to be better advisors for board decisions (Forbes and Milliken, 1999). Academicians could be expected to consider problems in a scientific approach and these different perspectives could be useful in the decision making and problem solving processes of the board. Also, they are trained to be critical thinkers with unique opinions and judgments (Jiang and Murphy, 2007).

Additionally, these directors could have an important resource-dependence role and the external links of the board could increase, as the occupational diversity of the board increases (Hillman et al., 2002). In accordance with these potential benefits, Francis et al. (2014) show that 40 % of S&P 1500 firms have at least one academician on their boards. The existence of academicians, who are scientists in nature, could be expected to be value-enhancing especially in the case of firms that focus on technology and invest heavily in R&D, since these scientists could bring external scientific knowledge to the firm (Audretsch and Lehmann, 2006). In addition, the existence of academicians on board could have other potential effects on issues such as compensation policy, CEO turnover, corporate innovation, acquisitions and earnings quality (Francis et al., 2014).

However, academicians might be more concerned about scholar research instead of important factors for success in business, which could lead them to devote majority of their time to scientific research (Jiang and Murphy, 2007; Francis et al., 2014).

They could also be expected to lack on-the-job experience, which is important in the improvement of skills required for high-quality management. Therefore, their existence in management could have adverse effects on firm value as well. Supportive of this argument, Francis et al. (2014) provide evidence suggesting that academicians with administrative positions in the firms are associated with lower firm performance. Also, Van Ness et al. (2010) provide evidence suggesting that as the number of academicians on boards increase, firm performance is affected negatively.

Lastly, I discuss the importance of the existence of lawyers in the boards of firms, on which there is very limited research in corporate governance literature. To begin with, intuitively, one could argue that directors with expertise in law and regulations could benefit the firm not only when the firm is subject to law suits, but also before the firms takes any actions that could be subject of potential lawsuits. These could include issues that would arise in relationships with customers, suppliers, or even the firm's own employees.

A director, who is a lawyer, could spot any potential issues that could cause legal concerns for the firm. In addition, she could provide the boardroom with a perspective that could not be provided in a setting without the existence of a lawyer. Also, she could help deal with legal and regulatory problems as they emerge. In the instance that firms have valuable assets such as patents, lawyer-directors could be beneficial in the protection of those assets (Litov et al., 2014). However, in terms of the potential costs related to the existence of lawyers on the boards of firms, Litov et al. (2014) argue that she might be less effective in monitoring the actions of the boards that she is a member of. This could be expected as a result of the possibility that lawyer-directors lack necessary firm-specific information about the complexity of the operations of the company.

Litov et al. (2014) provide evidence suggesting that firms with lawyers on the boards of directors are associated with significant increases in firm value. In addition, Litov et al. show that existence of lawyer-directors affects the CEO risk taking incentives and the existence of entrenchment provisions such as poison pills. In terms of characteristics of these lawyer-directors on a large sample of public firms in the US, the researchers show that these directors are mostly independent male directors, with board appointments in two other public firms, on whose various committees they stand.



Around one-fourth of these directors are on audit and governance committees, whereas one-third of them are on risk management committees. In another study, Gray and Nowland (2014) show that the shareholders of companies benefit from the existence of professionals such as lawyers, accountants, consultants and bankers, in the boardroom.

Findings of this study regarding the professional expertise of directors on boards are presented in Appendix 2 and Table 3. Appendix 2 shows that, at the end of 2013, 769 of the directors in the sample are categorized as financial experts. On the other hand, 213 of them are categorized as accounting experts, whereas 111 are lawyers and 119 are professors. A significantly lower percentage of these financial experts are CEOs of firms, whereas a lower, but insignificant, percentage of accounting experts, lawyers and professors are CEOs in firms. This evidence could be considered to suggest that firms do not value professional expertise highly when they assign CEOs.

In terms of chairmen of companies, what is observed is that a significantly lower percentage of professional experts are chairmen of companies. Financial experts are the exception this time, since, even though a lower percentage of them are chairmen, the difference is not statistically significant, compared to other directors. 12.52 % of financial experts are chairmen in companies, whereas this figure is 4.23 %, 3.67 %, and 2.52 % for accounting experts, lawyers and professors, consecutively. This evidence suggests that companies do not consider directors with professional expertise as more effective leaders, when assigning them to the position of the chairmen of the board. This could be a potential outcome of a belief that professional expertise and related skills are not sufficient enough to manage the board. Alternatively, it could be an outcome of chairmen being members of families or controlling groups, and that these controlling parties do not delegate authority to professionals.

In terms of the education degrees earned by the directors in the sample, what is observed from Appendix 2 is mixed evidence. A significantly higher percentage of financial experts and professors have degrees earned from institutions located outside of Turkey, compared to other directors. The percentages of these directors with foreign education are 46.71 % and 54.78 %, consecutively. The percentage of lawyers, 38.68 %, with foreign education, however, is not significantly different, compared to other directors. On the other hand, a significantly lower percentage of directors that are accounting experts, have degrees earned from institutions located outside of Turkey, 25.36 %.

In terms of educational degrees earned by the professional experts, Appendix 2 shows that, at the end of 2013, a significantly higher percentage of financial experts, lawyers and professors, 13.95 %, 21.05 % and 79.51 %, have PhD degrees. However, this figure is not significantly different for lawyers, compared to non-lawyers. In terms of master degrees, no category of professional experts in the sample has a significantly higher percentage of directors with master degrees. This evidence could be considered to suggest that, only advanced degrees such as PhDs could potentially have effects on the likelihood of directors having professional expertise. Still, this is just an observation and such a relationship could be investigated in future studies, in a causal manner.

Some surprising findings are observed in Appendix 2, in terms of committee appointments of directors with professional expertise.

29.45 % of the directors, who are financial experts, serve on audit committees, whereas 34.95 % serve on governance committees, and 27.23 % serve on risk committees. Compared to other directors, a significantly higher percentage of financial experts are not assigned to any of the three committees of the boards. These figures are surprising, since one could expect a significantly higher percentage of these directors to sit on board committees, especially on audit committees, since these directors would be expected to have more advanced technical financial skills that would lead them to be more effective monitors. However, this expectation is fulfilled in the case of accounting experts. A significantly higher percentage of them sit on board committees. 45.89 % of the directors, who are accounting experts, serve on audit committees, whereas 51.21 % serve on governance committees, and 35.27 % serve on risk committees. This evidence could be considered to suggest that companies value accounting expertise in committee appointments highly. Such an expertise would be vital, especially in the functioning of the audit committee, and companies appear to be aware of this.

Similar patterns are observed for lawyers and professors, in terms of their committee appointments, compared to other directors.

Overall, the evidence suggests that companies potentially value professional expertise in committee appointments and a higher percentage of professional experts are assigned to these committees, except financial experts. One could potentially argue that the exception of financial expertise should not be surprising since the other three professions require some additional technical skills and knowledge, whereas the definition of financial expertise does not include such requirements. It is possible that director X sits on the board of a financial company, not because she has superior financial skills, but because she is a family member. However, this would not qualify her as an accounting expert, a lawyer, or a professor.

What is observed from Appendix 2, in terms of independence, is that a significantly higher percentage of directors, who are accounting experts, lawyers, or professors, are assigned to boards as independent directors, who are expected to be more effective monitors, compared to other directors. 47.89 % of accounting experts are independent directors, whereas 53.15 % of lawyers and 70.59 % of professors are independent directors. A similar situation, however, is not observed for financial experts. Once again, this evidence could be considered to suggest that companies value professional experts, who have technical knowledge and skills, when they assign independent directors to their boards, compared to other directors.

**Table 3: Professional Experts vs. Non-Experts**

	2012		2013	
	Professional Experts	Non-Experts	Professional Experts	Non-Experts
<b>Number of Directors</b>	953	951	966	915
<b>CEO of the Firm</b>	***5.35 %	9.15 %	***5.49 %	9.18 %
<b>Chairman</b>	***10.96 %	17.90 %	***10.81 %	17.50 %
<b>Foreign education</b>	**45.08 %	39.36 %	**43.68 %	38.32 %
<b>PhD Degree</b>	***16.41 %	33.90 %	***16.27 %	3.85 %
<b>Masters Degree</b>	29.32 %	32.56 %	29.65 %	29.93 %
<b>College Degree</b>	51.96 %	56.25 %	*51.39 %	59.29 %
<b>High School or Lower</b>	***2.29 %	7.78 %	**2.67 %	6.91 %
<b>Financial expert</b>	78.91 %		80.35 %	
<b>Accounting Expert</b>	22.60 %		22.49 %	
<b>Lawyer</b>	13.27 %		11.50 %	
<b>Professor</b>	12.53 %		12.33 %	
<b>Audit Committee Member</b>	***34.29 %	21.53 %	***33.96 %	22.24 %
<b>Governance Committee Member</b>	***35.72 %	28.16 %	***38.36 %	27.52 %
<b>Risk Committee Member</b>	***14.91 %	10.18 %	***29.76 %	20.11 %
<b>Average Membership Number</b>	**3.52	3.22	**3.73	3.24
<b>Independent Member</b>	***36.23 %	23.01 %	***36.23 %	24.04 %
<b>Busy Director</b>	**11.88 %	7.56 %	***13.50 %	7.98 %
<b>Share Ownership %</b>	***1.28 %	2.71 %	***1.47 %	2.56 %

\*\*\*, \*\*, and \* present significance at 1 %, 5 %, and 10 % levels.

In terms of director busyness, it is observed that a significantly higher percentage of financial experts, accounting experts and professors are busy directors, compared to other directors. On the other hand, Appendix 2 shows that professional experts, except financial experts, have a significantly lower percentage of share ownership in firms. The average share ownership by accounting experts is 0.38 %, whereas it is 0.61 % and 0.05 % for lawyers and professors, consecutively. If companies considered share ownership by directors as a mechanism to align the interests of directors and shareholders, one could argue that companies do not feel the need to provide such incentives to professional experts. This would be valid if they believe that those professionals would be more effective monitors, as a result of their knowledge and skills earned. Still, this could be an outcome of the fact that a high percentage of these directors are independent directors and the PCG require independent directors not to own more than 1.00 % of shares in companies. For the end of 2012, we observe similar patterns.

In Table 3, I compare characteristics of various appointments of professional experts to non-experts. However, I define a director with any one of the following expertise as a professional expert: financial expert, accounting expert, lawyer or professor. Results presented in Table 3 are supportive of the previous arguments made, based on the figures presented in Appendix 2. As observed in Table 3, at the end of 2013 a significantly lower percentage of directors with professional expertise are CEOs or chairmen of companies, compared to directors who do not have the professional expertise.

5.49 % of professional experts are CEOs and 10.81 % of them are chairmen in companies. In addition, a significantly higher percentage of them have degrees earned from institutions located outside of Turkey, 43.68 %, and a higher percentage of them have advanced educational degrees such as PhDs, 16.37 %.

In terms of committee appointments, a significantly higher percentage of professional experts are assigned to committees of the boards, compared to other directors. 33.96 % of them are assigned to audit committees, whereas 38.36 % of them are assigned governance committees, and 29.76 % are assigned risk committees. In addition, a significantly higher percentage of them are independent directors, compared to other directors, 36.23 %, whereas a significantly higher percentage of them are busy directors, 13.50 %. Lastly, their average share ownership is significantly lower, 1.47 %, compared to directors who are not professional experts. Overall, results presented in Table 3 are supportive of the previous arguments made, based on the figures presented in Appendix 2 regarding the importance of professional expertise of directors.

## **5. CONCLUSIONS**

In this study I investigate the educational background and professional expertise of directors in firms quoted at National and Secondary markets of Borsa Istanbul. I put an emphasis on whether or not directors from various educational and professional backgrounds are the CEOs or chairmen of firms, as well as board committees on which they serve, and their independence, busyness, and share ownership. These topics are important in understanding whether or not companies in an economy such as the Turkish economy, where majority of public firms are controlled by families or business groups, appoint educated professionals to their boards of directors.

The main findings reveal that, compared to other directors, a higher percentage of directors with advanced degrees such as PhDs, serve on various board committees, and are assigned as independent directors to boards. A similar situation is observed for directors with at least a college degree, compared to directors who have high school degrees or lower education. However, the same cannot be stated for directors that have degrees earned from institutions located outside of Turkey, compared to other directors. The findings also reveal that a higher percentage of directors, who are accounting experts, lawyers or professors serve on various board committees, and they are assigned as independent directors. The same cannot be stated for financial expertise.

Based on these findings, one could potentially argue that advanced levels of education and professional expertise, which could lead directors to develop unique skills and technical knowledge over important corporate issues, are valued more highly by public companies. Even though a majority of companies quoted at Borsa Istanbul are controlled by families or controlling groups, they still appoint educated professionals as board committee members or independent directors, which are expected to provide effective monitoring. Directors that are assigned to committees and those who are independent hold those positions with the expectation that they could be better monitors providing superior oversight to the board of directors of companies. Based on this assumption, it is possible to argue that educated professionals are considered more effective monitors by public firms in Turkey.

A surprising finding in the paper is that a lower percentage of directors, who have advanced educational degrees or who are professional experts, are assigned as the CEO or the chairmen of the companies. This could be an outcome of the preferences by the controlling families or groups. They could potentially be appointing educated experts to positions, where unique skills and experiences could be important in monitoring effectiveness. And they could be assigning family members or employees of controlling groups as top executives or head of boards that could require superior managerial skills, as opposed to technical skills.

The findings in the paper show that, even though there are no mandatory regulations about the technical expertise of directors and their committee appointments, as opposed to US markets, public companies in Turkey still value and appoint educated experts to important committee positions. However, it should be kept in mind that these educated professionals would not necessarily lead to increased firm performance or enhanced shareholder wealth. These professionals could potentially be more beneficial in companies dealing with more technical issues, such as technology companies, whereas similar results might not be observed in other companies. After all, as argued by Coles et al. (2008), just as one optimal board size might not fit every firm, educated professionals might not be value-creating for all types of firms.

In future studies, researchers can investigate causally how the existence of educated professional affect firm value in regression settings considering potential endogeneity problems. In addition, they could investigate the market reaction given to the appointments or departures of these directors to boards, in event study settings.

Also, they could estimate the likelihood of educated professional directors being appointed to boards of public firms, or being appointed as busy directors to other firms' boards, following certain corporate events.

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## Appendix 1: Director Education

	PANEL A: 2012							
	PhD Degree	Lower Degree	Masters Degree	Lower Degree	College Degree	Lower Degree	High School or Lower	Higher Degree
<b>Number of Directors</b>	181	1664	567	1097	1006	91	91	1754
<b>Female</b>	***4.42 %	11.84 %	12.35 %	11.58 %	**11.03 %	17.58 %	**17.58 %	10.78 %
<b>CEO of the Firm</b>	5.52 %	7.69 %	8.64 %	7.20 %	7.36 %	5.49 %	5.49 %	7.58 %
<b>Chairman</b>	***5.03 %	15.63 %	*17.89 %	14.47 %	***13.25 %	28.09 %	***28.09 %	13.90 %
<b>Foreigner</b>	11.60 %	10.69 %	11.64 %	10.20 %	***11.03 %	1.10 %	***1.1 %	11.29 %
<b>Foreign education</b>	***63.54 %	39.99 %	***71.2 %	23.80 %	***25.77 %	2.20 %	***2.2 %	44.39 %
<b>Financial expert</b>	***56.91 %	37.37 %	***41.06 %	35.43 %	***36.78 %	20.88 %	***20.88 %	40.28 %
<b>Accounting Expert</b>	*7.73 %	11.73 %	***7.24 %	14.10 %	***15.2 %	2.20 %	***2.2 %	11.82 %
<b>Lawyer</b>	***13.81 %	5.62 %	*4.24 %	6.34 %	***6.93 %	0.00 %	***0.00 %	6.77 %
<b>Professor</b>	***49.17 %	1.57 %	***2.65 %	1.01 %	1.10 %	0.00 %	***0.00 %	6.60 %
<b>Audit Committee Member</b>	***52.87 %	25.31 %	23.91 %	26.05 %	***27.21 %	11.69 %	***11.69 %	28.77 %
<b>Governance Committee Member</b>	***44.25 %	30.35 %	29.01 %	31.05 %	***31.88 %	20.78 %	**20.78 %	32.23 %
<b>Risk Committee Member</b>	***19.54 %	11.83 %	11.69 %	11.92 %	**12.36 %	6.49 %	**6.49 %	12.88 %
<b>Average Membership Number</b>	***2.47	3.51	***3.81	3.34	3.33	3.54	3.54	3.39
<b>Age</b>	*55.77	54.15	***52.58	54.95	*54.77	56.87	**56.87	54.18
<b>Independent</b>	***54.70 %	27.01 %	25.57 %	27.76 %	***29.14 %	11.62 %	***11.62 %	30.62 %
<b>Busy Director</b>	***18.01 %	9.17 %	9.94 %	8.79 %	***9.62 %	0.00 %	***0 %	10.57 %
<b>Share Ownership %</b>	***0.47 %	2.18 %	***1.49 %	2.53 %	***1.97 %	8.77 %	***8.77 %	1.66 %

\*\*\*, \*\*, and \* present significance at 1 %, 5 %, and 10 % levels.

## Appendix 1: Director Education (Cont'd)

## PANEL B: 2013

	PhD Degree	Lower Degree	Masters Degree	Lower Degree	College Degree	Lower Degree	High School or Lower	Higher Degree
<b>Number of Directors</b>	186	1645	543	1102	1016	86	86	1745
<b>Female</b>	***3.23 %	11.43 %	11.23 %	11.52 %	**11.12 %	16.28 %	**16.28 %	10.32 %
<b>CEO of the Firm</b>	4.84 %	7.72 %	*9.58 %	6.81 %	6.99 %	4.65 %	4.65 %	7.56 %
<b>Chairman</b>	***5.98 %	15.20 %	*17.76 %	13.94 %	***12.52 %	30.95 %	***30.95 %	13.45 %
<b>Foreigner</b>	11.83 %	10.70 %	11.05 %	10.53 %	***11.22 %	2.33 %	***2.33 %	11.23 %
<b>Foreign education</b>	***60.75 %	39.05 %	***70.48 %	23.52 %	***25.32 %	2.32 %	***2.32 %	43.19 %
<b>Financial expert</b>	***55.91 %	39.35 %	***44.92 %	36.58 %	**37.52 %	25.58 %	***25.58 %	41.82 %
<b>Accounting Expert</b>	**6.99 %	12.02 %	***8.12 %	13.97 %	***14.97 %	2.33 %	***2.33 %	11.97 %
<b>Lawyer</b>	***11.83 %	5.13 %	4.61 %	5.38 %	***5.74 %	0.00 %	***0 %	6.04 %
<b>Professor</b>	***50.00 %	1.34 %	***2.58 %	0.73 %	0.79 %	0.00 %	***0 %	6.61 %
<b>Audit Committee Member</b>	***50.27 %	25.67 %	*22.82 %	27.09 %	***28.15 %	14.46 %	***14.46 %	28.86 %
<b>Governance Committee</b>								
<b>Member</b>	***47.03 %	31.43 %	29.87 %	32.22 %	***33.30 %	19.28 %	***19.28 %	33.70 %
<b>Risk Committee Member</b>	***37.30 %	23.68 %	22.08 %	24.49 %	**25.33 %	14.47 %	**14.47 %	25.60 %
<b>Average Membership</b>								
<b>Number</b>	***2.68	3.61	***4.17	3.34	3.34	3.45	3.45	3.52
<b>Age</b>	**56.61	54.49	***53.21	55.12	*54.87	57.97	**57.97	54.55
<b>Independent</b>	***53.22 %	27.66 %	*24.49 %	29.22 %	***30.51 %	13.95 %	***13.95 %	31.06 %
<b>Busy Director</b>	16.76 %	10.25 %	11.22 %	9.78 %	***10.64 %	0.00 %	***0 %	11.47 %
<b>Share Ownership %</b>	***0.46 %	2.24 %	***1.41 %	2.64 %	***2.13 %	8.75 %	***8.75 %	1.73 %

\*\*\*, \*\*, and \* present significance at 1 %, 5 %, and 10 % levels.

## Appendix 2: Director Professional Expertise

PANEL A: 2012								
	Financial Expert	Non- Financial Expert	Accounting Expert	Non- Account. Expert	Lawyer	Non- Lawyer	Professor	Non- professor
<b>Number of Directors</b>	745	1153	210	1675	126	1844	119	1850
<b>CEO of the Firm</b>	**5.64 %	8.32 %	4.76 %	7.70 %	**2.38 %	7.75 %	5.04 %	7.57 %
<b>Chairman</b>	13.06 %	15.35 %	***3.33 %	15.91 %	***4.03 %	15.08 %	***1.68 %	15.21 %
<b>Foreign education</b>	***49.23 %	37.72 %	***22.22 %	44.78 %	37.29 %	42.75 %	***58.36 %	41.34 %
<b>PhD Degree</b>	***14.36 %	7.03 %	**6.87 %	10.43 %	***21.18 %	9.17 %	***77.39 %	5.34 %
<b>Masters Degree</b>	32.35 %	30.05 %	***19.82 %	32.81 %	**20.33 %	31.88 %	***13.04 %	32.03 %
<b>College Degree</b>	50.62 %	56.31 %	***71.73 %	52.31 %	58.48 %	54.52 %	***9.56 %	57.26 %
<b>High School or Lower</b>	**2.67 %	6.61 %	**1.58 %	4.45 %	***0.00 %	4.43 %	***0.00 %	5.34 %
<b>Financial expert</b>			***60.58 %	36.05 %	36.36 %	39.38 %	***54.7 %	38.16 %
<b>Accounting Expert</b>	***17.31 %	7.13 %			*6.67 %	11.44 %	13.04 %	11.01 %
<b>Lawyer</b>	5.94 %	6.69 %	3.81 %	6.68 %			9.24 %	6.21 %
<b>Professor</b>	***8.64 %	4.60 %	7.14 %	5.97 %	8.73 %	5.86 %		
<b>Audit Comm. Member</b>	29.74 %	26.64 %	***49.51 %	25.23 %	***41.13 %	27.07 %	***68.1 %	25.32 %
<b>Governance Comm. Member</b>	32.24 %	31.72 %	***48.04 %	29.82 %	***43.55 %	31.29 %	***49.13 %	30.93 %
<b>Risk Comm. Member</b>	13.93 %	11.68 %	**17.65 %	12.05 %	15.32 %	12.12 %	**19.82 %	11.84 %
<b>Average Membership #</b>	***3.77	3.13	3.23	3.39	**2.64	3.39	**2.28	3.41
<b>Independent Member</b>	*32.26 %	27.77 %	***49.28 %	26.99 %	***44.44 %	28.45 %	***70.59 %	26.78 %
<b>Busy Director</b>	***12.33 %	7.99 %	***18.13 %	8.63 %	*5.30 %	9.80 %	***25.71 %	8.45 %
<b>Share Ownership %</b>	*1.58 %	2.27 %	***0.39 %	2.22 %	***0.43 %	2.15 %	***0.06 %	2.17 %

\*\*\*, \*\*, and \* present significance at 1 %, 5 %, and 10 % levels.

## Appendix 2: Director Professional Expertise (Cont'd)

PANEL B: 2013								
	Financial Expert	Non- Financial Expert	Accounting Expert	Non- Account. Expert	Lawyer	Non- Lawyer	Professor	Non- Professor
Number of Directors	769	1105	213	1653	111	1825	119	1816
CEO of the Firm	**5.72%	8.42%	4.69%	7.68%	9.91%	11.07%	5.04%	7.43%
Chairman	12.52%	15.21%	***4.23%	15.45%	***3.67%	14.79%	***2.52%	14.94%
Foreign education	***46.71%	37.20%	***25.36%	43.12%	38.68%	41.42%	***54.78%	40.35%
PhD Degree	***13.95%	7.66%	**6.70%	10.74%	***21.05%	9.54%	***79.51%	5.44%
Masters Degree	*32.61%	27.85%	***21.16%	30.93%	**23.88%	30.07%	***12.76%	30.88%
College Degree	*50.46%	58.50%	***70.92%	52.91%	55.06%	55.43%	***7.72%	58.64%
High School or Lower	*2.97%	5.98%	***1.22%	5.42%	***0.00%	4.95%	***0.00%	5.03%
Financial expert			***60.66%	38.12%	34.91%	41.42%	***58.11%	39.90%
Accounting Expert	***16.91%	7.52%			**5.71%	11.75%	11.30%	11.42%
Lawyer	4.82%	6.26%	*2.82%	5.99%			*9.24%	5.50%
Professor	***8.85%	4.44%	6.10%	6.17%	*9.91%	5.92%		
Audit Comm. Member	29.45%	27.12%	***45.89%	25.89%	***50.00%	26.77%	***69.49%	25.33%
Governance Comm. Member			***51.21%	30.76%	***44.55%	32.31%	***53.38%	31.62%
Risk Comm. Member	*27.23%	23.49%	***35.27%	23.86%	30.91%	24.32%	***39.83%	23.65%
Average Membership #	***4.06	3.11	*3.11	3.55	***2.54	3.55	*2.94	3.53
Independent Member	31.86%	28.96%	***47.89%	27.77%	***53.15%	28.66%	***70.59%	27.37%
Busy Director	***14.38%	8.32%	***19.51%	9.66%	10.28%	10.66%	***25.00%	9.64%
Share Ownership %	1.78%	2.17%	***0.38%	2.27%	**0.61%	2.22%	***0.05%	2.27%

\*\*\*, \*\*, and \* present significance at 1 %, 5 %, and 10 % level



## APPLYING FUZZY ANALYTIC HIERARCHY PROCESS FOR EVALUATING SERVICE QUALITY OF PRIVATE SHOPPING WEBSITE QUALITY: A CASE STUDY IN TURKEY

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### Keywords:

E-Commerce,  
Web Site Quality,  
Web Site Selection,  
Multi Criteria Decision  
Making

### Jel Classification:

C44, D81, M15

### ABSTRACT

The e-commerce is one of the most significant developments in Internet application. In order to be successful in the e-commerce, marketplace organizations will require to provide high quality web sites that attract and retain users. Usability is one of the most crucial factors for evaluating the quality of the website. Hence, the evaluation methods for the effectiveness of the e-commerce web sites are critical issues in both practice and research. Private shopping is one of the concepts that serve as a members-only online shopping platform with deep discounts and well-known brands. The study has investigated four private shopping web sites which are the most famous private shopping web sites in Turkey with proposed method. In this paper, a fuzzy analytic hierarchy process (FAHP) approach is employed for evaluating the e-commerce websites, which can tolerate vagueness and uncertainty of judgment. Therefore, the insufficiency and imprecision problems associated with the conventional AHP can be solved. Hence, websites can be evaluated more reasonably. To do so, experts' opinions and literature are considered. Totally 50 qualitative factors are identified. Only 22 of the most important factors are included in the questionnaires provided for interview in the research.

## 1. INTRODUCTION

The world is changing rapidly in order that business transactions, negotiation, settlement and business deals are changing excessively. Electronic buying and selling replace traditional commerce. The e-commerce has a potential to alter channels in the whole structure of businesses such as increasing business efficiency, enhancing information flows, improving transaction speed, wider geographical spread and etc (Harrison and Waite, 2006, 1002-1003). A gate to exhibit our identification in this virtual place is websites, because of this reason the number of brick and mortar organization selling costly and complex goods that are launching online initiatives to compete with pure-play online retailers' increase more and more every day (Ethier vd., 2006, 627) Customer has a significant role in B2C and allocated as a part of it. Nowadays the creation of customer-centered website becomes more crucial. Trying to comprehend customer expectation and values about the websites become essential indeed (Zhang and von Dran, 2001, 9).

Many companies investigate a great deal of money on their commercial websites. It is principal for companies to apprehend more about their websites for instance, how many visitors they have or how often they purchase and etc. Lots of companies lose great deal of budget just because they do not apprehend how their websites should be qualified.

Today with this huge amount of competitors, all companies should have qualified websites since it is somehow essential to perceive that companies who benefit their websites for transaction, website quality may have a major impact on the number of visitors (Auger, 2005, 119-123). Today, companies have to have high quality websites since the website quality may positively influence on the number of customers in present competitive market (Auger, 2005,123-124). Now this question shall be replied that "what causes customer satisfaction in a website?" the response is quality or in the better structure, the website quality not only can have a major impact on number of visitors (Auger, 2005, 119) but also can cause customer satisfaction. The higher website quality is, the higher business performance will be (Lee and Kozar, 2006, 1383). Loiacono et al 2002; Aladwani and Palvia 2002; Ranganathan and Ganapathy 2002; Liu and Arnett 2000 focus on the technical quality of the Web site. Some define the Web site quality in terms of the service quality provided to the consumers (Zeithaml et al. 2002, 364-365). Key dimensions investigated for the web site quality include: design, content, entertainment, usability, reliability, interactivity, security, and privacy (Song and Zinkhan, 2003, 106).

The intention of this paper is to expose the entire interpretation of the website quality and to clarify the parameters which affect it just to light upon a way to increase it and in follow to reserve a higher position for companies in the e-commerce.

The private shopping business model has flourished and thrived in a short time and become one of the most outstanding electronic commerce models. Some of the private shopping sites are Markafoni, Limango, Trendyol, Morhipo, to name but a few. The number and variety of private shopping platforms increased progressively reaching above 17 as of today.

Making sales format that goes in paralel with the world via the website has ganined a new direction in Turkey, too."Private shopping" conceptualized by the Turkish private shopping club private shopping or selling on the internet in an accelerating system has soared. With approximately 6.5 million users online shop in 2013 and foreseen that this number will reach to 22 million. Private shopping system started with Markafoni, Limango and has continued with Trendyol in Turkey. According to the Economist magazine, the largest companies in the field of these three large companies, Vipdukkán, the Bingomingo, Clubboon, Alamarka, Markalonga, Bedava.com, Bankomarka.com private shopping sites also initiated operations. This private shopping site of intense interest by the users. Shopping sites also have to make a new entry to the sector (Ekonomist, 2011, 46).

Paper organized as follows: Section 2 summarizes existing literature related with web site selection and evaluation. Section 3 describes fuzzy set theory and fuzzy AHP method. Section 4 presents and interprets the empirical findings on the evaluation of private shopping web site quality. In the last section presents conclusion of the study and suggestions for the future research.

## **2. LITERATURE REVIEW**

When reviewing the literature regarding the evaluation of the websites and designating the best website, it is seen that fuzzy AHP approach is used frequently.

Deng and Wang (2008) analyzed the characters of the E-commerce information system, and built up an evaluation indices which can be divided into 3 levels, 4 aspects, includes 20 detail indices. After that, it designated AHP and fuzzy evaluation method, carried out an integrative evaluation.

Liu, Kwon and Kang (2007) a fuzzy analytic hierarchy process (FAHP) approach was designated to evaluate the e-commerce websites, which can tolerate vagueness and uncertainty of judgment. Authors divided a website's quality into four aspects as follows: Website basic technique, Web page design, Website information/content, Website function/service.

Lin (2010) evolved an evolution model that integrates triangular fuzzy numbers and analytic hierarchy process to evolve a fuzzy evaluation model which prioritized the relative weights of course website quality factors. Firstly, author conducted a review of the literature on course website quality to generate 16 sub-criteria along with four criterias applied to measure course website quality. Secondly, a fuzzy AHP approach was adopted to determine the relative weights linking the above criteria between high and low online learning experience groups.

Kong and Liu (2005) aimed to expose the key factors that affect achievement in the E-commerce employing fuzzy AHP, and convey an evaluation method for the E-commerce in order to support researches and managers to determine the drawbacks and opportunities. Trust, System quality, Content quality, Online service, Use criteria used to evaluate the E-commerce web site.

Li and Chen (2010) introduced an AHP-Fuzzy method. Six top B-to-B commercial websites were selected as models of evaluation. Authors set up an indicator system which included three main indicator systems and 10 sub-indicators.

Chen (2011) explored the digital capital measures of automated cargo clearance business website. The content analysis and fuzzy analytic hierarchy process were employed while collecting and analyzing the data. The research subject was TradeVan, a semi-government controlled web-based service provider. This study has identified four dimensions to measure the digital capital of business website that is Internet relational capital, Internet customer capital, Internet innovative capital, and Internet service capital.

Li and Chen (2009) proposed fuzzy analytical hierarchy process (FAHP) approach to evaluate online bookstores. Research consists of five major criteria that are identified to achieve the overall goal. Specifically, the five major criteria are price, reputation, website features, service and quality.

Ip et al. (2010) The aim of this research was to develop a scientific model that integrated a set of website evaluation dimensions for evaluating websites performance. Unlike previous studies, this research proposed a novel framework for evaluating the website performance by employing Fuzzy Analytic Hierarchy Process (Fuzzy AHP).

Ellatif and Saleh (2008) developed an assessment method to evaluate the critical achievement factors of E-bank portals employing Fuzzy AHP & VBA, and convey an evaluation method to analyse five quality dimensions: access, web site interface, trust, attention and credibility.

Fei and Yu (2009) presented a fuzzy multiple-criteria decision making method — Fuzzy Analytic Hierarchy Process based on trapezoidal fuzzy numbers as the evaluation method to evaluate the public satisfaction of e-government.

Wang, Li and Tian (2010) established an evaluation index system of food enterprise websites from the perspective of user's experience based on the website localization and the current literature, and employed analytic hierarchy process to determine the weight of each level index, and established the fuzzy comprehensive evaluation model of enterprise websites, and carried out a case study with the evaluation index system.

Jun and Yu (2008) presented fuzzy analytic hierarchy process model to measure the e-commerce web sites' performance. The study has investigated three web sites the relative significance of the site quality, information quality, transaction capability.

Ip, Law and Lee (2012) adopted a sophisticated approach that analyzes the weights of hotel website functionality. This approach involved triangular fuzzy numbers and an analytic hierarchy process to evolve a fuzzy analytic hierarchy process (AHP) model which prioritizes the relative signification of the hotel website functionality criteria. A fuzzy AHP approach was used to examine the relative signification of the criteria and sub-criteria of the hotel website functionality evaluation.

Li and Pang (2011) proposed an AHP-based multi-level fuzzy comprehensive evaluation model for business website assessment. Effectiveness of business, Information of business, Design of business, Availability of system, efficiency of system as the first indexes in the study.

### **3. DATA AND METHODOLOGY**

#### **3.1. Fuzzy Sets**

The concept of fuzzy set is introduced firstly by Zadeh (1965). According to Zadeh(1965) a fuzzy set is a class of objects with a continuum of grades of membership. Such a set is characterized by a membership function which assigns to each object a grade of membership ranging between zero and one (Zadeh, 1965, 338).

Fuzzy logic which is apprehended as multi-valued logic is employed to define and transformation to notable values of the human judgement under uncertainty and dynamic system modeling. Fuzzy logic is employed in many distinct fields such as house tools, robotics, automation, image service, space and defence. Since human judgement and behaviour are so complex and not be estimated in certain numerical values, usage of certain values to define service and production system in real-world do not convey appropriate outcomes (Zeydan and Çolpan, 2009). For this reason fuzzy set theory with linguistic variables are commonly employed to shape optimal decisions under the uncertainty environment.



Fuzzy sets were proposed to represent the degree of elements belonging to the specific sets. Instead of employing the characteristic function as a mapping function, a fuzzy subset;

$\tilde{A}$  of a universal set  $X$  can be defined by its membership function  $\mu_{\tilde{A}}(x)$  as

$$\tilde{A} = \{ (x, \mu_{\tilde{A}}(x)) \mid x \in X \},$$

Where  $x \in X$  denotes the elements belonging to the universal set, and

$$\mu_{\tilde{A}}(x): X \rightarrow [0,1] \text{ (Tzeng and Huang, 2011, 7).}$$

Linguistic variables are the variables whose values are words or sentences in a **natural** or artificial language. Linguistic variables are stated with the effective values such as very high, very good, good, high, normal, very low and very bad (Cheng et al., 2005, 562). Linguistic idioms some like low, middle, high are natural representation of the judgments. These characteristics express the applicability of fuzzy set theory in constitution of preference structure of decision makers. Fuzzy set theory assists to measure uncertainty in concepts via subjective judgments of human being. Further to that, in group decision making, evaluation materialize as a result of evaluators’ view concerning the linguistic variables and this evaluation should be performed under the uncertain and fuzzy environment (Saghafian and Hejazi, 2005, 2).

In the literature, it is seen that the most widely employed fuzzy numbers are triangular and trapezoidal ones. Especially the fuzzy numbers, which we employ in this study, is the most preferred one due to the ease of calculation. The triangular fuzzy numbers can be denoted by  $(l, m, u)$ . Its membership function  $\mu_M(x): R \rightarrow [0,1]$  is equal to

$$\mu_M(x) = \left\{ \begin{array}{ll} \frac{x}{m-l} - \frac{l}{m-l}, & x \in [l, m], \\ \frac{x}{m-u} - \frac{u}{m-u}, & x \in [m, u], \\ 0, & \text{otherwise,} \end{array} \right\} \tag{1}$$

Where  $l \leq m \leq u$ ,  $l$  and  $u$  stand for the lower and upper value of the support of  $M$  respectively, and  $m$  for the modal value. Consider two triangular fuzzy numbers  $M_1$  and  $M_2$ ,  $M_1=(l_1, m_1, u_1)$  and  $M_2=(l_2, m_2, u_2)$ . Their operational laws are as follows:

$$1. \quad (l_1, m_1, u_1) \oplus (l_2, m_2, u_2) = (l_1 + l_2, m_1 + m_2, u_1 + u_2),$$

$$\begin{aligned}
 & (l_1, m_1, u_1) \otimes (l_2, m_2, u_2) \\
 2. \quad & = (l_1 l_2, m_1 m_2, u_1 u_2) \\
 & \quad (2)
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & (\lambda, \lambda, \lambda) \otimes (l_1, m_1, u_1) = (\lambda l_1, \lambda m_1, \lambda u_1) \\
 & \lambda > 0, \lambda \in R
 \end{aligned}$$

$$4. \quad (l_1, m_1, u_1)^{-1} = (1/u_1, 1/m_1, 1/l_1) \text{ (Chang, 1996, 650).}$$

AHP is the most commonly employed multi decision making methods in the literature. The main shortcoming of this method is the impact of the uncertainty on decision criteria. However, employing fuzzy set theory can overcome this problem.

**3.2. Fuzzy AHP Method**

In our study, we use Chang’s (1996, 1999) extent analysis method to select and evaluate the web site quality. Chang’s (1996, 1999) extent analysis can be portrayed as it follows:

$X = \{x_1, x_2, \dots, x_n\}$  be an object set, and  $U = \{u_1, u_2, \dots, u_m\}$  be a goal set.

In extent analysis, each subject is taken in order to accomplish a goal. By this way each subject has a m extent analysis value as the following:

$$\begin{aligned}
 & M_{gi}^1, M_{gi}^2, \dots, M_{gi}^m, \quad i = 1, 2, \dots, n \\
 & \quad (3)
 \end{aligned}$$

Where all the  $M_{gi}^j$  ( $j = 1, 2, \dots, m$ ) are triangular fuzzy numbers. Fuzzy synthetic extent value for i-th subject can be defined as:

$$\begin{aligned}
 1. \text{ Step: } & S_i = \sum_{j=1}^m M_{gi}^j \otimes \left[ \sum_{i=1}^n \sum_{j=1}^m M_{gi}^i \right]^{-1} \\
 & \quad (4)
 \end{aligned}$$

Here  $S_i$  denotes synthesis value of i.th goal. To calculate  $\sum_{j=1}^m M_{gi}^j$  value, m extent analysis values are calculated by employing fuzzy addition and then a matrix is obtained.

$$\begin{aligned}
 \sum_{j=1}^m M_{gi}^j & = \left( \sum_{j=1}^m l_j, \sum_{j=1}^m m_j, \sum_{j=1}^m u_j \right) \\
 & \quad (5)
 \end{aligned}$$

From this point of view, to calculate  $\left[ \sum_{i=1}^n \sum_{j=1}^m M_{gi}^j \right]^{-1}$ ,  $M_{gi}^j$  ( $j = 1, 2, \dots, m$ ) values and then the transpose of this vector are calculated as:

$$\left[ \sum_{i=1}^n \sum_{j=1}^m M_{gi}^j \right]^{-1} = \left[ \frac{1}{\sum_{i=1}^n u_i}, \frac{1}{\sum_{i=1}^n m_i}, \frac{1}{\sum_{i=1}^n l_i} \right] \tag{6}$$

2. Step: While  $\tilde{M}_1$  and  $\tilde{M}_2$  are two triangular fuzzy numbers, the probability degree of following equation  $\left[ (\tilde{M}_1 = l_1, m_1, u_1) \vee e(\tilde{M}_2 = l_2, m_2, u_2) \right] \tilde{M}_2 \geq \tilde{M}_1$  is defined as:

$$V(\tilde{M}_2 \geq \tilde{M}_1) = \sup_{y \geq x} [\min(\mu_{m_1}(x), \mu_{m_2}(y))] \tag{7}$$

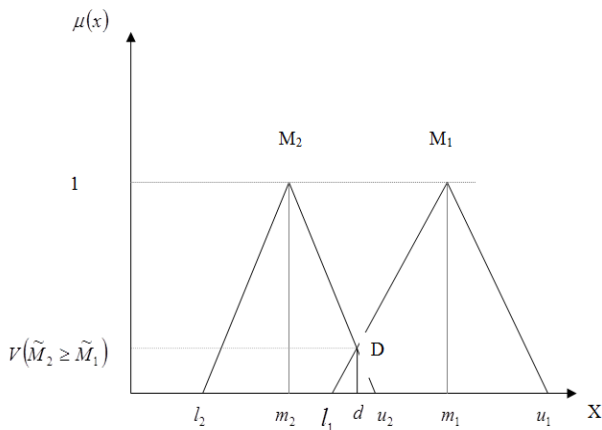
Between two fuzzy numbers like  $\tilde{M}_1$  and  $\tilde{M}_2$ , the probability of the case in which  $\tilde{M}_2$  is greater than  $\tilde{M}_1$  and other cases can be displayed as:

$$V(\tilde{M}_2 \geq \tilde{M}_1) = \text{hgt}(\tilde{M}_1 \cap \tilde{M}_2) = \mu_m(d)$$

$$= \begin{cases} 1, & \text{if } m_2 \geq m_1 \\ 0, & \text{if } l_1 \geq u_2 \\ \frac{l_1 - u_2}{(m_2 - u_2) - (m_1 - l_1)}, & \text{others} \end{cases} \tag{8}$$

Where d is the ordinate of the highest intersection point D between  $\mu_{m_1}$  and  $\mu_{m_2}$

Figure 1: Intersection point D between  $\mu_{m_1}$  and  $\mu_{m_2}$



3. Step: The degree possibility for a convex fuzzy numbers to be greater than k convex fuzzy numbers  $M_i (i = 1, 2, \dots, k)$  can be defined by

$$\begin{aligned}
 &V(M \geq M_1, M_2, \dots, M_k) \\
 &= V[(M \geq M_1) \text{ and } (M \geq M_2) \text{ and } \dots \text{ and } (M \geq M_k)] \\
 &= \min V(M \geq M_i), \quad i = 1, 2, \dots, k
 \end{aligned}
 \tag{9}$$

Assume that

$$d'(A_i) = \min V(S_i \geq S_k)
 \tag{10}$$

for  $k = 1, 2, \dots, n; k \neq i$  then the weight vector is given by

$$W' = (d'(A_1), d'(A_2), \dots, d'(A_n))^T
 \tag{11}$$

Where  $A_i (i = 1, 2, \dots, n)$  are n elements.

4. Step: Via normalization, we get the normalized weight vectors

$$W = (d(A_1), d(A_2), \dots, d(A_n))^T
 \tag{12}$$

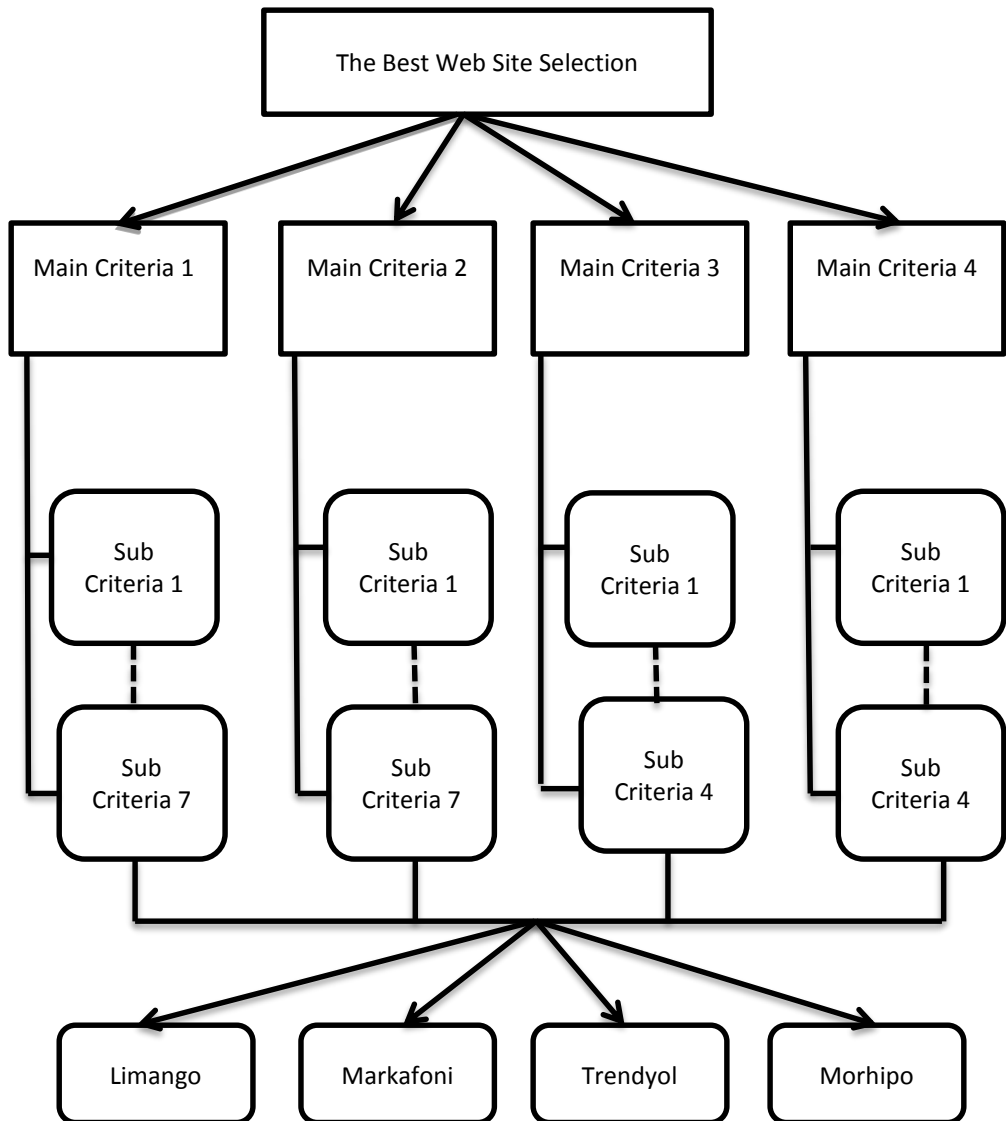
Where w is a nonfuzzy number.

#### 4. RESULTS AND IMPLICATIONS

In the study, the service quality given via the largest four e-commerce sites in Turkey was evaluated by fuzzy AHP. In accordance with the opinions of the related literature and experts, four main and 22 sub evaluation criteria were determined. Evaluations criterias used in the study are summarized in Appendix 1.

In the context of the main and sub criterias, the hierarchical structure of study is as follows.

**Figure 2: The Hierarchical Structure of the Study**



Criteria are evaluated by a team of three persons of software professionals who are engaged in web site design and made shopping from relevant sites before based on the following scale (Wang and Chen, 2008, 3758).

**Table 1: Fuzzy Linguistic Evaluation Scale**

Linguistic Variables	Triangular Fuzzy Scale	Triangular Fuzzy Reciprocal Scale
Equally Important	(1,1,1)	(1/1, 1/1, 1/1)
Weakly Important	(1,3,5)	(1/5, 1/3, 1/1)
Essentially Important	(3,5,7)	(1/7, 1/5, 1/3)
Very Strong Important	(5,7,9)	(1/9, 1/7, 1/5)
Absolutely Important	(7,9,9)	(1/9, 1/9, 1/7)

In the study, the consistency of pairwise comparison matrices expresses in linguistic variables are evaluated via using Kwong and Bai (2003) 's approach. In this approach, the number of triangular fuzzy  $(4m + s + u) / 6$  subjected to defuzzification by formula is converted to a number of not blurred and consistency check is performed. Consistency control with Non-fuzzy numbers are done in the same way as Classical AHP. In this study, all created on the criteria and alternatives in matrix consistency rate is less than 0,10 and All matrices were consistent. The main criteria based on pairwise comparison of fuzzy evaluation matrix is the same as in table 2.

**Table 2: Fuzzy Evaluation Matrix in terms of Main Purpose**

	Inf. Qual.		Sys. Qual.			Serv. Qual.			Ven. Sp.Q.			
Inf. Qual.	1,000	1,000	1,000	0,342	0,693	1,710	0,135	0,189	0,342	0,231	0,251	0,281
Sys. Qual.	0,585	1,442	2,924	1,000	1,000	1,000	0,585	0,843	1,442	0,131	0,164	0,251
Serv. Qual.	2,924	5,278	7,399	0,693	1,186	1,710	1,000	1,000	1,000	0,164	0,231	0,523
Ven. Sp.Q.	3,557	3,979	4,327	3,979	6,082	7,612	1,913	4,327	6,082	1,000	1,000	1,000

Weight vector of table 3 as a  $W_{aim} = (0.000 \ 0.031 \ 0.328 \ 0.641)^T$  is calculated. Afterwards, the main criteria are evaluated in terms of their sub-criteria, sub-criteria weight vector is calculated.

**Table 3: The Sub-criteria Weight Vectors in terms of Main Criterias**

Main Criterias	Weight Vectors
Information Quality	$W_{Inf.Qual.} = (0.2031, 0.0458, 0.2051, 0.1572, 0.1179, 0.1380, 0.1330)^T$
System Quality	$W_{Syst.Qual.} = (0.0000, 0.0183, 0.0000, 0.7521, 0.0960, 0.1335, 0.0000)^T$
Service Quality	$W_{Serv.Qual.} = (0.4104, 0.0000, 0.3094, 0.2802)^T$
Vendor Specific Quality	$W_{Ven.Sp.Qual.} = (0.0000, 0.1554, 0.7025, 0.1421)^T$

When the main criteria are examined in terms of weight vector of the sub criteria, Legibility criteria in terms of Information Quality, Security criteria in terms of System Quality, Reliability criteria Service Quality, Price Saving criteria in terms of Vendor Specific Quality have the highest importance weights. After calculating the weights of sub-criteria, in terms of each sub-criteria evaluation of alternatives the pairwise comparison matrix is created. For instance, the pairwise comparison matrix in terms of coherence sub-criteria evaluation of alternatives is as follows.

**Table 4: The Evaluation of the Alternatives in terms of the Coherence Sub-Criteria**

	Lim an.	Mar kaf.	Tre nd.	Mo rhi.								
Liman go	1,0 000	1,0 000	1,0 000	0,48 07	0,5 228	0,5 848	0,5 228	0,5 848	0,6 934	1,0 000	1,4 422	1,7 100
Mark afoni	1,7 100	1,9 129	2,0 801	1,00 00	1,0 000	1,0 000	1,0 000	1,4 422	1,7 100	1,7 100	1,9 129	2,0 801
Trend yol	1,4 422	1,7 100	1,9 129	0,58 48	0,6 934	1,0 000	1,0 000	1,0 000	1,0 000	1,4 422	1,7 100	1,9 129
Morhi po	0,5 848	0,6 934	1,0 000	0,48 07	0,5 228	0,5 848	0,5 228	0,5 848	0,6 934	1,0 000	1,0 000	1,0 000

Weight vector of table 4 as a  $W_{Coherence} = (0.0000, 0.6185, 0.3815, 0.0000)^T$  is calculated.

Belonging to other sub-criteria evaluation of alternatives as a result of the weight vectors are as follows in Appendix 2.

Finally, weight vectors obtained by combining the weight values are calculated for each alternative in Appendix 3.

As a result of the analyses conducted in accordance with expert opinions, vendor specific quality criteria (0.64064) has the highest weight was found in four main criteria affecting the quality of the website. Service quality (0.32819), system quality (0.03117) and information quality (0.00000) are followed in Appendix 3.

As a result of the evaluation of the alternatives, in terms of the website quality, Limango (0.27533) has the highest importance weight e-commerce site was found. Morhipo (0.26301), Markafoni (0.26299) and Trenyol (0.19867) are followed in Appendix 3.

## **5. CONCLUSION**

The web is growing at a dramatic place and is significantly impacting customer and business market behaviors. As a result, most firms have initiated flourishing marketing strategies for the web. The best idea to improve the electronic commerce in Turkey is to uncover how to compose commercial website attractive enough to attract customers? The rapid growth of e-commerce in the 1990s was met with widespread adoption and acceptance by consumers and retailers alike (Kalakota & Whiston, 1997). Indeed, the rapid growth in e-commerce sales through the 2000s has remained strong as reflected by the total yearly sales through e-commerce channels that grew from \$27.6 billion in 2000 to \$143.4 billion in 2009 (White & Ariguzo, 2011).

In the study, the quality of four e-commerce company web sites which operate in Turkey and have the highest sales volume have been analyzed with fuzzy AHP approach.

In this study, the reason of the fuzzy set theory utilization, dealing with uncertainty in the absolute values (crisp values) instead of working with discrete values (interval values) are more efficient and accurate results. When evaluating the quality of Web sites, the utilization of the relevant literature and expert opinions 4 main and 22 sub-criterias were identified. The main criteria affecting the quality of the Web site are determined as the information quality, system quality, service quality, and vendor specific quality.

As a result of the analysis of the main criteria, the most significant factor affecting the quality of the website is the vendor specific quality. Service quality, system quality and information quality are followed. despite the fact that Morhipo is the most crowned company in terms of the main criteria Service quality, system quality and information quality, Limango has been detected as the most crowned company in terms of four main criteria. As mentioned earlier, the reason of this is the high significance weights of the vendor specific quality criteria. Limango, morhipo, markafoni and Trendyol are followed. Companies having low weight score in the context of the main and sub-criteria should overcome their shortcomings.

In the study, four e-commerce company web sites which have the highest sales volume and operate in Turkey have been analyzed. Studies can be performed on a greater number of e-commerce companies. Fuzzy AHP approach is proposed to assess the quality of service of websites. In future studies, TOPSIS (Technique for Order Preference by Similarity to Ideal Solutions), DEA (Data Envelopment Analysis), ELECTRE (Elimination et Choix Traduisant la Realite), VIKOR (Vise Kriterijumska Optimizacija I Kompromisno Resenje) etc. multi-criteria decision making methods can be employed individually or integrated perspective. It could be possible for further research to compare affected parameters on website quality both in Turkey with the advanced countries that purchasing through the web is somehow the easiest way of purchasing, to find how to increase the quality of commercial website in Turkey. Also it is possible to compare two of the most important private shopping websites in Turkey in order to comprehend which factors may cause accomplishment or which factors may encourage people to purchase through the internet. Further research is to



measure the parameters of website quality of Turkish private shopping websites in order to increase them and in follow to get progress in sale as accomplished websites like advanced countries.

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### Appendix 1: Evaluation Criterias

Main Criterias	Sub Criterias
<b>Information Quality:</b> The quality of the information that the system produces and delivers	<ul style="list-style-type: none"> <li>- Coherence (Refers to the degree to which the environmental landscape hangs together, easy to understand &amp; clear)</li> <li>- Complexity (Richness of the elements in a setting)</li> <li>- Legibility (Distinctiveness, by possessing a memorable component, a landmark, a scene facilitates finding one's way)</li> <li>- Mystery (Enhances one's desire to explore a space by conveying the feeling that much more can be found if one keeps on going)</li> <li>- Relevance (Relevant depth and scope, and completeness of the information)</li> <li>- Usefulness (Website has lots of benefits for users)</li> <li>- Specialization (Adjusted Related information)</li> </ul>
<b>System Quality:</b> System performance in delivering information, also has been recognized as a critical achievement factor influencing technology use and user satisfaction	<ul style="list-style-type: none"> <li>- Website navigation (Website's capability to provide alternative interaction and navigating techniques)</li> <li>- Personalization (Making personal files for customers)</li> <li>- Currency (The state of being in common or general use)</li> <li>- Security (Quality or state of being secure)</li> <li>- Classification of needs (Basic , performance or excitement needs)</li> <li>- Technical efficiency (Do the right things)</li> <li>- Web design (Architecture of the website)</li> </ul>
<b>Service Quality:</b> The overall support delivered by internet retailers & become more critical in e-business since online customers transact with unseen retailers	<ul style="list-style-type: none"> <li>- Reliability (Ability to perform the promised service dependably and accurately)</li> <li>- Responsiveness (To be able to response to customer needs)</li> <li>- Trust (Customer should have confidence to the website)</li> <li>- Customer expectations and Satisfaction (What customers really want)</li> </ul>
<b>Vendor Specific Quality:</b> The awareness of Internet vendors and their reputation and price Competitiveness	<ul style="list-style-type: none"> <li>- Awareness (Existence of a critical mass who knows and experiences the website)</li> <li>- Reputation (Overall quality as seen or judged by online consumers)</li> <li>- Price saving (Lower the cost of online purchasing)</li> <li>- Comparative Performance (Pay attention to performance of competitors)</li> </ul>

**Appendix 2: The Weight vectors of the alternatives in terms of sub-criteria**

Main Criteria	Sub Criteria	Weight Vector
Information Quality	Coherence	$W = (0.0000, 0.6185, 0.3815, 0.0000)^T$
	Complexity	$W = (0.1716, 0.0000, 0.0000, 0.8284)^T$
	Legibility	$W = (0.2857, 0.2298, 0.0000, 0.4845)^T$
	Mystery	$W = (0.3936, 0.0406, 0.0000, 0.5658)^T$
	Relavance	$W = (0.0556, 0.2792, 0.0000, 0.6652)^T$
	Usefulness	$W = (0.4399, 0.0994, 0.0000, 0.4606)^T$
	Specialization	$W = (0.2658, 0.2834, 0.0000, 0.4508)^T$
System Quality	Navigation	$W = (0.3521, 0.0000, 0.0000, 0.6479)^T$
	Personalization	$W = (0.0000, 0.0000, 0.0000, 1.0000)^T$
	Currency	$W = (0.0000, 0.6251, 0.0053, 0.3696)^T$
	Security	$W = (0.2335, 0.1623, 0.1526, 0.4516)^T$
	Classification	$W = (0.2936, 0.3034, 0.0748, 0.3282)^T$
	Tech. Efficiency	$W = (0.1443, 0.3540, 0.0000, 0.5016)^T$
	Web Design	$W = (0.1592, 0.0111, 0.0000, 0.8297)^T$
Service Quality	Reliability	$W = (0.2591, 0.1691, 0.1521, 0.4197)^T$
	Responsiveness	$W = (0.1924, 0.1503, 0.0000, 0.6573)^T$
	Trust	$W = (0.0000, 0.0000, 0.0000, 1.0000)^T$
	Cus. Expectations	$W = (0.4936, 0.1314, 0.0000, 0.3750)^T$
Vendor Specific Quality	Awareness	$W = (0.2189, 0.2855, 0.1478, 0.3479)^T$
	Reputation	$W = (0.1389, 0.4361, 0.0470, 0.3780)^T$
	Price Saving	$W = (0.3333, 0.3333, 0.3333, 0.0000)^T$
	Com. Performance	$W = (0.2663, 0.3131, 0.2163, 0.2043)^T$

## Appendix 3: The Integration of Priority Weights

Weight Alternat.	Coher. 0,2031	Compl. 0,0458	Legib. 0,2051	Mystery 0,1572	Relevance 0,1179	Useful. 0,1380	Specializ. 0,1330	
Limango	0,0000	0,1716	0,2857	0,3936	0,0556	0,4399	0,2658	Main Pri.Weigh. 0,2310
Markafoni	0,6185	0,0000	0,2298	0,0406	0,2792	0,0994	0,2834	0,2634
Trendyol	0,3815	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0775
Morhipo	0,0000	0,8284	0,4845	0,5658	0,6652	0,4606	0,4508	0,4282
Weight Alternat.	Navig. 0,0000	Person. 0,0183	Curre. 0,0000	Security 0,7521	Classific. 0,0960	Tech.E. 0,1335	Web Desi. 0,0000	
Limango	0,3521	0,0000	0,0000	0,2335	0,2936	0,1443	0,1592	Main Pri.Weigh. 0,2231
Markafoni	0,0000	0,0000	0,6251	0,1623	0,3034	0,3540	0,0111	0,1984
Trendyol	0,0000	0,0000	0,0053	0,1526	0,0748	0,0000	0,0000	0,1220
Morhipo	0,6479	1,0000	0,3696	0,4516	0,3282	0,5016	0,8297	0,4565
Weight Alternatives	Reliabi. 0,4104	Respon. 0,0000	Trust 0,3094	Cus.Exp. 0,2802				Main Pri.Weigh.
Limango	0,2591	0,1924	0,0000	0,4936	0,2446			
Markafoni	0,1691	0,1503	0,0000	0,1314	0,1062			
Trendyol	0,1521	0,0000	0,0000	0,0000	0,0624			
Morhipo	0,4197	0,6573	1,0000	0,3750	0,5867			
Weight Alternat.	Aware. 0,0000	Reputat. 0,1554	Pric.S. 0,7025	Com.Per. 0,1421				Main Pri.Weigh.
Limango	0,2189	0,1389	0,3333	0,2663	0,2936			
Markafoni	0,2855	0,4361	0,3333	0,3131	0,3464			
Trendyol	0,1478	0,0470	0,3333	0,2163	0,2722			
Morhipo	0,3479	0,3780	0,0000	0,2043	0,0878			
Weight Alternat.	Inf.Qua. 0,00000	Syst.Q. 0,03117	Ser.Q. 0,32819	V.Sp.Q. 0,64064				Main Pri.Weigh. Ranking
Limango	0,23095	0,22311	0,24464	0,29359	0,27533	1,00000		
Markafoni	0,26342	0,19844	0,10624	0,34644	0,26299	3,00000		
Trendyol	0,07747	0,12200	0,06242	0,27220	0,19867	4,00000		
Morhipo	0,42816	0,45646	0,58671	0,08777	0,26301	2,00000		



## WORK-FAMILY, FAMILY WORK CONFLICT AND TURNOVER INTENTIONS AMONG THE REPRESENTATIVES OF INSURANCE AGENCIES

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### Keywords:

Work Family Conflict,  
Family Work Conflict,  
Turnover Intentions,  
Insurance Agencies

### ABSTRACT

WFC occurs when work pressures interfere with the quality of family life, whereas FWC occurs when family pressures interfere with responsibilities at work. On the other hand, turnover is about voluntary or involuntary act of leaving an organization. The purpose of the study is to examine within 95 representatives of insurance agencies the effects of work-family conflict (WFC) and family-work conflict (FWC) on turnover intentions. The main hypothesis reflects that employees experiencing high levels of WFC and FWC are likely to quit the job.

Data were collected using a 18-item questionnaire via e-mail containing a link to the online Internet Survey Instrument to the representatives of insurance agencies. The questionnaire was constructed to assess 3 variables (WFC, FWC and turnover intentions) and demographic characteristics as position, age, gender, total tenure, tenure at current job, marital status, income state of spouse, education level, number and ages of children. Results indicated that especially family work conflict have effect on turnover intentions with the family responsibilities emerging as the stronger predictor of turnover intentions. Our findings suggest that organizations who help their employees, manage the effects of WIF and FIW to reduce the turnover rate in insurance sector. In order to minimize turnover intentions, it is particularly needed to encourage employees by providing managerial and family support.

## 1. INTRODUCTION

The issue of work-family conflict (WFC) has been noted as a particular concern for today's businesses (Grandey, Cordeiro and Crouter, 2005). The topic of work-family conflict (also referred to as work-family stress, work-family balance) has so become an area of high interest, both in the research and practice literature (Piotrowski and Vodanovich, 2006). Work-family conflict which is bidirectional, such that work can interfere with family and family can interfere with work, defined generally as a type of stress which occurs when demands from the work and family domains are in conflict (Porter, Ayman, 2010).



In general, work-family conflict or family-work conflict is often associated with negative consequences both in organization and family. One of the main results of balancing work and family responsibilities is intention to leave the organization. Intention to quit is commonly studied job-related outcome in work-family conflict literature (Porter and Ayman, 2010). To understand the potential stress factors of turnover intention (from work to family or family to work), we try to examine the effects on WFC and FWC on turnover intentions. Especially in insurance sector, employees may have more trouble to balance work and family life because of work and family roles.

## **2. LITERATURE REVIEW**

### **2.1. Work-Family Conflict and Family-Work Conflict**

Conflict between work and family occurs when individuals have to perform multiple roles: worker, spouse, and parent. Each of these roles requires time and energy if it is to be performed adequately. Consequently, individuals are overwhelmed and experience interference from work to family or from family to work (Senecal, Vallerand and Guay, 2001).

Work-family conflict is a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible in some respect (Posig and Kickul, 2004). Prior researchs has identified two dominant types of work-family conflict: time based conflict and strain based conflict. Time based conflict is experienced when the time devoted to one role makes it difficult to fulfill the requirements of another role. Strain-based conflict is experienced when the strain generated in one role spills over or intrudes into the other role (Parasuraman and Simmers, 2001). Greenhaus and Beutell identified three types of work-family conflict, added third dimension of conflict as behavior-based conflict which refers to incompatibility between the behavior patterns that are desirable in the two domains (Yang, et.al, 2000).

Work-family conflict can occur in two directions: work interference with family and family interference with work. It is important to look at both directions of work family conflict to see if different antecedents and outcomes may be associated with each other (Posig and Kickul, 2004). Researchers and theorists have recently focused on the degree to which participation in the family role is made more difficult from participation in the work role—termed work-to-family conflict (WFC), and the degree to which participation in the work role is made more difficult from participation in the family role—termed family-to-work conflict (FWC) (Michel, et.al, 2011). An example of work interfering with family would be a parent missing a child's soccer game because of a late meeting; whereas an example of family interfering with work would be a parent calling in sick because the babysitter failed to show up (Marchese, Bassham and Ryan, 2002). As a result, from work-family and family-work perspectives, this type of conflict reflects the degree to which role responsibilities from the work and family domains are incompatible (Netemeyer, Boles and McMurrian, 1996, 401). There is a positive relationship between WFC and FWC and in general people report greater WFC than FWC (Lilly, Duffy and Virick, 2006; Carr, et.al, 2008).

Work and family conflict has been associated with a number of undesirable organizational and individual consequences both at work and at home (Thanacoody, Bartram and Casimir, 2009).

Research on work–family conflict has found that this variable influences a number of outcomes including psychological distress, job satisfaction, organization commitment, turnover, life satisfaction, burnout, absenteeism (Carlson, Kacmar and Williams, 2000).

## **2.2. Effects of WFC and FWC on Turnover Intentions**

Turnover, the voluntary or involuntary act of leaving an organization, occurs at a specific time that is marked by the actual separation of the individual from the organization (Heilmann, Bell and McDonald, 2009). Turnover intention, is a persistent problem in organizations, occurs when employees perceive an imbalance between their work demands and family demands (Yin-Fah, 2010). Among the variables consistently found to relate to intention to quit are; experience of job-related stress, lack of commitment to the organization and job dissatisfaction (Firth, et.al, 2004).

It is believed that when employees experience WFC and FWC, they will likely withdraw from work in an attempt to eliminate the conflict (Boyar, et.al, 2003). There are various results between work family conflict, family work conflict and turnover intentions. Some researchers find work-family conflict has an indirect effect on turnover intentions. In this situation work-family conflict first influence job satisfaction which subsequently influences intention to leave. On the other hand, some of them find that WFC but not FWC is related to turnover intentions (Pasewark and Viator, 2006). Frone et.al (1997), find support for the direct relationship between FIW and turnover intentions among employees in a financial firm (Post et.al, 2009). Research demonstrates that when work-family conflict grows too large in the organization, one solution is to leave the workplace. Hence, higher levels of work-family conflict are likely to be associated with higher levels of turnover intentions (Andres, Moelker and Soeters, 2012).

Consequently, a positive relationship is expected between work family conflict and turnover intention.

*Hypothesis 1: Work family conflict and family work conflict have positive effect on turnover intention.*

## **3. METHODOLOGY AND DATA**

The insurance market of Turkey had an impressive growth during the recent years. Because, economic growth of Turkey has led to rising levels of personal wealth and increased demand for life insurance and pensions. (*Turkey Insurance Market Intelligence Report*). In Turkish insurance market, 16.029 people have been employed by 58 active insurance, reinsurance and pension companies, as of December 31, 2010. Employees may have difficulties about reaching more customers, realizing their responsibilities at the same time, achieving goals. Especially in terms of gender, women employees have more responsibilities in family life than men. They may feel under stress and may choose to leave the organization to cope with these circumstances. Employees in this sector may experience difficulties about reaching more customers to achieve their goals of fulfilling their managers' expectancies. This study makes a significant contribution to the literature on work-family conflict and family-work conflict on turnover intention among the representatives of insurance agencies. It is also important to consider the effects of both dimensions of work-family conflict simultaneously.

The purpose of the study is so to examine within 95 representatives of insurance agencies the effects of work-family conflict (WFC) and family-work conflict (FWC) on turnover intentions. The main hypothesis reflects that employees experiencing high levels of WFC and FWC are likely to quit the job.

**Table 1: Demographic statistics of participants**

		Frequency	Percent (%)
<b>Age</b>	20-30	22	23,1
	31-40	33	34,7
	41 and above	40	42,1
	Missing	0	-
<b>Gender</b>	Male	52	54,7
	Female	42	44,2
	Missing	1	1,05
<b>Marital Status</b>	Married	66	69,4
	Single	26	27,3
	Missing	3	3,1
<b>Number of children</b>	0	36	37,8
	1	25	26,3
	2	25	26,3
	3	7	7,3
	Missing	2	2,1
<b>Income state of spouse</b>	Yes	40	42,1
	No	33	34,7
	Missing	22	23,1
<b>Education</b>	High-School	24	25,2
	Vocational High School	17	17,8
	Undergraduate	44	46,3
	Graduate	10	10,5
	Missing	0	-
<b>Total Tenure</b>	1-5 years	11	11,5
	6-10 years	17	17,8
	11-15 years	14	14,7
	16-20 years	22	23,1
	21 and above	28	29,4
	Missing	3	3,1
<b>Tenure at present job</b>	1-5 years	36	37,8
	6-10 years	18	18,9
	11-15 years	18	18,9
	16-20 years	13	13,6
	21 and above	7	7,3
	Missing	3	3,1
<b>Position</b>	Employee	28	29,4
	Manager	66	69,4
	Missing	1	1,05

The study was conducted with 95 representatives of insurance agencies in Insurance sector, Turkey. The majority of the participants are male (%54,7), between 41 and above ages (%42,1), married (%69,4), have mostly one or two children (%52,6). 40 participants' spouses are working in a company. Most of the respondents have undergraduate degree (%46,3). In terms of work experience, 28 of them have 21 and above years of total tenure, 36 of them have 1-5 years tenure at present job. %69,4 of participants have managerial positions.

### **3.1. Measures**

Data were collected using a 18- item questionnaire via e-mail containing a link to the online Internet Survey Instrument to the representatives of insurance agencies. The questionnaire was constructed to assess 3 variables (WFC, FWC and turnover intentions) and demographic characteristics as position, age, gender, total tenure, tenure at current job, marital status, income state of spouse, education level, number and ages of children.

#### *Work-Family Conflict and Family-Work Conflict:*

This study examines both WFC and FWC with a general measure of conflict not differentiated by time-based, strain-based or behavior-based conflict. The scale consists of 10 items which was developed by Netemeyer, et. al (2006). Work-family conflict was measured by 5 items (e.g: "The demands of my work interfere with my home and family life") and family-work conflict was measured by 5 items (e.g.: "The demands of my family or spouse /partner interfere with work-related activities"). Responses were given on a scale ranging from 1 (Never agree) to 6 (Completely agree) and negatively items were reversed.

#### *Turnover Intention:*

Employees' intention to quit was measured by six items, three of the items were selected from studies of turnover intentions (e.g: "I often think about quitting") such as Amah (2009), Post et.al (2009). Other three items were developed and added by the researchers. Responses were given on a scale ranging from 1 (Never agree) to 6 (Completely agree) and negatively items were reversed.

The data was analyzed in SPSS 18.0. Descriptive statistics (i.e., frequency distributions, means and standard deviations) were used to develop a profile of the respondents and to summarize the variables. Alpha coefficients were also computed to assess the reliability of work-family conflict, family work conflict and turnover intention. To better understand the effects of WFC and FWC on turnover intention, regression analysis was performed. For the demographic variables, t-test and ANOVA were used.

### **3.2. Results**

The results are presented in three sections. Reliability analysis and descriptive statistics are showed in first section. The second section includes the correlation results of variables and multiple and simple regression analysis results. In the last section, differences among variables in terms of demographics were presented.

For the reliability analysis of the scale used in this study, the most frequently used Cronbach alpha coefficient was examined. The Cronbach alpha coefficient of the scale in this study is higher than the commonly accepted .60 as shown in Table 2.

**Table 2: Reliability Analysis Scores for Dimensions**

Work-Family Conflict	,889
Family-Work Conflict	,862
Turnover Intention	,864

First of all, for the 12 items scale which measures the work-family conflict and family-work conflict, reliability analysis was performed. The cronbach alpha value of work-family conflict was found as ,889 and family-work conflict was found as ,862. For the 6 item scale which measures turnover intention, reliability analysis was performed. The cronbach alpha value was found as 0,864. Two items were omitted from the turnover intention scale, because of low reliability scores.

**Table 3: Descriptive Statistics**

	Mean	Std. Deviation
Work-Family Conflict	3,43	1,17
Family-Work Conflict	2,06	,97
Turnover Intention	1,85	1,23

According to the results of the descriptive statistics, mean and standard deviation for the work-family conflict and family-work conflict variable were found as 3,43 and 1,17; 2,06 and ,97. This result indicates that respondents mostly selected the "little agree" and "rather agree" alternatives for work-family conflict and "more little agree" for family-work conflict. Mean and standard deviation for the turnover intention variable was found as 1,85 and 1,23. Turnover intention is low for participants.

### 3.3. Test of Hypotheses

**Table 4: Correlations Results of Variables**

	Work-Family Conflict	Family-Work Conflict	Turnover Intention
Work-Family Conflict	1		
Family-Work Conflict	,508**	1	
Turnover Intention	,284**	,290**	1

The highest correlation can be seen between work-family conflict and family-work conflict ( $r=,508$ ). It is followed by the correlation between family work conflict and turnover intention ( $r=,290$ ). Work-family conflict is also correlated with turnover intention ( $r=,284$ ).

**Table 5: Results of Multiple Regression Analysis**

	Sum Squares	of Degrees Freedom	of Mean Square	F	Sig.
Regression	15,867	2	7,933	5,663	,005
Residual	128,878	92	1,401		
Total	144,745	94			
r = ,331; R <sup>2</sup> : ,110					
<b>Standardized coefficients</b>			T	Sig.	
Work-Family Conflict		,184	1,615	,110	
Family-Work Conflict		,197	1,724	,088	

The results of multiple regression analysis show that both work-family conflict and family-work conflict have no significant effect on turnover intention ( $p=,110$  and  $p=,088$ ). H1 hypothesis is rejected. As a simple regression model, family-work conflict and turnover intention have higher correlation result than work-family conflict and turnover intention. Family-work conflict has a significant effect on turnover intention alone ( $B=,290$ ;  $p=,000$ ).

**Table 6: t-test and One way ANOVA Results**

Turnover Intention	N	Mean	Standart Deviation	t-value	p-value
Man	52	1,58	,81	-2,133	,037
Women	42	2,14	1,56		
Work-Family Conflict	N	Mean	Standart Deviation	F-value	p-value
20-30	22	3,02	1,02	6,536	,002
31-40	33	3,99	1,25		
41 and above	40	3,19	1,03		

The results of t-test demonstrate that p value was found as  $0,037 < 0,05$ . There were differences among the turnover intentions in terms of their gender. Women representatives have more intention to leave than men ( $m=2,14$ ). According to results of the One-way ANOVA analysis, p value was found as  $0,002 < 0,05$ . There were differences among work-family conflict in terms of their ages. Scheffe test shows a significant difference among the 31-40 and 20-30 ages; 31-40 and 41 and above ages (20-30: 3,02; 31-40: 3,99; 41 and above: 3,19). Except these demographic variables, there are no differences between variables.

#### 4. CONCLUSION

This study was carried out among 95 representatives of insurance agencies in insurance sector in order to examine the effect of work family and family work conflict on turnover intentions of participants. Work family conflict is related with the imbalance between work and family responsibilities. As a result of conflict between these parts, negative outcomes can occur both in work and family life. Among the undesirable consequences of work-family conflict and family-work conflict, turnover intention is the most discussed and important issue in the organizational behavior literature.

In general, turnover intention is the voluntary or involuntary act of leaving an organization. When employees feel under stress and experience this kind of conflict in work or family life, leaving the organization can be a solution to eliminate the conflict. Work-family conflict and family-work conflict were measured by 12-item scale, Turnover intention was measured by 6-item scale, and two items were omitted, because of low reliability scores.

When means were examined, the highest mean score was found of work-family conflict as 3,46. This mean score of work-family conflict is higher than family-work conflict. This results show that, representatives of insurance agencies experience more responsibilities in work life with the comparison of family life and have more work-family work conflict than family-work conflict. On the other hand, mean score of turnover intention of employees which is 1,85, is lower than expected. They may have other solutions to reduce the effects of work-family conflict or family-work conflict than quitting the job.

When the hypothesis test result is examined, H1 hypothesis as “Work family conflict and family work conflict have positive effect on turnover intention” is not supported. Only family work-conflict has effect on turnover intentions. This finding emphasize that family-friendly policies should be enhanced to balance family and work lives of employees. Based on these results, it can be said that representatives may have work-family conflict than family-work conflict. But they may not prefer to leave the organization. When they have more responsibilities about family and have role conflict as being mother, wife and manager or employee at the same time, they may show withdrawal behaviors to cope with childcare responsibilities, spouse problems and expectations etc. Women participants have also more turnover intention than men participants in this study. They may have more trouble because of these expectations. In spite of the fact that there is a reason to believe that both types of work-family conflict affect employees’ turnover intention based on other studies in work family conflict literature, family-work conflict is the only main predictor of turnover intention in our study.

The findings about the differences of representatives’ work-family conflict in terms of their demographic characteristics demonstrated no significant differences with the exception of age variable. The age group 31-40 has more work-family conflict than the age group 20-30. In the younger age group, work load may not be high pressure on them because of the responsibilities related with the position; on the other hand, older age group may have job demands and responsibilities than younger ones. The findings about the differences of representatives’ family-work conflict in terms of their demographic characteristics demonstrated no significant differences in our study. As it mentioned before, women representatives have more turnover intention than men representatives in this study. There are no differences in terms of demographic characteristics of representatives’ turnover intention with the exception of gender.

## **5. LIMITATIONS AND RECOMMENDATIONS**

There are limitations to consider in our study. First, in the literature, there are several measurements of work family conflict and family work conflict, but we use 12 items for both types of conflict. Second, we focus on representatives of insurance agencies in our study. The insurance sector has growing market share in Turkey.

Axa, Anadolu, Allianz, Aksigorta, Yapı Kredi, Güneş, Groupama, Ergo and Eureko were the insurance companies in Turkey that collected the most premiums last year. The absence of these companies in the content of this research is a limitation. By this way, the number of participants can be increased.

It is particularly needed to manage the effects of WIF and FIW to reduce the turnover rate in insurance sector and encourage employees by providing managerial and family support. Future studies in this area should also examine and include the importance of social support in their research model. The researchers should investigate and approach the family-friendly policies and work-family balance in Turkish organizations. Flexible work hour schedule can be performed for women employees.

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## DETERMINATION OF THE FACTORS THAT AFFECT HOUSE PRICES IN TURKEY BY USING HEDONIC PRICING MODEL<sup>1</sup>

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### Keywords:

House Price Index,  
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Hedonic Pricing Model

### ABSTRACT

The primary purpose of this paper is to analyze the marginal effects of various features of the houses on the prices to observe the price changes in the Turkish housing market which follows a heterogeneous pattern. As the second concern, it is aimed to declare the results and additionally to define Turkish housing market and its submarkets which affect the market itself and to calculate the pure price changes of the houses with constant features. Hedonic pricing model is applied on the data obtained via the house price index study performed at the Central Bank of Turkey. For the period between December 2010 and June 2012, under the constant housing features, hedonic price indexes are calculated as 6.21% for Turkey, 5.93% for İstanbul, and 5.05% and 2.83% for Ankara and İzmir respectively.

## 1. INTRODUCTION

The traditional Index method which takes into account quality changes is known as "matched model" method (Nair, 2004). However, using matched model method is not appropriate for the construction of house price indexes for three reasons. First, since houses have heterogeneous structure, they cannot be matched exactly. Second, the relation between the number of transactions and housing stock is considerably low. Third, a house price is only determined when the transaction takes place.

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Due to these characteristics of the housing market, particular housing index methods have been developed. These methods are repeated sales, median or mean price model, sale price appraisal ratio model, representative property model, mix adjustments model, hybrid model and hedonic pricing model.

Each of these methods has certain advantages and disadvantages. In addition, each of them may require data sets differing in terms of both sample size and content of the data (Eurostat Handbook on Residential Property Price Indices, 2011).

In this paper we use hedonic pricing model. Our aim is to define Turkish housing market and its submarkets which affect the market itself and calculate the pure price changes of the houses with constant features by using the adjacent-period time dummy variable approach.

## **2. LITERATURE REVIEW**

In the related literature Haas (1922) is the first to apply hedonic price model in agriculture and the first to use the term hedonic. Haas made an attempt to put an explanation through independent variables distance to city and size of the city and dependent variable field of the farm.

However, the first authors to apply hedonic price model in housing market were Ridker and Henning (1967). Ridker and Henning (1967) in their study highlighted the significant effect of air pollution on the preference of household for housing. Using cross-sectional data, they estimated the linear price function through OLS method.

Kain and Quigley (1970) in their study were in the pursuit of explaining the dependent variables house sale price and house rent price through the independent variables the quality of the building, construction quality, features of the house, the location, the success rate of the public school in the location, the age of the house, bathroom number, type of the house, inclusion of warm water and furniture in the rent.

Straszheim (1973), using the linear hedonic price function pattern, tried to explain the house sale price with such independent variables as the number of the room, the age of the house, the size of the house. Besides, in the study, it was concluded that there was differentiation among the regions in house prices. Namely, he found out that the location is a significant factor in house pricing.

Goodman (1978) in his study divided cities into strata being downtown and suburb. For each stratum, he made an attempt to explain the house sale price through such independent variables as the type of the building, age and the number of black people in the location of the house and the number of rooms. The results of his study revealed that for each stratum, the hedonic price function estimate results differed from each other.

Palmquist (1984), based on the 7 standard metropolitan statistical locations, tried to explain the house sale price with such independent variables as the quality of the house, whether the house has a parking lot, air conditioner, etc...

Kim (1992) tried to explain the monthly average rental price with such independent variables as the number of bathrooms, bedrooms, income level of the household, etc.

Aoki, Proudman and Vlieghe (2004) stressed the importance of house prices due to the use of houses as assurance in order to decrease the cost of borrowing in loan markets.

Aizcorbe and Pho (2005) compared weighted and unweighted price indices through matching model in order to put the difference between the hedonic price index values.

Vor and Groot (2009) studied the effect of such unfavorable factors as traffic in industrial zones, noise, etc. on house sale prices.

Widlak and Tomczyk (2010), using time dummy variable, price index and hedonic estimate methods for the same data set, performed results comparisons.

### **3. METHODOLOGY AND DATA**

#### **3.1. Hedonic Pricing Model and Function**

By the method of hedonic pricing model, houses are decomposed into their characteristics and then it is assessed whether each feature has a real effect on the price of the house. This method is based on Lancaster's consumer preferences theory (1966). According to this theory, consumers' benefit from the consumption levels of goods is determined by the properties of the goods. Furthermore, "quality changes" over time can be detected by this method. For these advantages, in literature, hedonic pricing model is preferred if data set is sufficient.

According to hedonic pricing model based on consumer preferences theory, structural features of the houses, number of the components of these features, the location of the house and the specifications of the location should be included as variables in the model.

First of all, construction of the hedonic pricing function is required before calculation of the index by using hedonic pricing model. In the hedonic function, dependent variable is the price of the house; independent variables are structural features of the houses, number of the components of these features, the location of the house and the specifications of the location. If some variables have significant impact on the price of a house, it means that, the price of that house is determined by those significant variables.

The functional form of the hedonic function and the variables included in the function need to be determined accurately (Vries et al, 2009). Functional form is basically determined according to the structure of the relation between the dependent variable and the independent variables; i.e. whether it is linear or nonlinear.

Hence, there are four functional forms. These are the linear model, the logarithmic model, linear logarithmic model and the logarithmic linear model. In the hedonic function the coefficients of characteristics are called hedonic price (Rosen, 1974).

### 3.2. Hedonic Price Indexes & The Time Dummy Variable Method

The index calculated by using the hedonic pricing function is called hedonic price index. There are four hedonic price index methods. These are the characteristics price index method, the hedonic price imputation method, the hedonic quality adjustment method and the time dummy variable method.

In the time dummy variable method and the characteristics price index method, data sets needed to estimate the hedonic function and to calculate the hedonic price index are the same. Therefore, these methods are called as "direct" methods, whereas the others are called as "indirect" methods (Triplett, 2006).

The time dummy variable method is based on the method of estimation of the coefficient of the time (Triplett, 2006). This method has two alternative approaches; the adjacent-period time dummy variable and the multi-period time dummy variable. In the multi-period time dummy variable approach, the hedonic function is constructed with the combined data observed in all periods. In the adjacent-period time dummy variable approach the hedonic function is constructed with the combined data observed in only two adjacent periods. This means that, the coefficients of the features (hedonic prices) are kept constant for only two periods.

$$\ln P_i^t = \beta_0 + \sum_{k=1}^k \beta_k X_{i,k} + \gamma D_i + \varepsilon_i^t \quad (1)$$

The coefficients of the features ( $\beta$ ), in the model, refer to the changes in quality. Gamma ( $\gamma$ ) refers to percentage time-based change in price, i.e. price change independent of quality change. Therefore, gamma is interpreted as "pure price change" occurred in the period of analysis.

Since houses have a low rate of technological development, in literature, the time dummy variable method is suggested. In application the adjacent-period time dummy variable approach is adopted for few reasons. First, there is no prior knowledge about the current structure of the Turkish housing market and its characteristics. Second, valuation reports are obtained from banks monthly. Finally, the data set length is relatively short for other approaches and methods.

The constructed hedonic functions have 69 dummy variables<sup>2</sup> representing the structural features of the houses, provincial dummy variables representing location and district dummy variables belonging to each province. The hedonic functional form is determined as log-linear form since all the independent variables used are qualitative. Significant variables have been identified in two stages. In the first stage, each of significant variables was required to be significant at least in 13 periods of 18 periods. In the second stage, regression analysis was repeated with the variables identified in the first stage until only the variables that are significant in all periods remain. Thereby, only the significant variables were identified for each location during the period of December 2010 and June 2012.

In practice, from general to specific approach is adopted. First of all, hedonic house price index for Turkey (THHPI) has been calculated, and then hedonic price index values for the provinces significant in Turkey have been calculated. Finally, for the three big cities, district level hedonic price index values have been calculated.

### **3.3. Data**

Hedonic pricing model is applied on the data obtained via the house price index study performed at the Central Bank of Turkey. At the beginning of the study, the initial intention was to conduct the application with the 756.082 data covering the period from January 2010 to June 2012. However, expected level of relationship between the features of the houses and the house prices could not be detected in the evaluation of the results of analysis of the periods before December 2010. As a possible reason, the effect of the notification issued by the BRSB (Banking Regulation and Supervision Agency) on 12/16/2010 has been examined. The notification ensures that valuation reports are prepared solely by certified real estate appraisal companies. In order to determine the effect, first of all, for every period bank branch (D\_PARTY\_1), expertise (D\_PARTY\_2) and valuation firms (D\_PARTY\_3) have been defined as dummy variables and then estimated in the hedonic functions. According to the estimation results (Table 1.), in the periods before December 2010 there is a significant relationship between the house price and the party preparing the valuation report.

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<sup>2</sup> See full version of the thesis for all the dummy variables.

**Table 1. Effect of the Notification Issued by the BRSA**

Periods	Unstandardized Coefficients		Periods	Unstandardized Coefficients			
	$\beta$	Standard Error		$\beta$	Standard Error		
0110	(Constant)	5.014	0.002	1210	(Constant)	5.017	0.001
	D_PARTY_1	-0.052	0.004	0111	(Constant)	5.025	0.001
0210	(Constant)	5.000	0.007	0211	(Constant)	5.026	0.001
	D_PARTY_1	-0.037	0.008	0311	(Constant)	5.027	0.001
	D_PARTY_3	0.023	0.007	0411	(Constant)	5.027	0.001
0310	(Constant)	4.973	0.002	0511	(Constant)	5.035	0.001
	D_PARTY_3	0.051	0.003	0611	(Constant)	5.041	0.001
0410	(Constant)	4.974	0.009	0711	(Constant)	5.032	0.001
	D_PARTY_1	-0.034	0.010	0811	(Constant)	5.041	0.002
	D_PARTY_3	0.054	0.009	0911	(Constant)	5.032	0.001
0510	(Constant)	5.023	0.003	1011	(Constant)	5.050	0.001
	D_PARTY_1	-0.147	0.006	1111	(Constant)	5.052	0.002
	D_PARTY_2	-0.037	0.013	1211	(Constant)	5.040	0.002
0610	(Constant)	5.016	0.003	0112	(Constant)	5.052	0.002
	D_PARTY_1	-0.152	0.006	0212	(Constant)	5.061	0.002
0710	(Constant)	5.017	0.003	0312	(Constant)	5.066	0.002
	D_PARTY_1	-0.150	0.006	0412	(Constant)	5.066	0.001
0810	(Constant)	5.020	0.004	0512	(Constant)	5.072	0.001
	D_PARTY_1	-0.216	0.008	0612	(Constant)	5.075	0.001
0910	(Constant)	5.021	0.002				
	D_PARTY_1	-0.080	0.005				
	D_PARTY_2	-0.023	0.010				
1010	(Constant)	5.000	0.006				
	D_PARTY_1	-0.027	0.007				
	D_PARTY_3	0.031	0.006				
1110	(Constant)	4.976	0.003				
	D_PARTY_3	0.061	0.003				

It means that, as of December 2010 the valuations began to be done independently of the subjective judgments and also the composition of the data was eliminated from the effect of individual decisions of banking sector. With regard to results of this analysis, the scope of the application was restricted from December 2010 to June 2012.



**4. RESULTS AND DISCUSSIONS**

The primary purpose is to analyze the marginal effects of various features of the houses on the prices to observe the price changes in the Turkish housing market and also its submarkets which affect the market itself and to calculate the pure price changes of the houses having constant features.

Results of the analysis for Turkey revealed that 31 structural and 26 locational (provinces) variables are the determining factors in housing prices. The coefficients of the structural variables mean that, for the last comparison period for instance, an elevator increases the hedonic house price of the house 3.5 percent or a stove heating system decreases the hedonic house price of the house 6.8 percent (Table 2.).

**Table 2. Coefficients of the Structural Variables**

Model	Unstandardized Coefficients		Model	Unstandardized Coefficients	
	$\beta$	Standard Error		$\beta$	Standard Error
(Constant)	5.172	0.006	D_KALT_1 (Luxury house)	0.111	0.004
D_ALAN_1 (Gross Area: 35-100 m <sup>2</sup> )	-0.270	0.005	D_KALT_2 (Good quality house)	0.045	0.001
D_ALAN_2 (Gross Area: 101-150 m <sup>2</sup> )	-0.170	0.005	D_ODA_1 (Have 1 room)	-0.137	0.004
D_ALAN_3 (Gross Area: 151-200 m <sup>2</sup> )	-0.065	0.005	D_ODA_2 (Have 2 rooms)	-0.100	0.003
D_ALAN_5 (Gross Area: 251-300 m <sup>2</sup> )	0.109	0.009	D_ODA_3 (Have 3 rooms)	-0.057	0.003
D_ALAN_6 (Gross Area: 301 m <sup>2</sup> or more)	0.174	0.009	D_OTOP (Have a parking lot)	0.016	0.001
D_ASANS (Have an elevator)	0.035	0.002	D_TKATN_2 (2-storey building)	0.049	0.004
D_BALK_1 (Have a balcony)	0.048	0.002	D_TKATN_4 (4-storey building)	-0.029	0.002
D_BALK_1_1 (Have only 1 balcony)	-0.007	0.002	D_TKATN_5 (5-storey building)	-0.031	0.002
D_BAN_1 (Have only 1 bathroom)	-0.047	0.002	D_TKATN_6 (6-storey building)	-0.038	0.002
D_BAN_3 (Have 3 or more bathrooms)	0.068	0.006	D_TKATN_7 (7-storey building)	-0.020	0.002
D_GUVN (Have security)	0.057	0.003	D_TKATN_12 (12-storey building)	0.017	0.005
D_HAV (Have a pool)	0.066	0.003	D_TKATN_14 (14-storey building)	0.033	0.006
D_IS_1 (Construction level: %100)	0.026	0.002	D_TKATN_15 (15-storey building)	0.055	0.004
D_ISIT_1 (Have a central heating system)	0.025	0.002	D_YYIL_8 (built btw 1993-1997)	-0.013	0.002
D_ISIT_3 (Have a stove heating system)	-0.068	0.002	D_YYIL_10 (built in 1987 or before)	0.052	0.002

Locations of the 26 provinces, which are determinants of house prices in Turkey, are shown on the map. It is interesting to note that these significant provinces border each other.

**Figure 1: Locations of the 26 Provinces, Which are Determinants of House Prices in Turkey**

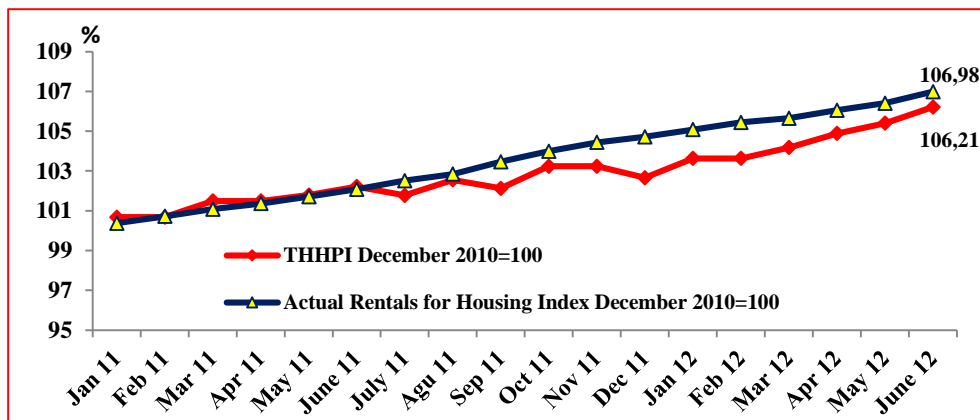


Province of Aydın is excluded from the hedonic function for failing to protect the significance in all periods. Provinces of Gaziantep and Şanlıurfa have been identified as provinces that must be followed in the long term since they began to be significant during the last six periods. The coefficients of the locational variables mean that, for the last comparison period for instance, being in Istanbul increases the hedonic house price of the house 22.1 percent or being in Kahramanmaraş decreases the hedonic house price of the house 12.5 percent (Table 3.).

**Table 3. Coefficients of the Locational Variables**

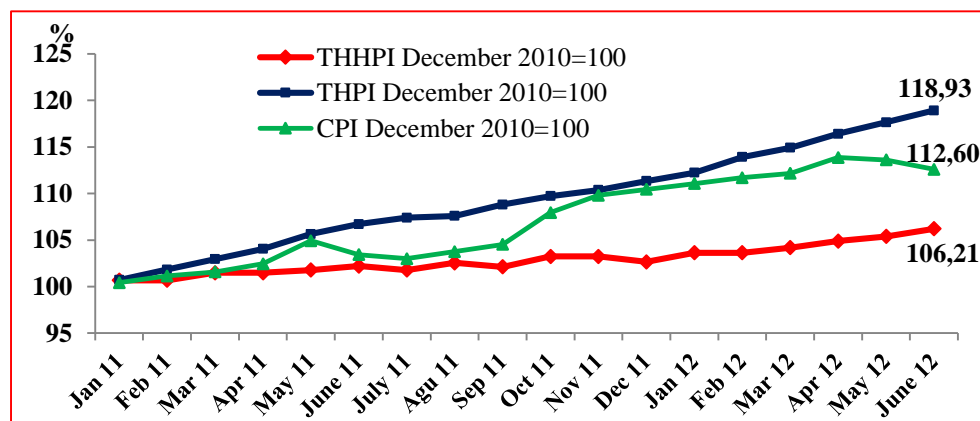
Model	Unstandardized Coefficients		Model	Unstandardized Coefficients	
	$\beta$	Standard Error		$\beta$	Standard Error
D_IL_01 (Adana)	0.041	0.005	D_IL_34 (İstanbul)	0.221	0.002
D_IL_02 (Adıyaman)	-0.086	0.012	D_IL_35 (İzmir)	0.153	0.003
D_IL_06 (Ankara)	0.062	0.002	D_IL_38 (Kayseri)	-0.044	0.005
D_IL_07 (Antalya)	0.070	0.003	D_IL_41 (Kocaeli)	0.045	0.004
D_IL_10 (Balıkesir)	0.066	0.005	D_IL_42 (Konya)	-0.031	0.005
D_IL_11 (Bilecik)	-0.057	0.010	D_IL_44 (Malatya)	-0.055	0.008
D_IL_16 (Bursa)	0.047	0.004	D_IL_45 (Manisa)	0.044	0.005
D_IL_17 (Çanakkale)	0.024	0.007	D_IL_46 (Kahramanmaraş)	-0.125	0.008
D_IL_19 (Çorum)	-0.069	0.008	D_IL_48 (Muğla)	0.158	0.006
D_IL_21 (Diyarbakır)	-0.061	0.006	D_IL_51 (Niğde)	-0.083	0.012
D_IL_26 (Eskişehir)	0.028	0.005	D_IL_72 (Batman)	-0.095	0.015
D_IL_31 (Hatay)	0.046	0.006	D_IL_77 (Yalova)	0.061	0.010
D_IL_33 (Mersin)	-0.05	0.004	D_IL_80 (Osmaniye)	-0.075	0.010

Figure 2: Hedonic house price index for Turkey (THHPI)



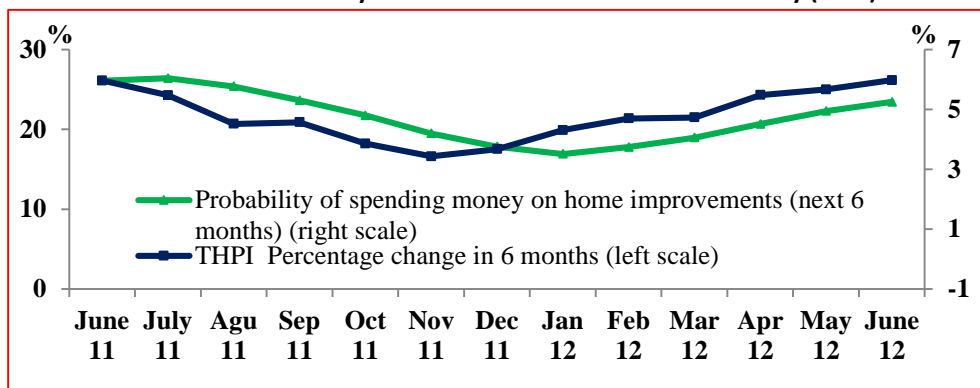
Source: TURKSTAT.

Figure 3: Comparison of Hedonic House Price Index for Turkey (THHPI) with Central Bank of Turkey Publishes House Price Index for Turkey (THPI) is made with the Consumer Price Index (CPI)



Source: TURKSTAT, CBRT

**Figure 4: Probability of Spending Money on Home Improvements (Next 6 Months) and Central Bank of Turkey Publishes House Price Index for Turkey (THPI)**



Source: TURKSTAT, CBRT

Comparing the Hedonic house price index for Turkey (THHPI) with the actual rentals for housing index, one of the sub-items of consumer price index (CPI), it is seen that (Figure 2.) THHPI is realized in the same direction but at a lower level.

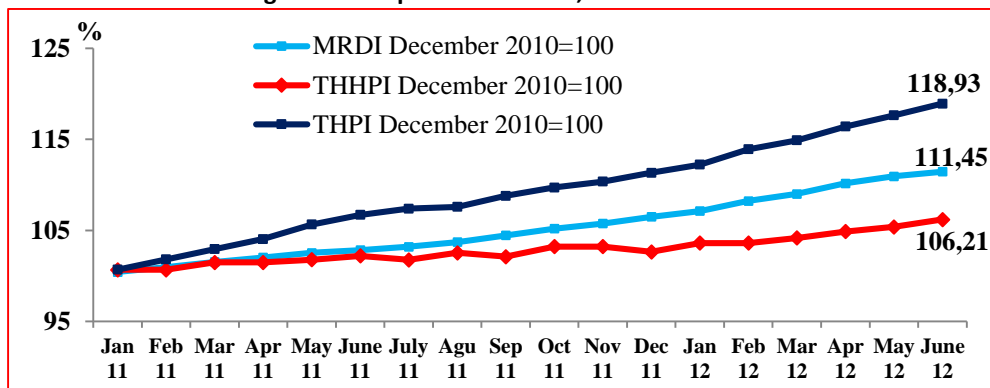
Comparison of THHPI with THPI is made with the CPI, because of the lack of relationship with all of the sub-items of CPI and housing, the desired level of explanatory power is not available (Figure 3.) On the other hand, it is observed that the percentage change in 6 months of the THPI has almost same direction with probability of spending money on home improvements (next 6 months), one of the sub-items of real sector confidence index (Figure 4.).

Central Bank of Turkey publishes house price index for Turkey (THPI) monthly by the method of stratified median price. The method of stratified median price cannot decompose the quality changes that occur in housing characteristics over time. Therefore, this method includes both time-based price changes and quality related price changes in the index value.

THHPI calculates the value of the pure price changes (time-based price changes) that occur under fixed housing characteristics. Comparison of THHPI with THPI is made with the value of maintenance and repair of the dwelling index (MRDI), one of the sub-items of CPI, it is seen that the value of THPI is very close to sum of the values of THHPI and MRDI (Figure 5.). MRDI represents the value of quality related price changes in the index value.

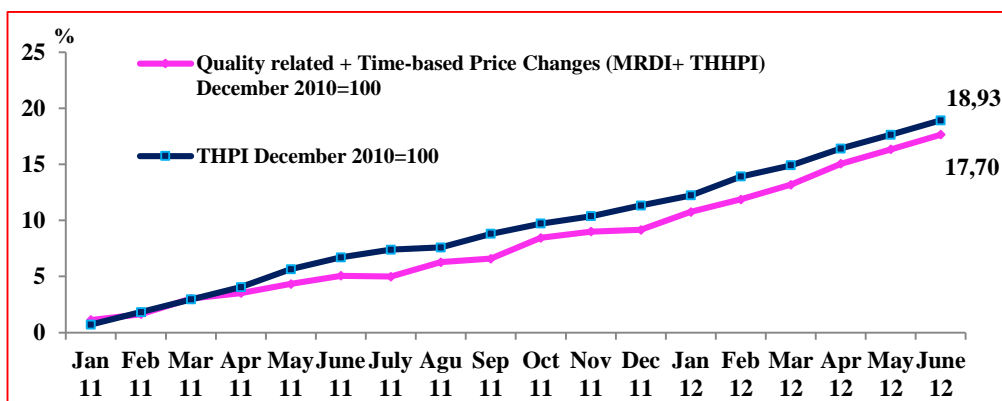
As a result,  $THPI \cong THHPI + MRDI$  (Figure 6.)

Figure 5: Comparison of MRDI, THHPI and THPI



Source: TURKSTAT, CBRT

Figure 6: Comparison of MRDI + THHPI and THPI



Source: TURKSTAT, CBRT

The difference between the sum of THHPI and MRDI and the THPI occurs for two reasons. First, the methods used in THPI, MRDI and THHPI are different. And the second, there are some changes in price due to other unobservable variables.

In application, employing the parameters that are significant in every period ensures that hedonic price determined in one period is comparable with other periods. Thus, hedonic price trends can be followed in all periods. This refers to the fact that trends in consumer preferences can also be followed.

When the hedonic prices of some selected provinces examined during the 18 periods, it is seen that, the biggest increase in the hedonic price is observed in İstanbul. It can be inferred that, in general, consumers are willing to pay more to the houses in İstanbul than to the ones in the other provinces.

For the last period, being in İstanbul, İzmir, Muğla, Ankara and Antalya increases the hedonic house price of the house 22.12 %, 15.34%, 15.84%, 6.99% and 6.22%, respectively (Figure 7.).

It is seen from the area chart that consumers are willing to pay more for the houses which have an area of 251-300 m<sup>2</sup> (D\_ALAN\_5) or 301 m<sup>2</sup> or more (D\_ALAN\_6). In Turkey, in the cases of the houses which have an area of 35-100 m<sup>2</sup>, 101-150 m<sup>2</sup> or 151-200 m<sup>2</sup>, hedonic prices fall (Figure 8.).

Figure 7: THHPI for İstanbul, İzmir, Muğla, Ankara and Antalya

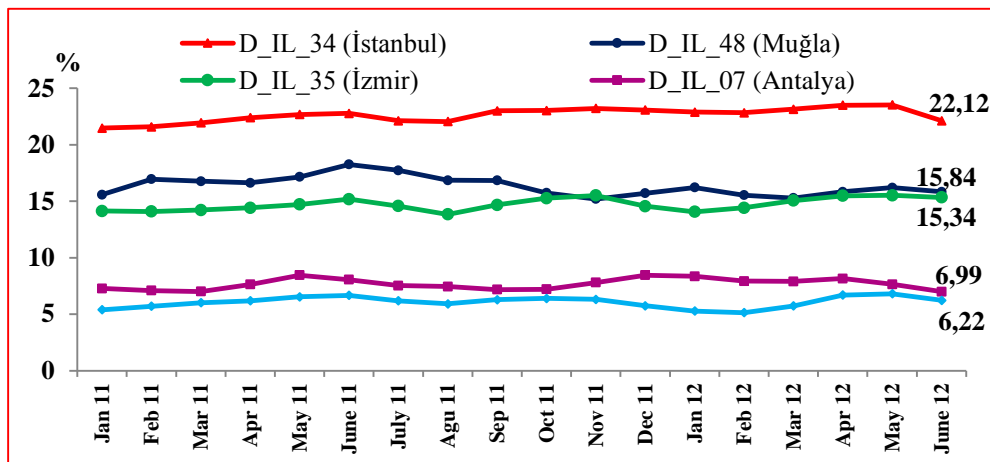


Figure 8: THHPI for Area of Houses

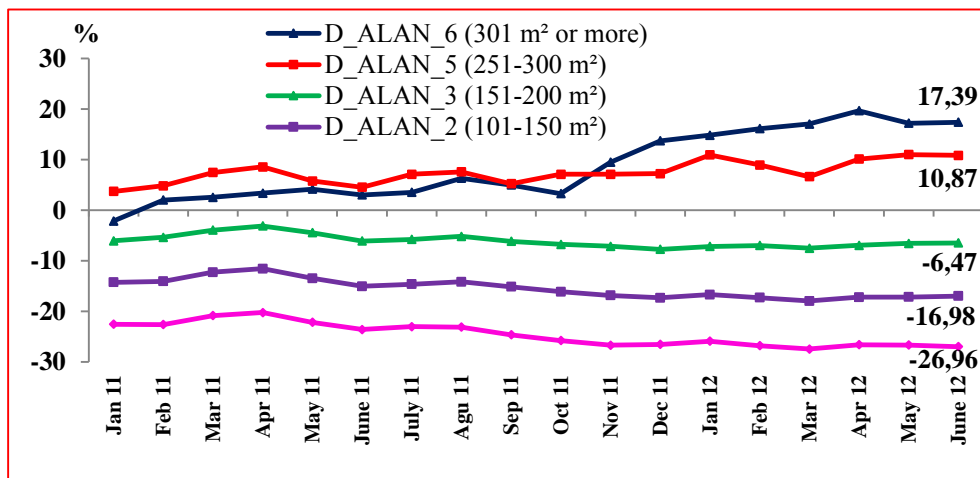
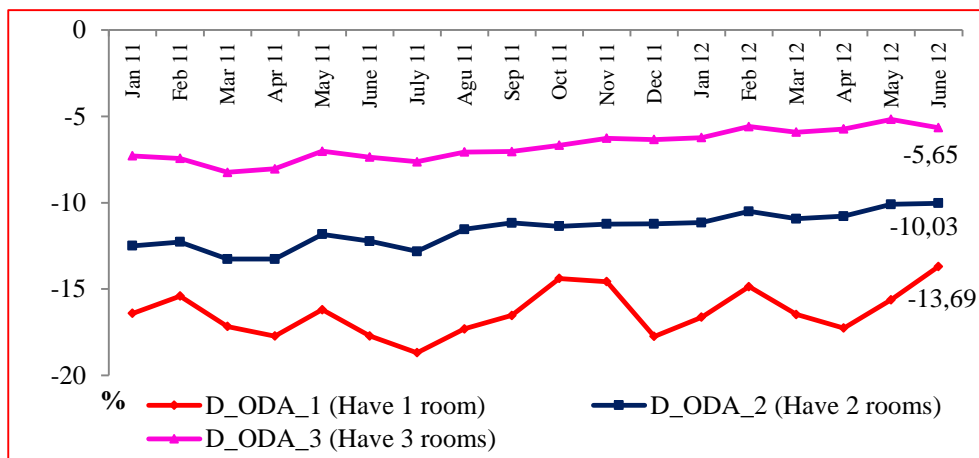


Figure 9: THHPI for Number of Rooms at Houses



In Turkey, consumers are willing to pay less to the houses with 1, 2 or 3 rooms. The hedonic price drops 5.65%, 10.03% and 13.69 % in the cases of 3, 2 or 1 rooms respectively (Figure 9.).

The findings with regard to the preferences of the number of rooms and the area of the house support each other.

5. CONCLUSION

In practice, in some locations (particularly in some districts), due to the lack of the composition and the quantity of the data, regional hedonic price index cannot be calculated. Therefore, in the long run, "multi-period time dummy variable method" is recommended for these locations.

Furthermore, some structural changes have been identified especially in some provinces and districts after a certain period. These structural changes emerged due to effects of TOKI (Republic of Turkey, Prime Ministry, Housing Development Administration) and other private housing projects in housing market. In practice, within the data set used in this study, there is no data for TOKI and other private housing projects. It is recommended that in order to conduct further analysis, TOKI and other private housing projects are included.

In addition, it is needed to monitor some of the results achieved in this study in the long-term. Therefore, evaluation of the results by repeating the analysis of each term is required.

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## RESEARCH AND DEVELOPMENT INTENSITY AND AUDIT FEES

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### Keywords:

Audit fees;  
Research and development  
intensity;  
Audit specialist.

### ABSTRACT

This study provides evidence on whether audit fees vary in response to the intensity of research and development (R&D) expenditure and whether some other factors, such as expert auditor, may moderate the relationship between R&D intensity and audit fees. Our evidence indicates that there is a positive relationship between R&D intensity and audit fees and hiring an industry specialist auditor may attenuate the relationship. Our findings suggest that auditors charge a premium for heightened audit risk and increased audit efforts related to R&D intensity.

## 1. INTRODUCTION

Prior literature identifies two factors that interact to influence an auditor's pricing decision (Bell et al., 2001): first, the risk profile of an audit client that impacts auditor's assessment of client-specific business risk. High client-specific business risk may heighten the litigation risk and/or loss of reputation from bankruptcies or undetected misreported accounting numbers. In return, auditors charge risk premium to compensate for future litigation risk; second, the extent of audit coverage and/or the amount of audit effort may vary across different audit clients, which influence auditors' pricing decision. In this paper, we explore whether research and development (R&D) intensity is related to audit fees and whether hiring an industry specialist auditor may impact the relationship.

The relationship between R&D intensity and audit fees is based on the argument that higher R&D intensity can increase both audit risk and audit effort and thus auditors charge more accordingly.

Higher R&D intensity can lead to higher audit risk for the following reasons. First, R&D investments have some unique characteristics (Holmstrom, 1989): long-term in nature, uncertain in result, risky in terms of failure likelihood, and idiosyncrasy. R&D expenditure, unlike other corporate investments, creates tremendous amount of information asymmetry problem. Managers can continuously monitor the progress of the R&D investments while investors only get an aggregate value of the R&D investments.

To the extent that higher information asymmetry may lead to higher likelihood of earnings management and asset embezzlement (Frankel and Li, 2004; Froot et. al 1993; Tsui et al. 2001), auditors may ask for a price premium to compensate for heightened risk of litigation as the exposure of the earnings management and asset embezzlement may result in shareholder litigations against auditors. Second, the results of the R&D investments are highly unpredictable, which increases the overall firm risk and the variance of the future cash flows. Shi (2003) suggests that the increased overall firm risk and the variance of the future cash flows arising from high R&D intensity will increase the probability of debt default and the bankruptcy risk of a firm. Debt default, business failure and bankruptcy risk will also trigger shareholder litigation against managers and auditors for financial losses incurred by the business failure. Simunic(1980) indicates that auditors take into consideration the probability of business failure and bankruptcy risk into pricing decision and ask for fee premium to compensate for the litigation risk and loss of reputation if the risk of business failure is high. Thus, high R&D intensity may increase the risk of business failure and auditors will raise audit fee if the R&D intensity is high.

R&D intensity can also increase the audit scope and audit effort. R&D investments are firm specific and idiosyncratic as each R&D project is unique (Himmelberg and Petersen, 1994). The uniqueness of R&D investments increases the difficulty of valuation of those investments and the measurement of the R&D investments is generally unreliable. Auditors must exert additional effort to verify the accounting measurement and valuation.

The above arguments imply that higher R&D intensity increases information asymmetry, earnings management risk, overall firm risk, the risk of debt default and business failure, and ultimately, the risk of litigation against auditors. The idiosyncrasy of R&D investments also increases the difficulty of valuation and the unreliability of accounting measurement of those investments demand an expanded audit scope and audit efforts. Therefore, we hypothesize a positive relationship between R&D intensity and audit fees.

To address our research questions, we utilize a sample of audit fees from the database of Audit Analytics from the fiscal year 2000 to fiscal year 2012. We obtain accounting data from the database of Compustat and exclude foreign firms (ADRs) and firms in regulated industries. Following prior research (Godfrey and Hamilton, 2005), we define R&D intensity as all non-missing values of R&D expenditure in Compustat scaled by total assets. Our empirical finding corroborates our prediction. We document that as R&D intensity is higher, audit fees tend to increase too.

The extent to which R&D intensity can impact auditor's pricing decision is likely to be conditioned on a number of factors including internal and external monitoring mechanisms, such as auditor type. We next examine whether high-quality auditors, or industry specialist auditors, may attenuate the higher audit fees due to higher audit risk and audit efforts related to R&D intensity.

Industry specialist auditors, or industry specialists, are known to invest heavily in sophisticated auditing technologies and accrue significant amount of experience of using such technologies in practice.

Prior audit fee research argues that high-quality audit firms, such as industry specialist auditors, are more likely to detect accounting fraud, enhance a firm's information environment by reducing information asymmetry and is an additional control mechanism to relieve agency cost (Francis, Maydew, and Sparks 1999; Francis and Wilson 1988;). Empirical evidence confirms that industry specialists can relieve client's concern of earnings management, asset embezzlement, and provide high-quality audits (Johnson and Lys 1990; DeFond 1992). For example, DeAngelo (1981) argues that industry specialists have a higher likelihood to detect accounting problems and are more incentivized to do so than low-quality auditors. More recently, Godfrey and Hamilton (2005) suggest that firms with higher agency costs proxied by R&D intensity are more likely to hire high-quality auditors to improve the accuracy of the financial reports, reduce information asymmetry and constrain managerial opportunism. We thus hypothesize that audit fee premium arising from the litigation risk related to R&D intensity can be reduced if industry specialist auditors are hired. In other words, high quality audits may significantly reduce audit risk and attenuate the positive relationship between audit fees and R&D intensity.

Consistent with prior research (Godfrey and Hamilton, 2005), we use the city level expertise of auditors as our proxy for industry specialist auditors and interact this proxy with R&D intensity as the primary independent variable in the multiple regression models. Our empirical finding supports our hypothesis. The interactive variable is significantly negative in the audit fee regression, suggesting the risk premium arising from high R&D intensity is reduced if a high-quality auditor is hired.

Our research contributes to the audit fee research literature as our paper identifies an important determinant to audit fees. Our research contributes to the research of R&D intensity. Our research indicates that high R&D intensity, although enhance firm value, has unintended burden on firms.

## **2. METHODOLOGY**

### **2.1 Proxies of R&D Intensity**

The R&D expenditure variable in COMPUSTAT has a lot of missing values. Following prior research (Godfrey and Hamilton, 2005), we use all non-missing values of R&D expenditure, and scale this variable with the total assets as our primary R&D intensity proxy. This definition of R&D intensity may relieve the doubt that our results are driven by the missing values. Alternatively, similar results are found if we replace the missing values of the R&D expenditure with zeros.

### **2.2 Sample Selection**

Our sample is the overlap of the audit fee data from Audit Analytics database and the financial statement data from Compustat database from the fiscal year 2000 to fiscal year 2012. Observations are removed from the sample if there are duplicate audit fees entries in Audit Analytics, if they are foreign firms (ADRs), or if there is not enough financial statement information to calculate the R&D intensity and other control variables, or if they are from regulated industries (SIC 4000-4999) or financial industries(SIC6000-6999).

To mitigate the effect of potential outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels before analysis<sup>1</sup>. The final sample size is 23,439 firm-year observations from 3,979 firms.

### 2.3 Regression Model

To test the association between our proxies of R&D intensity, and fees paid to auditors, we estimate the following regression model based on audit fee models, consistent with prior research (Abott et.al, 2003):

$$\begin{aligned} LAUDIT_t = & b_0 + b_1 * RD\_INTENSITY_t + b_2 * LOGAT_t + b_3 * BM_t + b_4 * BUSY_t + b_5 * ROA_t \\ & + b_6 * QUICK_t + b_7 * LEVERAGE_t + b_8 * LOSS_t + b_9 * INVREC_t \\ & + b_{10} * SPITEM_t + b_{11} * BIGN_t + b_{12} * NSEG_t + b_{13} * FOPS_t \\ & + b_{14} * GCM_t + b_{15} * REPORT\_LAG_t + b_{16} * EXPERT_t + b_{17} * TENURE_t + e_t. \end{aligned}$$

A detailed description of variable definitions is listed in Appendix 1.

The dependent variable (*LAUDIT*) is the natural log of fees (in 000s) paid to auditors for audit services<sup>2</sup>. *RD\_INTENSITY* is the independent variable, calculated as was described above. If the R&D intensity is a risk factor to which the external auditor sensitive, then we expect  $b_1$  will be positive and significant. The common determinants of audit fees model include audit client size, complexity, financial health, and auditor characteristics. The auditee's size is measured by the natural log of its total assets. We control for client complexity by including the number of consolidated segments (*NSEG*) and if the company has foreign operation (*FOPS*). *INV\_REC* measures the proportion of total assets in inventory and accounts receivable. *LEVERAGE* is used to measure the client's business risk related to their financial structure and the debt level. *BM*, the book to market ratio, is used to control the client growth opportunities. *ROA*, the return on assets and *LOSS*, the net income direction dummy, are used to control the audit client financial health. *GCM*, is a dummy variable that denotes if the client has received a qualified opinion from their auditor. *REPORT\_LAG* is the variable of the audit report lag. the city level audit expert (*EXPERT*)<sup>3</sup>, the number of years for any auditor serving her specific client<sup>4</sup> (*TENURE*), and *BIGN*, a dummy variable to indicate if the auditor is one of big 5 auditors<sup>5</sup>, are used here to control the possible auditor characteristics in the regression.

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<sup>1</sup>Our results remain unchanged if unwinsorized or winsorized at top and bottom 5% data are used in the regression.

<sup>2</sup> To be consistent with Abbot et. al. (2003), Fields et. al. (2004), Mayhew and Wilikins (2003), and other prior studies, the natural log of audit fees in thousands of dollars is used as dependent variables in this study.

<sup>3</sup>Industry audit expert or Industry specialist auditor is defined on city (or the metropolitan statistical areas) level following Reichelt and Wang (2009). Similar results are found if we use both national and city level audit expert as control variable in our regression model.

<sup>4</sup> Instead of using the continuous tenure measurements, when we use another dummy variable *TENURE2* (= 1 when *TENURE* is larger than or equal 3, = 0 otherwise) to replace the *TENURE* variable, our results hold.

<sup>5</sup>*BigN* auditors are defined as: Deloitte, PwC, Ernst & Young, KPMG and Arthur Andersen in this study.

To study the moderating effect of auditor expertise on the R&D audit risk, an interaction term of the city level industry specialist (*EXPERT*) and R&D intensity (*RD\_INTENSITY*) is added to our main regression. If hiring the industry specialist auditors can mitigate the audit risk associated with R&D intensity, then we expect the coefficient on this interaction term will be negative significant.

### 3. RESULTS

#### 3.1 Descriptive and Univariate Results

Panel A of Appendix 2 provides descriptive statistics for the sample. The mean audit fees are 1,416 thousand dollars, which is a lot larger than the median audit fees of 473 thousand dollars. Consistent with prior literature, after the log transformation, the difference between the mean and median of *LAUDIT* is small.

Panel B of Appendix 2 exhibits the correlation matrix for the variables in the regressions. In line with prior studies, the *LAUDIT* is positively correlated with *SIZE*. The *RD\_INTENSITY* are correlated with natural log of audit fees negatively. The negative coefficient correlation suggests a negative relationship between R&D intensity and audit fees, on the surface. We control other factors that may impact the relationship in multiple regression. Although the correlation coefficients between some variables are larger than 0.50, the VIF scores are less than 6 in our regressions. Therefore, multicollinearity does not seem an issue here.

#### 3.2 Multivariate Results

Appendix 3 reports the multivariate regression results of our primary regressions. Following Krishnan et. al. (2013), our regressions models are estimated with the standard errors clustered by firms to correct for time-series dependence of audit fee data. Year and industry fixed effects are controlled by dummy variables<sup>6</sup>. The regressions have a high R-square value (0.85), which confirms the high explanatory power of the audit fee model in prior literature. All control variables are in the expected direction as in prior literature (Hay et al. 2006). The coefficient of *RD\_INTENSITY* is significantly positive ( $p=0.00$ ). This result supports our risk hypothesis on R&D expenditure.

In addition, Appendix 4 reports results of the moderating effect of audit expertise on the riskiness of R&D expenditure. The coefficient of the interaction term of audit expertise and *RD\_INTENSITY* is significantly negative ( $p = 0.00$ ). This result is in line with our hypothesis that audit expertise may mitigate the audit risk associated with RD activities.

#### 3.3 Sensitivity Analysis

Additional tests are conducted to determine if our results are sensitive to the specification of the audit fee model. Using alternative definitions of *RD\_INTENSITY*, such as R&D expenditure scaled by firm total sales revenue, the regressions yield similar results. Since R&D expenditure is associated with intangible assets development, we also include intangible asset ratio (intangible assets scaled by total assets) as an sensitivity test. Our

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<sup>6</sup> The unreported regression results with no clustering standard errors are similar with the reported.

result does not change. In addition, our results hold when we include performance matched discretionary accruals (Kothari 2005) as additional control variable in our regression. Lastly, similar results are also found in both pre-SOX and post-SOX subsamples (using year = 2002 as cut off), or both pre-crisis and post-crisis subsamples (using year = 2008 as cut off).

## 5. CONCLUSION

We provide evidence on whether audit fees vary in response to the intensity of research and development (R&D) expenditure and whether some other factors, such as high-quality auditors, may moderate the relationship between R&D intensity and audit fees. Our evidence indicates that there is a positive relationship between R&D intensity and audit fees and hiring an industry specialist auditor may attenuate the relationship. Our findings suggest that auditors charge a premium for heightened audit risk and increased audit efforts related to R&D intensity. We contribute to both the research of determinants to audit fees and the literature of R&D intensity.

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**Appendix 1**  
**Variable Definitions****Dependent Variables**

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AUDFEE = audit fees in thousand dollars;

LAUDIT = log of audit fees in thousand dollars;

**Experimental Variables**

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RD\_INTENSITY = research and development expenditure scaled total assets;

**Control Variables**

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ASSET = total assets in millions of dollars;

LOGAT = natural log of total assets;

BM = book-to-market ratio;

BUSY = 1 if fiscal year end is December, and 0 otherwise;

ROA = income before extraordinary items deflated by total assets;

QUICK = current assets divided by current liabilities;

LEVERAGE = total debts deflated by total assets;

LOSS = 1 if the firm report loss for current year, and 0 otherwise;

INV\_REC = sum of inventories and receivables, divided by total assets;

SPITEM = 1 if the firm reports a special item, and 0 otherwise;

BIGN = 1 if the firm is audited by a big 5 audit firm, and 0 otherwise;

NSEG = the number of business segments;

FOPS = 1 if firm has a foreign operation, and 0 otherwise;

GCM = 1 if firm receives a going concern opinion, and 0 otherwise;

REPORT\_LAG = time in days from fiscal year end to the audit report date;

EXPERT = 1 if an auditor is City (MSA) level expert, 0 otherwise

RD\_EXPERT = the interaction of RD\_INTENSITY and EXPERT

TENURE = number of years for an audittee served by a specific auditor

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## Appendix 2

Panel A: Descriptive Statics (N = 23,439)

Variable Name	Mean	Median	Standard Deviation	25th percentile	75th percentile
AUDFEE	1,416.27	473.43	3,062.28	162.09	1,312.94
LAUDIT	6.18	6.16	1.45	5.09	7.18
RD_INTENSITY	0.14	0.06	0.28	0.01	0.15
ASSETS	2,402.77	179.51	11,123.12	35.23	928.32
BM	0.40	0.38	0.95	0.19	0.67
BUSY	0.67	1.00	0.47	0.00	1.00
ROA	-0.34	0.01	1.31	-0.22	0.07
QUICK	2.79	1.67	3.35	0.98	3.24
LEVERAGE	0.71	0.43	1.53	0.24	0.64
LOSS	0.46	0.00	0.49	0.00	1.00
INV_REC	0.28	0.25	0.23	0.11	0.39
SPITEM	0.64	1.00	0.48	0.00	1.00
BIGN	0.73	1.00	0.44	0.00	1.00
NSEG	1.99	1.00	1.48	1.00	3.00
FOPS	0.50	1.00	0.49	0.00	1.00
GCM	0.10	0.00	0.31	0.00	0.00
REPORT_LAG	111.34	102.00	54.40	87.00	118.00
TENURE	8.59	6.00	7.60	3.00	11.00
EXPERT	0.42	0.00	0.49	0.00	1.00

**Panel B: Correlation among Variables – Pearson (below)/ Spearman (above)**

Bold indicate correlation significant at  $p < 0.10$  level. See Appdenix1 for variable definition.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) LAUDIT	1	<b>-0.25</b>	<b>0.86</b>	<b>0.10</b>	0.01	<b>0.39</b>	<b>-0.07</b>	<b>0.14</b>	<b>-0.37</b>	<b>0.07</b>	<b>0.35</b>	<b>0.43</b>	<b>0.60</b>	<b>0.51</b>	<b>-0.34</b>	<b>-0.28</b>	<b>0.45</b>	<b>0.25</b>
(2) RD_INTENSITY	<b>-0.30</b>	1	<b>-0.40</b>	<b>-0.29</b>	<b>0.11</b>	<b>-0.44</b>	<b>0.32</b>	<b>-0.14</b>	<b>0.43</b>	<b>-0.28</b>	<b>-0.07</b>	<b>-0.29</b>	<b>-0.10</b>	<b>-0.08</b>	<b>0.20</b>	<b>0.20</b>	<b>-0.14</b>	<b>-0.28</b>
(3) Log(at)	<b>0.86</b>	<b>-0.45</b>	1	<b>0.18</b>	<b>-0.02</b>	<b>0.50</b>	<b>-0.05</b>	<b>0.09</b>	<b>-0.47</b>	<b>0.08</b>	<b>0.32</b>	<b>0.44</b>	<b>0.57</b>	<b>0.57</b>	<b>-0.43</b>	<b>-0.37</b>	<b>0.47</b>	<b>0.29</b>
(4) BM	<b>0.07</b>	<b>-0.22</b>	<b>0.18</b>	1	<b>-0.10</b>	<b>0.12</b>	<b>0.14</b>	<b>-0.34</b>	<b>-0.13</b>	<b>0.14</b>	<b>0.09</b>	<b>0.15</b>	<b>0.14</b>	<b>0.12</b>	<b>-0.33</b>	<b>-0.02</b>	<b>0.11</b>	<b>0.08</b>
(5) BUSY	0.01	<b>0.08</b>	<b>-0.02</b>	<b>-0.06</b>	1	<b>-0.11</b>	<b>0.06</b>	<b>0.03</b>	<b>0.10</b>	<b>-0.13</b>	<b>0.02</b>	<b>-0.01</b>	<b>-0.04</b>	<b>0.06</b>	<b>0.04</b>	<b>0.04</b>	<b>-0.07</b>	0.00
(6) ROA	<b>0.33</b>	<b>-0.62</b>	<b>0.49</b>	<b>0.30</b>	<b>-0.05</b>	1	<b>0.05</b>	<b>-0.15</b>	<b>-0.85</b>	<b>0.34</b>	0.01	<b>0.25</b>	<b>0.36</b>	<b>0.23</b>	<b>-0.42</b>	<b>-0.27</b>	<b>0.27</b>	<b>0.16</b>
(7) QUICK	<b>-0.18</b>	<b>0.02</b>	<b>-0.1</b>	<b>0.10</b>	<b>0.06</b>	<b>0.10</b>	1	<b>-0.74</b>	<b>0.03</b>	<b>-0.22</b>	<b>-0.11</b>	<b>-0.17</b>	0.00	<b>0.14</b>	<b>-0.31</b>	<b>0.08</b>	0.01	<b>-0.14</b>
(8) LEVERAGE	<b>-0.20</b>	<b>0.44</b>	<b>-0.36</b>	<b>-0.44</b>	<b>0.04</b>	<b>-0.75</b>	<b>-0.22</b>	1	<b>0.07</b>	<b>0.09</b>	<b>0.15</b>	<b>0.17</b>	<b>0.02</b>	<b>-0.07</b>	<b>0.31</b>	<b>-0.08</b>	<b>0.02</b>	<b>0.11</b>
(9) LOSS	<b>-0.37</b>	<b>0.36</b>	<b>-0.47</b>	<b>-0.09</b>	<b>0.10</b>	<b>-0.35</b>	<b>0.13</b>	<b>0.18</b>	1	<b>-0.32</b>	<b>-0.01</b>	<b>-0.27</b>	<b>-0.34</b>	<b>-0.21</b>	<b>0.33</b>	<b>0.27</b>	<b>-0.25</b>	<b>-0.17</b>
(10) INV_REC	<b>-0.03</b>	<b>-0.23</b>	0.00	<b>0.06</b>	<b>-0.11</b>	<b>0.17</b>	<b>-0.24</b>	<b>-0.05</b>	<b>-0.25</b>	1	<b>-0.03</b>	<b>0.17</b>	<b>0.17</b>	<b>-0.05</b>	<b>-0.16</b>	<b>-0.11</b>	<b>0.03</b>	<b>0.08</b>
(11) SPITEM	<b>0.35</b>	<b>-0.1</b>	<b>0.31</b>	<b>0.03</b>	<b>0.02</b>	<b>0.05</b>	<b>-0.16</b>	<b>-0.01</b>	<b>-0.01</b>	<b>-0.07</b>	1	<b>0.20</b>	<b>0.26</b>	<b>0.18</b>	<b>-0.05</b>	<b>-0.09</b>	<b>0.15</b>	<b>0.07</b>
(12) NSEG	<b>0.47</b>	<b>-0.23</b>	<b>0.47</b>	<b>0.06</b>	0.01	<b>0.16</b>	<b>-0.20</b>	<b>-0.07</b>	<b>-0.27</b>	<b>0.07</b>	<b>0.20</b>	1	<b>0.34</b>	<b>0.18</b>	<b>-0.16</b>	<b>-0.22</b>	<b>0.21</b>	<b>0.18</b>
(13) FOPS	<b>0.59</b>	<b>-0.25</b>	<b>0.55</b>	<b>0.09</b>	<b>-0.04</b>	<b>0.26</b>	<b>-0.14</b>	<b>-0.15</b>	<b>-0.34</b>	<b>0.08</b>	<b>0.26</b>	<b>0.34</b>	1	<b>0.33</b>	<b>-0.29</b>	<b>-0.23</b>	<b>0.30</b>	<b>0.08</b>
(14) BIGN	<b>0.51</b>	<b>-0.19</b>	<b>0.58</b>	<b>0.13</b>	<b>0.06</b>	<b>0.29</b>	<b>0.04</b>	<b>-0.25</b>	<b>-0.21</b>	<b>-0.10</b>	<b>0.18</b>	<b>0.18</b>	<b>0.33</b>	1	<b>-0.34</b>	<b>-0.18</b>	<b>0.47</b>	<b>0.23</b>
(15) GCM	<b>-0.34</b>	<b>0.41</b>	<b>-0.49</b>	<b>-0.36</b>	<b>0.04</b>	<b>-0.56</b>	<b>-0.15</b>	<b>0.48</b>	<b>0.33</b>	<b>-0.09</b>	<b>-0.05</b>	<b>-0.15</b>	<b>-0.29</b>	<b>-0.34</b>	1	<b>0.14</b>	<b>-0.23</b>	<b>-0.10</b>
(16) REPORT_LAG	<b>-0.18</b>	<b>0.1</b>	<b>-0.24</b>	<b>-0.04</b>	<b>-0.01</b>	<b>-0.13</b>	0.00	<b>0.08</b>	<b>0.18</b>	<b>-0.02</b>	<b>-0.04</b>	<b>-0.13</b>	<b>-0.16</b>	<b>-0.15</b>	<b>0.14</b>	1	<b>-0.24</b>	<b>-0.14</b>
(17) TENURE	<b>0.44</b>	<b>-0.16</b>	<b>0.46</b>	<b>0.06</b>	<b>-0.06</b>	<b>0.17</b>	<b>-0.10</b>	<b>-0.10</b>	<b>-0.25</b>	0.01	<b>0.15</b>	<b>0.29</b>	<b>0.30</b>	<b>0.38</b>	<b>-0.18</b>	<b>-0.17</b>	1	<b>0.20</b>
(18) EXPERT	<b>0.25</b>	<b>-0.16</b>	<b>0.29</b>	<b>0.06</b>	0.00	<b>0.11</b>	<b>-0.09</b>	<b>-0.05</b>	<b>-0.17</b>	<b>0.06</b>	<b>0.07</b>	<b>0.19</b>	<b>0.08</b>	<b>0.23</b>	<b>-0.10</b>	<b>-0.08</b>	<b>0.21</b>	1

## Appendix 3

## Testing the Association between Audit Fees and R&amp;D Intensity

Variables	Predicted Sign	Coefficient	t-Statistic	p-value
INTERCEPT	?	3.074	63.36	0.000
RD_INTENSITY	?	0.210	7.26	0.000
EXPERT	+	0.033	2.30	0.022
LOGAT	+	0.447	80.55	0.000
BM	-	-0.017	-3.28	0.000
BUSY	+	0.097	5.45	0.000
ROA	-	-0.039	-5.38	0.000
QUICK	-	-0.029	-13.80	0.000
LEVERAGE	+	0.013	2.25	0.024
LOSS	+	0.134	10.18	0.000
INV_REC	+	0.053	1.74	0.081
SPITEM	+	0.108	8.11	0.000
NSEG	+	0.063	10.02	0.000
FOPS	+	0.278	15.13	0.000
BIGN	+	0.362	17.16	0.000
GCM	+	0.064	2.78	0.006
REPORT_LAG	+	0.001	11.51	0.000
TENURE	+	0.002	1.96	0.049
N			23,439	
AdjustedR <sup>2</sup>			0.84	

Significance of t-statistics are two-tailed. Industry and year dummies are included, but not reported. \*, \*\*, \*\*\* represent significance levels of 10 percent, 5 percent, and 1 percent, respectively. Standard errors are clustered by company following Petersen 2009 and Gow et al. 2010. Variables are defined in Appendix1.

## Appendix 4

**Testing the Association between Audit Fees, R&D Intensity and  
Moderating Effect of City Level Audit Specialist**

Variables	Predicted Sign	Coefficient	t-Statistic	p-value
INTERCEPT	?	3.068	62.94	0.000
RD_INTENSITY	?	0.216	7.50	0.000
RD_EXPERT	-	-0.010	-4.37	0.000
EXPERT	+	0.033	2.31	0.022
LOGAT	+	0.448	81.01	0.000
BM	-	-0.017	-3.25	0.000
BUSY	+	0.097	5.90	0.000
ROA	-	-0.039	-5.45	0.000
QUICK	-	-0.030	-14.58	0.000
LEVERAGE	+	0.014	2.33	0.020
LOSS	+	0.135	10.23	0.000
INV_REC	+	0.053	1.73	0.083
SPITEM	+	0.106	10.07	0.000
NSEG	+	0.063	10.70	0.000
FOPS	+	0.278	15.23	0.000
BIGN	+	0.373	17.73	0.000
GCM	+	0.066	2.82	0.005
REPORT_LAG	+	0.001	11.47	0.000
TENURE	+	0.002	1.97	0.049
N			23,439	
AdjustedR <sup>2</sup>			0.84	

Significance of t-statistics are two-tailed. Industry and year dummies are included, but not reported. \*, \*\*, \*\*\* represent significance levels of 10 percent, 5 percent, and 1 percent, respectively. Standard errors are clustered by company following Petersen 2009 and Gow et al. 2010. Variables are defined in Appendix1.



## EXCHANGE RATE AND BILATERAL TRADE BALANCE OF TURKEY WITH EU (15) COUNTRIES

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### Keywords:

Exchange Rate,  
J-curve,  
Bilateral Trade,  
Bounds Testing Approach,  
Depreciation

**JEL Classification:** F14, F31

### ABSTRACT

This paper investigates the short-run and long-run impact of real exchange rate on the bilateral trade balance of Turkey with EU (15) countries. We've employed the bounds testing approach to the cointegration and the error correction modeling. Following Yazici and Islam (2011a, 2011b, 2012) and Yazici (2012), we select the optimal model from the set of those models that satisfy both diagnostic tests and cointegration. Thus, unlike the other studies, it is ensured that a statistically reliable and cointegrated model is picked up for estimation. Based on the quarterly data for 1982-I to 2001-IV period, estimation results indicate no evidence of J-curve in the short run in any of Turkey's bilateral trade with EU(15) countries. In the long run, however, real depreciation of Turkish Lira improves the trade balance of Turkey with Austria, Denmark, France, Ireland, Italy, Sweden and UK.

## 1. INTRODUCTION

Economists, given the fact that exchange rate is an important price variable, have long been interested in the effect of the exchange rate, particularly the effect of devaluation or depreciation, on the trade balance. In trade theory the long-run impact on trade balance of exchange rate depreciation is characterized by Marshall-Lerner condition.<sup>1</sup> Also in theory the short-run effect of real currency depreciation on trade balance is hypothesized to follow j-curve effect put forward by Stephen P. Magee (1973). According to j-curve effect, as a result of devaluation, the trade balance first worsens and then after the passage of sometime it begins to improve.

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<sup>1</sup> Marshall-Lerner condition states that in order for devaluation or depreciation to improve the trade balance, the sum of export demand and import demand elasticities must be greater than one, under the assumption that both export supply and import supply elasticities are infinite. When this assumption about export and import supply elasticities is not made, Marshall-Lerner condition takes a more complicated form, which can be found in, for example, Salvatore (1999).

Even though in theory the issue of exchange rate effect on trade balance is resolved, how the trade balance of a particular economy is affected by exchange rate is an empirical question to be investigated.

The purpose of this paper is to examine the relation between the exchange rate and the bilateral trade balance of Turkey with EU(15) countries using bounds testing approach with the model selection strategy adopted from Yazici and Islam (2011a, 2011b, 2012) and Yazici (2012).

EU(15) countries is selected for bilateral analysis because Turkey is a candidate-country pursuing to join European Union and such a study will shed light on the trade relations between a candidate country and the Union members. EU(15) countries together have a share of 49.7 % in Turkey's total exports and 47.3 % in Turkey's total imports over 1982-2001.

The rest of the paper is organized as follows; in the following section the relevant literature is reviewed and then the model employed in the estimation of the trade balance is set out. This is followed by the description and the sources of data. The next section presents the empirical results, and the last section contains the key findings and the concluding remarks.

## **2. LITERATURE REVIEW**

Numerous studies have investigated empirically the impact of the exchange rate changes on the trade balance for a variety of countries using different models and different econometric techniques. Results emerging from these studies regarding the impact of the exchange rate on trade balance are mixed, some supporting what the theory predicts others are not. These studies can be classified in terms of at what level the trade balance is considered. There are basically three types of studies, specifically those at aggregate trade balance level, at bilateral trade balance level and at industry or commodity-group trade balance level. Some examples from each category are reviewed in this section.

Examples of studies investigating the impact of exchange rate on aggregate trade balance include Mohsen Bahmani-Oskooee (1985), Anju Gupta-Kapoor and Uma Ramakrishnan (1999), Elif Akbostanci (2004), Mohsen Bahmani-Oskooee and Ali Kutan (2009) and Pavle Petrovic and Mirjana Gligoric (2010).

Mohsen Bahmani-Oskooee (1985) tests J-curve for four developing countries (Greece, India, Korea and Thailand) by imposing an Almon lag structure on the exchange rate variable in a trade balance model. His findings support the j-curve effect in cases of Greece, India and Korea while favorable impact of depreciation on trade balance in the long-run is found only in the case of Thailand.

Anju Gupta-Kapoor and Uma Ramakrishnan (1999) examines the effect of currency depreciation on the trade balance of Japan using Johansen cointegration test and corresponding error correction model and impulse response based on quarterly data from 1975 to 1996. They report that there exists a long-run relationship between trade balance, exchange rate, real domestic income and real foreign income and that depreciation improves trade balance in the long-run. As for the short-run effect of currency depreciation, they report that there exists a j-curve effect.



Elif Akbostanci (2004), using Johansen cointegration method and impulse response function, investigates the J-curve effect in Turkish data and finds no worsening of the trade balance in the short run but finds long-run improvement as a result of domestic currency depreciation.

Mohsen Bahmani-Oskooee and Ali Kutan (2009) investigates the effect of depreciation on the trade balance for eleven East European emerging countries (Bulgaria, Croatia, Cyprus, Czech Republic, Hungary, Poland, Romania, Russia, Slovenia, Turkey and Ukraine). Results, based on monthly data from 1990:1 to 2005:6 and the use of bounds testing approach to cointegration and error correction modeling, show that there exists j-curve effect in Bulgaria, Croatia and Russia, when j-curve is defined as a short-run deterioration combined with long-run improvement.

Pavle Petrovic and Mirjana Gligoric (2010) explores the short run and long run effect of currency depreciation on Serbian trade balance using Johansen method and ARDL approach as well as corresponding error correction model and impulse response function based on monthly data from 2002:1 to 2007:9. They find that currency depreciation in Serbia improves trade balance in the long-run and leads to j-curve effect in the short run.

Among the studies using bilateral data are Andrew K. Rose and Janet L. Yelen (1989), Marwah and Lawrence R. Klein (1996), Swarnjit Arora, Mohsen Bahmani-Oskooee and Gour Goswami (2003) and Mohsen Bahmani-Oskooee and Artatrana Ratha (2004).

Andrew K. Rose and Janet L. Yelen (1989) tests the j-curve at the bilateral level between US and each of its six major trading partners (Canada, France, Germany, Italy, Japan and UK) based on quarterly data from 1960 to 1985. They find no j-curve pattern or a long-run relationship at the bilateral level between trade balance and exchange rate

Kanta Marwah and Lawrence R. Klein (1996) using quarterly data from 1977 to 1992 investigates the J-curve phenomenon between Canada and its five largest trading partners as well as US and its five trading partners. They find that in both US and Canada after currency depreciation trade balance first deteriorates, then improves and then deteriorates again, thus exhibiting an S pattern.

Swarnjit Arora, Mohsen Bahmani-Oskooee and Gour Goswami (2003) using Autoregressive Distributed Lag (ARDL) method or bounds testing approach examines the effect of the depreciation of the rupee on Indian bilateral trade balance with its seven major trading partners (Australia, France, Germany, Italy, Japan, UK and USA). They don't find j-curve effect in bilateral trade with any of trading partners but they find that in the long-run real depreciation of rupee improves bilateral trade balance of India with Australia, Germany, Italy and Japan.

Mohsen Bahmani-Oskooee and Artatrana Ratha (2004) investigates the J-curve effect in US data bilaterally between US and its fourteen developing countries as trading partners. Results based on quarterly data from 1975 to 2000 show that while no specific short-run pattern is detected, currency depreciation improves bilateral trade balance of US with Argentina, Chile, Israel, Korea, Mexico, Singapore and South Africa.

Khosrow Doroodian, Chulho Jung and Roy Boyd (1999), Mohsen Bahmani-Oskooee and Yongqing Wang (2008), Mehmet Yazici and Mushtaq A. Klasra (2010) and Mehmet Yazici and M. Qamarul Islam (2011a) are examples exploring the exchange rate impact at industry level.

Khosrow Doroodian, Chulho Jung and Roy Boyd (1999) investigates the J-curve hypothesis for both US agricultural and manufacturing sectors using the Shiller lag model and finds J-curve effect in agricultural sector but not in manufacturing.

Mohsen Bahmani-Oskooee and Yongqing Wang (2008) consider 88 Chinese industries and investigate how trade balance of each of these industries in bilateral trade between China and US reacts to currency depreciation. They have based their study on annual data from 1978 to 2002 and utilized bounds testing approach to cointegration and corresponding error correction model. Their results show that trade balances of 34 industries improve in the long-run as a result of depreciation and that in the short run j-curve effect is detected in 22 industries.

Mehmet Yazici and Mushtaq A. Klasra (2010) investigates, in the context of two sectors of Turkish economy that use imported inputs at different rates in production, how the response of trade balance to currency devaluation is affected by usage of imported inputs in production of exports. Based on the data covering the period from 1986: I to 1998:III, their results indicate that in neither sector J-curve exists and that the violation of the J-curve effect is more severe in the sector with higher import content.

Mehmet Yazici and M. Qamarul Islam (2011a) explores the impact of exchange rate on trade balances of 21 commodity groups of Turkey with EU(15). They find that exchange rate matters in the determination of trade balances of 13 commodity groups out of 21 in the short-run with no j-curve effect but in the long-run exchange rate has no statistically significant effect on the trade balance of any of commodity groups.

### 3. MODEL

In modeling the trade balance, we closely follow the previous literature and specify the trade balance as a function of the real domestic income, the real foreign income, and the real exchange rate.<sup>2</sup> The reduced form of trade balance equation in log-linear form is given as follows;

$$\ln TB_{i,t} = a + b \ln Y_{TR,t} + c \ln Y_{i,t} + d \ln RER_{i,t} + \varepsilon_t \quad (1)$$

Where  $TB_i$  is bilateral trade balance defined as the ratio of exports of Turkey to trading partner  $i$  over Turkey's imports from the same trading partner,  $Y_{TR}$  is Turkey's real income,  $Y_i$  is the trading partner  $i$ 's real income, and  $RER_i$  is the bilateral real exchange rate between Turkey and trading partner  $i$  constructed as nominal exchange rate times trading partner's price index over domestic price index where nominal exchange rate is defined as the amount of Turkish Lira per trading partner's currency.

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<sup>2</sup> Details of derivation of this trade balance model can be found in Yazici and Islam (2012).

Our expectations about the signs of the variable coefficients are as follows. Given that the exchange rate is defined as the amount of domestic currency per foreign currency, a rise in the real exchange rate (depreciation) will make exports cheaper and imports more expensive and thus lead to an improvement in the trade balance. As far as the real domestic income is concerned, an increase in real domestic income will lead to higher demand for imports and as a result trade balance will worsen. So we expect the coefficient of domestic income to be negative. If the increase in the domestic income, however, results from an increase in the production of import-substitutes, the domestic income will have a positive impact on trade balance. As for the trading partner's real income, a rise in it will be expected to lead to higher exports and therefore the trade balance will improve. However, if the increase in the partner's income is due to the increase in the production of import-substitutes, the effect of trading partner's real income on the trade balance will be negative.

Relationship among the variables in equation (1) is a long-run one. However, the short run impact also matters because this is the period in which, as a short-run phenomenon, j-curve effect could arise. Therefore, short-run dynamics needs to be incorporated into equation (1). Following Peseran, Shin and Smith (2001), by employing Autoregressive Distributed Lag Method (ARDL), we express equation (1) in error-correction modeling format as follows;

$$\Delta \ln TB_{i,t} = \alpha + \sum_{j=0}^k \beta_j \Delta \ln Y_{TR,t-j} + \sum_{j=0}^l \gamma_j \Delta \ln Y_{i,t-j} + \sum_{j=0}^m \lambda_j \Delta \ln RER_{i,t-j} + \sum_{j=1}^n \theta_j \Delta \ln TB_{i,t-j} + \delta_1 \ln Y_{TR,t-1} + \delta_2 \ln Y_{i,t-1} + \delta_3 \ln RER_{i,t-1} + \delta_4 \ln TB_{i,t-1} + u_t \quad (2)$$

Cointegration among the model variables is determined in the bounds testing approach using F-test. The null hypothesis of no cointegration ( $H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$ ) is tested against the alternative of cointegration ( $H_1 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$ ). Under the null hypothesis, F-statistic exhibits a non-standard distribution. Therefore, in testing the above hypothesis new critical values provided by Peseran, Shin and Smith (2001) is used. In this case the upper bound critical value for F-statistic at 10% significance level is 3.77 (Peseran *et al.* (2001), Table CI, Case III, p.300). The null hypothesis is rejected and cointegration among variables is established if the calculated F-statistic exceeds the upper bound critical value.

Papers other than Yazici and Islam (2011a, 2011b, 2012) and Yazici (2012) utilizing the bounds testing approach proceed in selecting a model as follows. Based on a certain model selection criterion such as Akaike Information Criterion (AIC), they first select the optimum model and then apply the cointegration and diagnostic tests to the selected model. Without any regard to whether or not diagnostics and cointegration are satisfied, they report whatever results come up in the end. However, some or all of the diagnostics may not be satisfied and/or cointegration may not exist in the selected model, thus making the reported model unreliable. In this paper we use the model selection strategy adopted by Yazici and Islam (2011a, 2011b, 2012) and Yazici (2012).

Following them, we first apply the cointegration and diagnostic tests to all possible combinations or models available given a maximum lag length and then determine the subset of models satisfying both the cointegration and the diagnostics. Finally, we apply model selection criterion to this subset in order to come up with the optimal model for estimation. Unlike other studies, this strategy of model selection ensures that the estimated optimum model is cointegrated and passes the diagnostics, thus enabling us to derive reliable statistical inferences from the estimated model.

#### **4. DATA**

We use quarterly data that covers the period from 1982:I to 2001:IV. We index all data using 2000 quarterly average as the base and adjust them seasonally. Our data come from the following sources; IMF-IFS Country Tables, Eurostat, Central Bank of Turkey and Statistics Office of Turkey. We obtain data for bilateral export and import with all countries in our study from Statistics Office of Turkey. Data for Gross Domestic Product (GDP), Industrial Production Index, GDP Deflator and Consumer Price Index (CPI), except for Greek CPI, are compiled from IMF-IFS Country tables. Source for CPI of Greece is Eurostat. Bilateral nominal exchange rate data between Turkish Lira and the currency of each of the EU countries except for Finland, Greece, Ireland, Portugal and Spain come from Central Bank of Turkey. The source for bilateral nominal exchange rates between Turkish Lira and the currency of Finland, Greece, Ireland, Portugal and Spain is Eurostat. Bilateral exchange rates between Turkish Lira and the currency of each of these countries are not, however, directly available in Eurostat. We have calculated them using the exchange rate between the currency of each country and ECU, the exchange rate between US dollar and ECU and the exchange rate between Turkish Lira and US dollar.

#### **5. ESTIMATION RESULTS**

Before proceeding to the estimation, we have checked the integrating properties of variables involved using Augmented Dicky-Fuller (ADF) (David A. Dickey, and Wayne A. Fuller 1979) test. Because bounds testing approach, unlike two-step residual based approach of Robert F. Engle and Clive W. J. Granger (1987) and system-based reduced rank approach of Soren Johansen and Katarina Juselius (1990), does not require that all variables have the same order of integration, one might be tempted to conclude that no unit-root testing is needed. However, since the distribution of F-statistic used for cointegration test is derived under the assumption that integration order of variables is either  $I(1)$  or  $I(0)$  or in between, unit-root testing is required to make sure that integration order of variables is not greater than one. ADF unit-root test is used for this purpose and results are reported in Appendix in Table A1. Results indicate that all variables become stationary after being differenced once. Thus, all have an order of integration one, fulfilling the requirement that no variable has an order of integration greater than one.

As we have mentioned earlier, in the present paper, we follow the model selection strategy used in Yazici and Islam (2011a, 2011b, 2012) and Yazici (2012) because this strategy ensures the selection of a model that satisfy both diagnostics and cointegration. As a result, inferences derived from such a model will be statistically reliable and therefore meaningful. An algorithm developed by the second author is used for this purpose and we have proceeded as follows.

First, we set the maximum lag length on each first differenced variable in equation (2) as 10. Then we have estimated models corresponding to each possible lag combination and selected those models that satisfy the diagnostic tests of normality, no serial correlation and no heteroscedasticity at least at 10 % level. For each of these selected models or combinations, we have checked whether there exists a cointegration or not. In case no cointegration is established for a combination, we have discarded it. Finally, in order to determine the optimal model, we have applied AIC to the set of those models that satisfy diagnostic tests and at the same time indicate a cointegration.

Having followed this procedure, we have come up with optimal lag combinations given in Appendix in Table A2. We have also determined the optimal lag combinations that would have been selected if the method of the previous literature was adopted and we have reported them in Table A2 as well. In order to see the performance of models picked up by the previous literature in terms of diagnostics and cointegration, we have also provided in Table A2 associated diagnostic tests and cointegration results. When compared with our strategy, only in three cases, namely Austria, Germany and Greece, optimal models selected coincide. This means that these three countries are the cases where all four conditions we impose are satisfied simultaneously. In other cases at least one of the conditions fails with the previous literature. We see from Table A2 that normality assumption fails in three cases, no serial correlation in eight cases, no heteroscedasticity in one case and cointegration in three cases

Having determined the optimal lag combination, we have then proceeded to estimate the model in equation (2) corresponding to optimal lag combinations reported in Table A2 based on quarterly data for the period of 1982:I-2001:IV. Short-run impact of the exchange rate on the bilateral trade balance is inferred from the coefficients of the first-differenced bilateral exchange rate variable. To assess the short-run effect of the exchange rate, estimates of those coefficients are reported in Table A3.

Note that in cases of Austria, Belgium-Luxemburg, Finland, Germany, Italy, Portugal, Spain and Sweden, none of the coefficients of the exchange rate variable is significant. This means that exchange rate does not matter in the short run in Turkey's bilateral trade with these countries. In the bilateral trade with the remaining countries, namely Denmark, France, Greece, Holland, Ireland and UK, exchange rate does play a role in the short run. As a short-run phenomenon, we are particularly interested whether or not J-curve effect exists in Turkey's bilateral trade with EU countries. Given the fact that the exchange rate is defined in such a way that a rise in the exchange rate represents the depreciation or devaluation of Turkish Lira, J-curve effect will be observed if the coefficient of the first-differenced exchange rate variable has first negative values and then positive ones. Looking at the Table A3 reveals that in none of the cases such a pattern is observed. Therefore, we can conclude that in Turkey's bilateral trade with EU (15) countries no evidence is found supporting the J-curve phenomenon.

As for the long-run effect, long-run estimates are reported fully in Table A4. The real depreciation of Turkish Lira has a favorable and significant long-run effect in bilateral trade with Austria, Denmark, France, Ireland, Italy, Sweden and UK. In other cases the bilateral real exchange rate does not carry a significant coefficient, implying that changes in the exchange rate do not affect Turkey's bilateral trade balance in the long run with these countries. In case of Portugal, the exchange rate coefficient has the unexpected negative sign but it is insignificant at conventional 5 % significance level. As far as the effect of the real domestic income on bilateral trade is concerned, only in four cases, namely Finland, Greece, Portugal and Spain does the domestic income have no long-run effect on bilateral trade flow. In all other cases the real domestic income has the expected negative and significant impact on the bilateral trade flow. As for the trading partner's real income, it has significant impact on bilateral trade of Turkey with Austria, Belgium-Luxemburg, Denmark, France, Greece, Holland, Ireland, Italy, Sweden and UK. In case of Greece, however, partner's real income has a negative effect at 10% significance level on Turkey's bilateral trade balance. This negative coefficient can be justified on the basis that the increase in the partner's income could be resulting from the increase in the production of its import substitutes.

When all three determinants of trade balance are evaluated in terms of number of significant cases, we see that each of income, domestic and foreign, are statistically significant in ten cases and real exchange rate in seven cases (The number of cases in which at least either one of incomes is significant is eleven and in nine of these eleven cases both incomes are significant at the same time). In this sense partner's real income and domestic real income are the main determinants of Turkey's trade balance with EU(15) countries and then comes the real exchange rate. When evaluated in terms of sizes of coefficients, which represent elasticities in the current log-linear specification, except in the case of Greece, which is insignificant, domestic income has a coefficient greater than one in absolute value with an average of  $-1.81$ . Similarly, except in the case of Germany, which is insignificant, partner's income has a coefficient greater than one as well with an average of  $2.18$ . Thus, we can conclude that Turkish trade balance is income elastic with respect to both domestic and foreign income. On the other hand, real exchange rate has a coefficient, in some cases less than one and in others greater than one, suggesting no specific pattern but with an overall average of  $0.96$ .

In light of these long-run effects, two policy suggestions can be made regarding the improvement of trade balance with the countries studied here. First, by reducing the inflation rate, the real exchange rate can be increased and thus trade balance with those partners where real exchange rate is significant can be improved. Second, negative impact of the growth of domestic economy can be reduced by encouraging industries to use less imported inputs and more domestic resources.

Even though we have required in the model selection phase that diagnostic tests for normality, no serial correlation and no heteroscedasticity be satisfied at least at 10% level, for the sake of completeness of the presentation of estimation results and more importantly for the comparison with the diagnostic results of the procedure adopted by the previous literature we have reported in Table A5 the diagnostic test results corresponding to the estimated model.

To find out whether estimated coefficients are stable or not, we have conducted CUSUM and CUSUMSQ tests and reported results in Table A5 as well. Test results indicate that in all cases estimated model coefficients are stable according to both tests.

## **6. CONCLUSION**

This paper has examined the effect of exchange rate changes in the short run as well as in long run on the bilateral trade balance of Turkey with EU (15) countries based on the quarterly data over 1982:I-2001:IV period. The impact on the trade balance of the currency devaluation is extensively investigated in the literature. Most of the studies, however, are subject to aggregation bias problem. Realizing this problem, a new body of research has emerged, namely the analysis at the bilateral level. The present paper contributes to the literature by considering the bilateral trade of Turkey with its EU (15) partners, which together constitute about 50% share in total trade of Turkey.

As far as the short-run impact of the real depreciation of Turkish Lira is concerned, no J-curve effect is observed in Turkey's bilateral trade with any of EU (15) countries. As for the long-run effect, our results indicate that real depreciation of Turkish Lira improves the bilateral trade balance of Turkey in cases of Austria, Denmark, France, Ireland, Italy, Sweden and UK. In other cases, real currency depreciation plays no significant role in Turkey's trade balance in the long-run. It is further found that the real exchange rate variable is less important than domestic and trading partner's real incomes in the determination of Turkey's bilateral trade balance with EU(15) countries.

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## APPENDIX

Table A1: ADF Unit-Root Test Results

Trading Partner	lnTB		lnY <sub>partner</sub>		lnRER	
	Level	First Diff.	Level	First Diff.	Level	First Diff.
Austria	-2.80 (4)	-11.1 (1)*	-0.25 (2)	-7.70 (1)*	-2.38 (5)	-5.75 (2)*
Bel-Lux	-2.41 (5)	-6.52 (2)*	-0.12 (2)	-4.58 (1)*	-2.39 (5)	-5.83 (2)*
Denmark	-2.67 (4)	-7.97 (2)*	-0.17 (4)	-9.12 (2)*	-2.39 (4)	-4.59 (2)*
Finland	-2.76 (5)	-9.13 (2)*	-0.47 (2)	-6.23 (1)*	-2.06 (2)	-5.75 (1)*
France	-2.52 (4)	-6.47 (2)*	-0.22 (2)	-3.93 (1)*	-2.31 (2)	-5.98 (1)*
Germany	-2.61 (6)	-6.14 (1)*	-1.03 (2)	-6.76 (1)*	-2.23 (2)	-5.75 (1)*
Greece	-2.53 (8)	-6.85 (2)*	-1.43 (2)	-12.6 (1)*	-2.40 (2)	-6.45 (1)*
Holland	-2.61 (4)	-8.37 (1)*	-0.14 (2)	-6.09 (1)*	-2.48 (2)	-5.96 (1)*
Ireland	-2.22 (3)	-10.1 (1)*	-1.27 (2)*	-5.83 (1)*	-2.63 (2)	-6.19 (1)*
Italy	-2.44 (2)	-7.61 (1)*	-1.50 (2)	-5.93 (1)*	-2.57 (2)	-6.15 (1)*
Portugal	-2.14 (5)	-8.84 (1)*	-1.65 (2)*	-5.97 (1)*	-2.06 (2)	-5.84 (1)*
Spain	-1.97 (2)	-7.05 (1)*	-1.57 (2)	-5.38 (1)*	-2.32 (2)	-6.54 (1)*
Sweden	-2.69 (2)	-8.22 (1)*	-1.58 (2)	-9.17 (1)*	-2.02 (2)	-6.26 (1)*
UK	-2.13 (4)	-8.52 (1)*	-0.37 (2)	-5.58 (1)*	-2.38 (2)	-6.06 (1)*

**Notes:** \* indicates statistical significance at conventional 5 % level. Domestic real income (lnY<sub>Turkey</sub>) becomes stationary as well after the first difference. ADF unit root statistics associated with domestic real income for level and for first difference are -2.29(3) and -6.35(1)\*, respectively.

**Table A2: Optimal Lag Orders: Our Strategy vs. Previous Literature**

Trading Partners	Lag Order with Our Strategy	Lag order and Diagnostic Results with Previous Literature				
		Lag Order	N	S	H	C
Austria	9, 9, 9, 0	9, 9, 9, 0	√	√	√	√
Belg-Lux	6, 3, 1, 0	6, 3, 0, 0	×	√	√	√
Denmark	10, 2, 7, 7	10, 4, 7, 7	√	×	√	√
Finland	10, 8, 6, 0	10,10,10,10	√	×	√	√
France	8, 0, 1, 4	8, 0, 0, 4	×	√	√	√
Germany	2, 6, 3, 0	2, 6, 3, 0	√	√	√	√
Greece	1, 2, 1, 9	1, 2, 1, 9	√	√	√	√
Holland	7,10, 5, 8	7,10, 7, 8	√	×	√	√
Ireland	9, 9, 7, 7	9,10,10, 8	√	×	√	√
Italy	1, 0, 3, 0	9, 5, 6, 2	√	√	√	×
Portugal	8, 3,10, 0	9, 8, 8,10	×	×	√	×
Spain	1, 0, 0, 6	10, 5, 6, 9	√	×	×	×
Sweden	9, 3,10, 0	9,10,10, 0	√	×	√	√
UK	9, 9, 8,10	8, 9,10,10	√	×	√	√

**Notes:** The order of the optimal lags corresponds to the following order of the variables: ( $\Delta \ln TB, \Delta \ln Y_{\text{Turkey}}, \Delta \ln Y_{\text{partner}}, \Delta \ln RER$ ). N: normality, S: no serial correlation, H: no heteroscedasticity, C: cointegration.

Table A3: Short-Run Coefficient Estimates of Exchange Rate Variable

Trading Partners	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8	t-9	t-10
Austria	-0.12 (-0.15)										
Belg-Lux	0.262 (0.508)										
Denmark	-1.58* (-1.84)	0.31 (0.32)	-3.24*** (-3.37)	1.38* (1.79)	-1.58* (-1.95)	-1.60* (-0.76)	-0.76 (-1.04)	-2.09*** (-2.87)			
Finland	0.99 (1.16)										
France	-0.26 (-0.44)	-0.48 (-0.87)	-1.92*** (-3.69)	0.03 (0.05)	-1.14** (-2.14)						
Germany	-0.16 (-0.47)										
Greece	-0.50 (-0.38)	-0.02 (-0.01)	-3.51** (-2.55)	-2.32* (-1.92)	-1.85 (-1.57)	0.25 (0.23)	0.03 (0.03)	-1.51 (-1.43)	-0.84 (-0.83)	-2.91** (-2.63)	
Holland	0.04 (0.10)	-0.98** (-2.24)	-0.86** (-2.20)	-0.52 (-1.29)	-0.18 (-0.46)	0.22 (0.54)	0.34 (0.79)	-1.23*** (-2.77)	-0.96** (-2.23)		
Ireland	-2.57** (-2.46)	-6.41*** (-4.94)	-2.48* (-1.79)	-6.15*** (-4.92)	-1.28 (-1.12)	-4.11*** (-3.72)	-2.53** (-2.58)	-1.17 (-1.16)			
Italy	0.29 (0.69)										
Portugal	0.99 (0.70)										
Spain	0.81 (0.97)	0.44 (0.57)	0.94 (1.29)	-0.69 (-0.94)	0.46 (0.63)	0.15 (0.21)	-0.23 (-0.33)				
Sweden	0.37 (0.42)										
UK	0.05 (0.07)	-1.97* (-2.00)	-2.46*** (-3.18)	-1.74* (-1.78)	-3.30*** (-3.58)	-1.58* (-1.94)	-0.78 (-1.05)	-0.55 (-0.86)	-1.51** (-2.39)	-1.28* (-1.87)	-0.90 (-1.69)

Notes: \*, \*\*, \*\*\* indicate significance levels at 10%, 5%, and 1% respectively. Figures in parentheses below each coefficient indicate the value of the t-statistic.

**Table A4: Long-Run Coefficient Estimates**

Trading Partner	Constant	$\ln Y_{\text{Turkey}}$	$\ln Y_{\text{Partner}}$	$\ln \text{RER}$
Austria	-0.38*** (-4.09)	-1.64*** (-4.29)	1.46* (1.95)	0.62*** (4.30)
Belg-Lux	-0.72*** (-16.23)	-1.33*** (-4.14)	1.26** (2.02)	0.07 (0.48)
Denmark	-0.03 (-0.17)	-2.79** (-2.45)	5.04** (2.55)	1.02* (1.94)
Finland	-2.36*** (-4.21)	-2.63 (-1.03)	6.00 (1.16)	4.82 (1.49)
France	-0.78*** (-16.50)	-2.47*** (-8.30)	3.84*** (5.56)	0.53*** (3.27)
Germany	-0.24*** (-4.83)	-1.02*** (-3.04)	0.52 (1.08)	0.04 (0.35)
Greece	-0.33 (-0.84)	-0.69 (-0.98)	-4.45* (-1.73)	0.33 (0.26)
Holland	-0.51*** (-10.32)	-1.84*** (-4.76)	1.42** (2.26)	0.32 (1.67)
Ireland	-0.77*** (-4.83)	-5.25*** (-14.83)	1.72*** (8.11)	1.23*** (3.65)
Italy	-1.07*** (-11.37)	-3.64*** (-5.64)	6.49*** (4.36)	0.59** (2.31)
Portugal	-1.73 (-0.95)	5.60 (1.52)	-7.67 (-1.50)	-1.15 (-0.81)
Spain	-0.65* (-1.90)	-1.45 (-0.75)	2.82 (1.15)	1.12 (1.13)
Sweden	-0.95*** (-3.62)	-4.62*** (-4.61)	10.35*** (3.81)	2.09*** (5.38)
UK	-0.35*** (-8.98)	-1.54*** (-2.88)	1.73** (2.25)	1.78*** (5.26)

**Notes:** \*, \*\*, \*\*\* indicate significance levels at 10%, 5%, and 1% respectively. Figures in parentheses below each coefficient indicate the value of the t-statistic.

**Table A5: Diagnostic and Stability Test Results**

Trading Partner	Normality <sup>1</sup>	No Serial Correlation <sup>2</sup>	No Heteroscedasticity <sup>3</sup>	CUSUM	CUSUMSQ
Austria	1.65 (0.44)	1.28 (0.86)	0.05 (0.83)	S	S
Bel-Lux	5.00 (0.13)	3.99 (0.41)	0.06 (0.80)	S	S
Denmark	3.43 (0.18)	6.85 (0.14)	0.13 (0.72)	S	S
Finland	0.87 (0.65)	7.56 (0.11)	0.48 (0.49)	S	S
France	3.60 (0.17)	0.91 (0.92)	0.86 (0.35)	S	S
Germany	0.78 (0.68)	5.38 (0.25)	0.19 (0.66)	S	S
Greece	0.05 (0.98)	4.41 (0.35)	0.45 (0.50)	S	S
Holland	1.90 (0.39)	7.17 (0.13)	0.20 (0.66)	S	S
Ireland	0.44 (0.80)	5.94 (0.20)	0.54 (0.46)	S	S
Italy	3.60 (0.17)	0.71 (0.95)	0.01 (0.93)	S	S
Portugal	0.80 (0.67)	6.21 (0.18)	0.01 (0.93)	S	S
Spain	4.39 (0.11)	4.95 (0.29)	2.53 (0.11)	S	S
Sweden	1.90 (0.39)	7.73 (0.10)	0.09 (0.76)	S	S
UK	1.31 (0.52)	5.99 (0.20)	2.45 (0.12)	S	S

**Notes:** Figures in parentheses indicate p-values of the relevant statistic.

1: Jarque-Bera test statistic is used having a  $\chi^2(2)$  distribution.

2: LM test statistic is used having a  $\chi^2(4)$  distribution.

3: LM test statistic is used having a  $\chi^2(1)$  distribution.



## EFFECT OF GLOBALIZATION ON NIGERIA STOCK EXCHANGE AND CAPITAL MARKET LIBERATION ON ECONOMIC GROWTH (1981 – 2011)

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### ABSTRACT

Liberalization of capital market is hypothesized to lead to the growth of the Nigerian capital market yet its effect at the macro-economy seems to have received negligible attention. The study therefore explored the effect of globalization on Nigeria Stock Exchange and economic growth from 1981 to 2011; and the effect of new stock issued on the capital market on globalization on the Nigerian economic growth. The study employed inferential statistics using a combination of ordinary least square regression and secondary econometrics test such as ADF and PP unit root test, and co-integration test in testing and analysis of data. The result of the analysis shows that, the coefficients of Trade Openness (TOPN), Total Inflow of Capital (TIC) and Net Flow of Capital (NFC) coefficient had a positive linear relationship with Total Market Capitalization of the Nigeria Stock Exchange (TMCSE) and if the variables increase, then Nigerian Total Market Capitalization of the Nigeria Stock Exchange value (TMCSE) will increase by 1.210, 0.550, and 4.72 percent respectively. Again, with the  $R^2$  which stood at 0.655927 and the F-ratio of 10.96159 which was greater than the tabulated or F-critical value of 2.78 the *a priori* met. Similarly, the result indicates that injection of new stock into Nigeria capital market will have a significant effect on globalisation of Nigerian economy. This was statistically significant at 1% level; and at the same time has an  $R^2$  value of 0.86. In order to establish the findings of this study, the following were recommended: the establishment of an institution that will ensure that the capital market executive's director maintained the rules and regulations that guided the market for the interest of the shareholders and of the economy at large so as to boost the financial responsibility of customer; There is need to ensure suitable macroeconomic environment that will encourage foreign multinational companies (MNCs) or their subsidiaries to be listed on the Nigerian Stock Exchange, relax the listing requirements to the first tier market and ensure tax rationalization in the capital market to encourage quotation and public interest in shareholdings; increasing the minimum equity capital requirements for companies other than banks, insurance companies and other financial institutions, encouraging merger and consolidation, discriminatory income tax in favours of public quoted companies.

## **1. INTRODUCTION**

Globalization is a multifaceted contemporary economic and socio-political phenomenon that has elicited diverse interpretation and reactions, some of which are positive, while some are negative, depending on the context and situation of the perceiver. Globalization and capital market which came into the economic literature of Nigeria as a result of the introduction of Structural Adjustment Programme in 1986 has generated controversies among various scholars. The ambiguity and vagueness of the concept made every attempt to define it a subject of intense controversy among the experts (Okoro, 2012). Ogundele (2005) viewed globalization as the process of international integration of goods, technology, labour, capital, individuals, organization, institutions, that are implementing worldwide strategies which link and coordinate international activities on a global basis. Omoleye and Adewumi (2004) defined globalization as the increasing integration of regions and nations into world market, the overcoming borders and easing of transaction cost as frontiers barriers are eliminated. The definitions presuppose that globalization motive is on economic resources gain for the actors in the world market. A major aspect of financial intermediation is globalization and internationalization of financial transaction. Improvement in technology brought in internet banking, which today, makes it possible to transfer funds and invest in financial securities within the same economy and internationally within seconds (Ogunseye, 2009).

The Nigerian Stock Exchange market is a capital market which is a sub-set of the financial system that serves as the engine of growth in our modern economy. It is referred to as a capital market because it is a capital oriented, and has been identified as an institution that contributes to the socio-economic growth and development of emerging and developed economies. This is made possible through some of the vital roles played such as channelling resources, promoting reforms to modernize the financial sectors, financial intermediation capacity to link deficit to the surplus sector of the economy, and a veritable tool in the mobilization and allocation of savings among competitive uses which are critical to the growth and efficiency of the economy (Alile, 1984). Ekundayo (2002) argued that a nation requires a lot of local and foreign investments to attain sustainable economic growth and development. The capital market provides a means through which this is made possible. However, the paucity of long-term capital has posed the greatest predicament to economic development in most African countries including Nigeria.

The development of capital market in Nigeria, as in other developing countries has been induced by the government. Though, prior to the establishment of a stock market in Nigeria, there existed some less formal market arrangement for the operation of a capital market. The capital market was not prominent until the visit of Mr. J,B Lobyneision in 1959 at the invitation of the federal government to decide on the role the Central Bank could play in the development of local money and capital market. As a follow-up to this, the government commissioned and set up the Barback committee to study and make recommendation on the ways and means of introducing a stock market in Nigeria as a formal capital market.



The report of the committee led to the registration of a business name "the Lagos stock exchange" in March, 1960, through the collaborative effort of the central Bank of Nigeria, the business community and the Nigeria industrial development Bank. With the establishment of the central Bank of Nigeria in 1959 and the coming into existence of the Lagos stock exchange in 1961 and subsequently the Nigeria stock by an act in 1979, a sound foundation was laid for the operation of the Nigeria capital market for trading in securities of long term nature, needed for financing the industrial sector and the economy at large. By the mid 70's, the need for an efficient financial system for the whole nation was emphasized and a review by the government of the operation of the Lagos stock exchange market was advocated. The review was carried out to take of the low rate of capital formulation, the large channel of the currency in circulation which was held outside the banking system, the unsatisfactory demarcation between the operation of commercial bank and the emerging class of the merchant banks and the extremely shallow depths of the capital market (Anyanwu, 1997). In response to this, the government accepted the principle of decentralization but opted for a national stock exchange, which will have branches in different parts of the country. Thus, on December 2<sup>nd</sup> 1977, the memorandum and articles of association creating the Lagos stock exchange was transformed in the Nigeria stock exchange, with branches in Lagos, Kaduna, Kano, Port-Harcourt, Onitsha, Abuja and Ibadan (Anyanwu, 1998).

Theoretically, capital market liberalization is expected to have a positive impact on growth in the poorest countries but some strong positive evidence for middle-income countries, especially those that have characteristics, such as strong financial system, likely to make them attractive to foreign investors. In a attempt to substantiate the view that countries with strong financial system, effective prudential supervision and quality policies and institutionary likely to have positive effects of financial liberalization. Kraay (1998) stated that the effects of capital market liberalization depend on the strength of the financial system, the effectiveness of prudential supervision and regulation, and the quality of policy and institution with financial globalization is almost never positive and significant, and it is sometimes significantly negative.

The global and financial meltdown have a multiplier effect on Nigeria economy directly and indirectly due to the fact that many Nigerians of affluence acquired properties in America and other developed countries and established their businesses there. A good number of the multinationals which operate in Nigeria have their base in America and the rest of the world, so therefore any upheaval in the developed (American) economic and capital market (financial system) have a multiplier effect in Nigeria stock exchange (Ogunseye, 2009). The effect of global meltdown though does not really have much negative effect on Nigeria financial institution and capital market owing to the fact that before the crisis the then governor of central Bank of Nigeria implemented a policy on consolidation of the financial institution from ₦5billion to ₦25billion capital base, this makes the financial system a little immune from it (Ibid). According to Wikipedia (2008), the immediate causes of the present financial crisis stems from "the failure of large financial institutions in the United States. It rapidly evolved into credit crisis, deflation and sharp reduction in shipping, resulting in a number of European bank failures and decline in stock indexes and large reduction in the market value of equities and commodities worldwide.

The situation continues and later turns to currency crisis at the end of October 2008, and investors in the glob transfer their capital resources into stronger currencies. Thus, it might suffice to say that the relationship between economic growth and the Nigerian capital market (stock exchange) liberalization in face of the present global meltdown is a field of enquiry that remain in its infancy at least for the Nigeria and other developing African countries (Ogunseye, 2009). Therefore, this study will be undertaken to investigate the impact of globalization on the Nigeria stock exchange from 1980 to 2011 period of observation.

However, the Nigeria capital market (stock exchange) has been in existence for over half a century now and has become an integral part of the economy structure of the country. Thus, the functions of the stock exchange have in recent times been beset by a lot of problems. This has been due to social and institutional factors and other bottlenecks, which hindered its vibrancy and development. Meanwhile, it seems that the results from the previous studies on globalization on stock exchange and capital market account liberation on economic growth have not been clear and conclusive. The inconclusive nature of these results has been attributed to several reasons, including the difficulty of measuring the real global variables, policies of capital accounts liberalization, and the issue of distortions in the foreign capital transaction, as well as exchange rate restrictions. Distortions in capital movement have been a major characteristic of developing countries like Nigeria. Several studies address the circumstances under which restrictions are prevalent. The most robust regularity in the literature is the negative association between per capita income and controls, where the per capita income is typically interpreted in this context as a measure of economic development. It follows that the more developed the country, the more likely that it would have removed restrictions on capital flows.

In a bid to address the content of the work the following objectives were analysed; the effect of globalization on the stock exchange market and rate of economic growth in Nigeria economy; and the effect of new stock issued on the capital market on globalization on the Nigerian economic growth.

## **2. LITERATURE REVIEW**

### **2.1. Theoretical Literature**

The review of globalization, current global meltdown and stock exchange market may look myopic and insufficient if their evolution and how they are conceptualized by both local and foreign scholars are not given cursory attention. Globalization and global meltdown which had its way into the economic literature of Nigeria as a result of the introduction of Structural Adjustment Programme in 1986 has generated controversies among various scholars. There have been the growing concerns and controversies on the role of the stock markets globalization on economic growth and development (Sule and Momoh, (2009); Esang and Bassey, 2009). However, many growth literatures emphasize a number of factors that intermediate between capital market liberalization, globalization and economic growth. Investment, financial development and the stability of macroeconomic policy among other variables have been shown to be positively related to an economy's rate of growth (Levine and Renelt, 1992; Levine, 1997; and Barro, 1997).

These variables create channels through which globalization can potentially affect capital market liberalization, and economic growth; and studying the impact of capital market liberalization policy on these intermediate variables, therefore is away of inferring its implication for growth.

However, several researchers have attempted to analyze the connections between capital market liberalization policies and domestic investment. Demiurgic-Kunt and Levine (1996) relates the investment GDP ratio to IMF's measure of capital account openness. Similarly, Kraay (1998) found no impact on gross domestic investment a percentage of GDP using the IMF's index, the Quinn index, and gross capital inflows and outflows as human capital per worker, respectively. There have been mixed results; while some are in support of a positive link, some negative link and others do not find any empirical evidence to support such conclusion. They further posited that in a cross-country study of stock and economic growth of 40 countries from 1980 to 1988 that there was a significant correlation between the average economic growth and stock market capitalization. Levine and Zervos (1996) examined whether there was a strong empirical relationship between stock market development and long-run economic growth. They found a strong correlation between overall stock market development and long-run economic growth. Demiurgic-Kunt and Levine (1996) using data from 44 countries for the period 1986 to 1993 found that different measures of stock exchange size are strongly correlated to other indicators of activity levels of financial, banking, non-banking institutions as well as to insurance companies and pension funds. They concluded that countries with well-developed stock markets tend to also have well-developed financial intermediaries. Levine and Zervos (1998) used pooled cross country time series regression of 47 countries from 1976 to 1993 to evaluate whether stock market liquidity is related to growth, capital accumulation and productivity. They towed the line of Demiurgic-Kunt and Levine (1996) by conglomerating measures such as stock market size, liquidity and integration with world market, into index of stock market development. The rate of Gross Domestic Product (GDP) per capita was regressed on a variety of variables designed to control for initial conditions, political instability, investment in human capital and macroeconomic condition and then, included the conglomerated index of stock market development. They found empirically that the measures of stock market liquidity were strongly related to growth, capital accumulation and productivity while stock market size does not seems to con-elate to economic growth. Nyong (1997) developed an aggregate index of capital market development and used it to determine its relationship with long-run economic growth in Nigeria. The study employed a time series data from 1970 to 1994. Four measures of capital market development-ratio of market capitalization to GDP (in %), ratio of total value of transactions on the main stock exchange to GDP (in %), the value of equities transactions relative to GDP and listing were used. The four measures were combined into one overall composite index of capital market development using principal component analysis. The financial market depth was included as control. It was found that the capital market development is negatively and significantly correlated with the long-run growth in Nigeria. Demiurgic-Kunt and Maksimovic (1998) cited in Henry (2000) found a relationship between economic growth and the stock market activity in the field of transmission of security (secondary market) more than in funds channeling (primary market).

Barlett (2000) demonstrated that a rising stock price raises the wealth of the economy (wealth effect) by encouraging increase in consumer's consumption and increase in investment. Ewan *et al.* (2009) appraise the impact of the capital market efficiency on the economic growth of Nigeria using time series data from 1961 to 2004. They found fact the capital market in Nigeria has the potential of growth inducing but it has not contributed meaningfully to the economic growth of Nigeria because of low market capitalization, low absorptive capitalization, illiquidity, misappropriation of funds among others. Harris (1997) did not find hard evidence that stock market activity affects the level of economic growth.

## **2.2. Overview of Capital Movement in Nigeria**

Major interest is the net flow of capital in Nigeria; the difference between inflow and outflow of capital. The trend shows an irregular flow of capital in Nigeria. The net flow declined in 1981, picked up in 1982, and declined thereafter until 1986, when it rose to ₦2,499.6 million. The trend can be attributed to economic and political instabilities. On the average, the net capital flow was about ₦6,912,41 million. This average is comparatively low for a high resource endowed country like Nigeria. Using the ratio of total capital flow (TCP) to the Gross Domestic Product (GDP) as proxy for capital market liberalization, the ire shows an interesting trend. Nigeria has been slow in positive implementation of its capital market liberalization policies. This is reflecting in the low average GDP share of total capital flow of barely 5 percent for the period under study. It appears that capital market in Nigeria is still very far *from* been liberalized so as to encourage foreign domestic investments (Anyanwu, 1997).

Alternative measures of financial openness, Kraay considers the possibility that capital market liberalization positively affects investment only in countries where risk adjusted returns exceed the world average, that is where liberalization will lead to inflow of capital rather than outflow. Using the average balance on the financial account of the balance of payments as proxy for risk adjusted returns, (Kraay, 1998) observe a positive impact on investment when this variable is pressed on capital account openness. The regression coefficient, however, differs significantly from zero for only one of Kraay's three measures of capital accounts openness, that is, the actual gross capital inflows and outflows. Klein and Olivei (1999) found that capital market liberalization stimulates financial depth (measured variously as change in the ratios of liquid liabilities to GDP, claims on the non-financial private sector). But the correlation between capital market liberalization and financial depth has been found limited in less developed countries; the relationship fails when these countries are excluded from the stuffy sample. It has been noted severally that the impact of capital market liberalization, globalization, and economic growth is indirect (for example, an open capital market encourages financial development, which in turn encourages growth) and contingent on a range of intervening factors. This may explain the difficulties in documenting a direct link between capital market liberalization and economic growth.

### 3. DATA AND METHODOLOGY

The study examined the effect of globalization on the Nigeria capital market from 1980-2011 using an econometric analysis. The econometric analysis is used to evaluate estimate and analyze the influence of the globalization on stock exchange (capital market), with explanatory variables as; Trade Openness (TOPN), Total Inflow of Capital, (TIC), Foreign Direct Investment (FDI), and Net Flow of Capital (NFC), while Total Market Capitalization of the Nigeria Stock Exchange (TMCSE) become the dependent variable.

Specifically, the researcher adopted the Ordinary least Square (OLS) method of estimation in order to derive the parameters of the model. In order to avoid the problem of spurious regression, the time series properties of data series employed in the estimation equation is tested for stationary using Augmented-Dick-Fuller (ADF), Philip Perron unit root test. To investigate whether there is long run relationship among the variables in estimation we employed the Johansen test for co-integration. The trace test is based on the comparison of the null hypothesis,  $H_0 (r = 0)$  against the alternative,  $H_1 (r = 0,)$  where  $r$  stands for the number of co integrating vectors. If the alterative is accepted, it implies co-integration among the variables and suggests long-run relationship among the variables. The functional form, on which our econometric model was based, employed a multiple regression equation model in this work. However, to investigate this study data were obtained from Central Bank of Nigeria's (CBN) Statistical Bulletin, from 1980 to 2011.

#### Model Specification

$TMCSE = f(TPON, FDI, TIC, NFC) \dots$  implicit

Mathematically, this implicit functional relationship was specified in explicit stochastic linear form as thus:

$$TMCSE = \alpha_0 + \alpha_1 TOPN + \alpha_2 TIC + \alpha_3 NFC + \alpha_4 FDI + \mu_1$$

However, the Log Linear specification is specified as thus:

$$\text{Log } TMCSE = \alpha_0 \text{log} + \alpha_1 \text{log} TPON + \alpha_2 TIC + \alpha_3 \text{log} NFC + \alpha_4 FDI + \mu_2$$

Where:

TMCSE = Total Market Capitalization of the Nigeria Stock Exchange

TOPN = Trade Openness, thus, the volume of trade (import plus export) is used as proxy of trade openness.

FDI = Foreign Direct Investment,

TIC = Total Inflow of Capital,

NFC = Net Flow of Capital and

$\alpha_0$  = Constant,

$\alpha_1, \alpha_2, \alpha_3,$  to  $\alpha_4$  = Co-efficient of the respective independent variable.

$\mu$  = Stochastic error term, Log = logarithm.

The general form of (ADF) test is estimated by the following regression.

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum^n \alpha_i \Delta y_i + \epsilon_t \quad (1)$$

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum^n \alpha_i \Delta y_i + \delta_t + \epsilon_t \quad (2)$$

Where:

Y is a time series, t is a linear time trend, Δ is the first difference operator, such that  $\Delta y_{t-1} = y_t - y_{t-1}$ ,  $\alpha_0$  is a constant, n is the optimum number of lags in the dependent variable and  $\epsilon_t$  is the random error term.

The null hypothesis is that  $\alpha_1 = 0$ . If the null hypothesis  $\alpha_1 = 1$ , then we conclude that the series under consideration  $\Delta(y_t)$  has a unit root and is therefore non-stationary.

The Philip- Person (PP) Unit Root Test is implemented to justify the results ADF test. The equation is thus:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \epsilon_t \quad (3)$$

**Co-Integration Test**

This was used to test for the long run relationship between the variables. Johansen co-integration approach will be undertaken by the researcher in the course of the analysis. Johansen’s methodology takes its starting point in the vector auto regression (VAR) of order P given by

$$y_t = \mu + \Delta_1 y_{t-1} + \dots + \Delta_p y_{t-p} + \epsilon_t$$

Where,  $Y_t$  is an  $n \times 1$  vector of variables that are integrated of order commonly denoted (1) and  $\epsilon_t$  is an  $n \times 1$  vector of global variables.

This VAR can be rewritten as:

$$\Delta y_t = u + \eta_{y_{t-1}} + \sum t_i \Delta y_{t-1} + \epsilon_t$$

To determine the number of co-integration vectors, Johansen (1988, 1989) and Johansen and Juselius (1990) suggested two statistic test, the first one is the trace test ( $\lambda$  trace). It tests the null hypothesis that the number of distinct co-integrating vector is less than or equal to q against a general unrestricted alternatives  $q = r$ . the test was calculated as:

$$\lambda \text{ trace } (r) = -T \sum \ln (1 - \lambda_t)$$

Where:

T is the number of usable observations, and the  $\lambda_{1,s}$  are the estimated eigen value from the matrix.

The Second statistical test is the maximum eigen value test ( $\lambda$  max) that is calculated according to the following formula

$$\lambda \text{ max } (r, r + 1) = -T \ln (1 - \lambda_{r+1})$$

#### 4. RESULTS

This section shows the analysis of data, presentation of results, and discussion of the results in line with specific objectives.

##### Globalization on The Stock Exchange Market and Rate of Economic Growth

Table 1 presents the analysis of the effect of globalization on the stock exchange market and rate of economic growth in Nigeria economy using econometric model. The variables of analysis were: Total Market Capitalization of the Nigeria Stock Exchange (TMCSE) as dependent variable while Total Inflow of Capital (TIC) and Net Flow of Capital (NFC), Foreign direct investment (FDI), Trade openness (TOPN) were the independent variables

**Table 1: Impact of globalization on the stock exchange market and rate of economic growth**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	3.919722	2.678739	1.463272	0.1569
LogFDI	-0.114455	0.453610	-0.252319	0.8030
LogTOPN	1.210924	0.289316	4.185470	0.0004
LogNFC	0.550714	0.209892	2.623799	0.0152
TIC(-1)	4.72E-05	2.26E-05	2.085910	0.0483
R-squared	0.655927	Mean dependent var		11.65996
Adjusted R-squared	0.596089	S.D. dependent var		2.597541
S.E. of regression	1.650841	Akaike info criterion		4.000880
Sum squared resid	62.68137	Schwarz criterion		4.238773
Log likelihood	-51.01232	F-statistic		10.96159
Durbin-Watson stat	1.396700	Prob(F-statistic)		0.000040

Source: E-views version 3.1 authors' computation.

The result of the analysis as presented in Table 1 shows that, the coefficients of Trade Openness (TOPN), Total Inflow of Capital (TIC) and Net Flow of Capital (NFC) coefficient had a positive linear relationship with Total Market Capitalization of the Nigeria Stock Exchange (TMCSE). This entails that if the Trade Openness (TOPN), Total Inflow of Capital (TIC) and Net Flow of Capital (NFC) in Nigeria increases, then Nigerian Total Market Capitalization of the Nigeria Stock Exchange value (TMCSE) will increase by 1.210, 0.550, and 4.72 percent respectively. The result is in line with initial expectation because theoretically, the sign of the coefficients are expected to be positive (i.e. directional relationship with that of aggregate Nigeria Stock Exchange value (TMCSE)). The implication is that an economy with globalization affair in her stock exchange market will experience increase in her TMCSE as a trade transactions become favourable to her domestic economy. This could be as a result of positive increase from Trade Openness (TOPN), Net Flow of Capital (NFC) and Total inflow of capital (TIC) growth rate in Nigeria.

However, the resultant effect of the finding is that Nigerian economy will always and equally experienced higher aggregate output contribution from the productive sector since capital formation and credit to real economic sectors will be made avertable, which in turn will results to full-employment, since not all the total resource of that country were fully employed before, but if that all the economic resource of the country were to be employed, then the country aggregate output GDP will increased as the Market Capitalization of the Nigeria Stock Exchange increased impacted by Globalization effect. Thus, the variable (TOPN, TIC and NFC) are statistically significant to the study at 5 percent significance level.

The coefficient of Foreign Direct Investment (FDI) shows that there exists a negative relationship with the Total Market Capitalization of the Nigeria Stock Exchange (dependent). This implies that a percent change (increase) in Foreign Direct Investment (FDI) (i.e. once the economic financial resource percent that will employed as a profiler investment in the Nigeria stock market decrease, will brought about change (decrease) in the Total Market Capitalization of the Nigeria Stock Exchange value in Nigerian economy by 0.114455percent. This is not in line with the *a priori* expectation. Thus, this variable (FDI) is statistically insignificant at 5% level of significance.

Meanwhile, the  $R^2$  stood at 0.655927 percent. This implies that about 66% of the total variation in Total Market Capitalization of the Nigeria Stock Exchange value (TMCSE) was explained by the explanatory variables employed in this study. While variables that were not included in the model, account for about 44% of the remaining variation in Total Market Capitalization of the Nigeria Stock Exchange in Nigeria during the period under review. The F-ratio, which is the joint test of significance of all parameter estimated in the model is statistically significant at 5 percent level. And with the calculated F- ratio of 10.96159 which was greater than the tabulated or F- critical value of 2.78, it is concluded that globalization has significant impact on the Nigeria stock exchange market and the rate of economic growth in Nigerian economy. Again, the test for incidence of serial correlation or autocorrelation (Durbin-Watson) which indicates 1.36700 shows that the presence of first order autocorrelation in the model is inconclusive, since the DW calculated is greater than the  $d_L$  1.22 but less than the  $d_U$  1.55 at 5% significant level.

### **Effect of New Stock on Globalization**

In order to determine the effect of new stock issued on the capital market on globalisation of Nigerian economy, Trade Openness (TOPN) which represents the volume of trade (import plus export) was regressed against Total Inflow of Capital (TIC) – the new stock. Trade openness is equally described as the index of commercial openness (ICO) was measured as a trade dependency ratio. The output of the result is as shown Table 2.



**Table 2: Effect of new stock on globalization and growth of economy**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	717.4179	5215.354	0.137559	0.8916
TIC	1.734531	0.138326	12.53940	0.0000
R-squared	0.858107	Mean dependent var		1289.932
Adjusted R-squared	0.852650	S.D. dependent var		71859.21
S.E. of regression	27584.06	Akaike info criterion		23.35661
Sum squared resid	1.98E+10	Schwarz criterion		23.45177
Log likelihood	-324.9926	F-statistic		157.2367
Durbin-Watson stat	2.977405	Prob(F-statistic)		0.000000

The result of the regression as shown Table 2 indicates that injection of new stock into Nigeria capital market shows a statistically significant positive impact or effect on globalisation of Nigerian economy. This finding is justified as the coefficient of TIC was positive and statistically significant at 1% level. Again, value of  $R^2$  which stood at 0.86 shows that about 86% of the effect on globalisation was explained by the included variable – TIC. Thus, the more the new stock is injected into the capital market, the higher the level of globalisation of the economy. This finding is in consonance with Igberi, Awoke, Nwibo, and Odoh (2012); Akanni, Akinleye, and Oyebanjo (2009) who deduced that injection of new stock was positively related to growth, especially in the short run. This was justified as trade openness will result to inflow of capital which will contribute positively to economic growth by facilitating the exploitation of economies of scale, relieving the binding constraint to allow increases in the import of capital and intermediate goods, enhancing efficiency through increased competition, and promoting the diffusion of knowledge through learning by doing.

## 5. CONCLUSION

This study explored the macroeconomic impact of the activities of globalization on Nigeria stock exchange and economic growth from 1981 to 2011. The analysis of data shows that the coefficients of Trade Openness (TOPN), Total Inflow of Capital (TIC) and Net Flow of Capital (NFC) have positive linear relationship with Total Market Capitalization of the Nigeria Stock Exchange (TMCSE). Thus, a conclusion that globalization has a positive impact on the Nigeria capital market (stock exchange) and the economic growth.

Based on the finding, the study recommended the establishment of an institution that will ensure that the capital market executive's director maintained the rules and regulations that guided the market for the interest of the shareholders and of the economy at large so as to boost the financial responsibility of customer. There is need to ensure suitable macroeconomic environment that will encourage foreign multinational companies (MNCs) or their subsidiaries to be listed on the Nigerian Stock Exchange, relax the listing requirements to the first tier market and ensure tax rationalization in the capital market to encourage quotation and public interest in shareholdings. There is need for Nigerian capital market to diversify its investment portfolio through fixed physical domestic investment as it will enhance or boost the investment volume and value thereby reducing unemployment which hitherto will significantly increase the nation's economy.

For new issues in the market, increasing the minimum equity capital requirements for companies other than banks, insurance companies and other financial institutions, encouraging merger and consolidation, discriminatory income tax in favours of public quoted companies should be reconsidered so as to encourage more participation in the market. Lastly, there should be improvement in the declining market capitalization by encouraging more foreign investors to participate in the market, maintain state of the art technology like automated trading and settlement practices, electronic fund clearance and eliminate physical transfer of shares.

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## CAPITAL DISTRIBUTIONS IN THE BANKING INDUSTRY

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### ABSTRACT

As the 2008 banking disaster loomed banks increased their dividends and stock repurchase distributions to common shareholders dramatically. This unique time period provides a natural experimental setting to examine financial institutions' capital management strategies during periods of macroeconomic change. As the crisis loomed, we find that U.S. banks did not conserve cash but returned capital to investors at the same pace that they earned capital from operations. We also find that U.S. firms that accepted funds from the Capital Purchase Program (CPP) relative to non-CPP firms, returned a higher proportion of their available capital to shareholders in the periods leading up to the financial crisis.

## 1. INTRODUCTION

The world economy is still recovering from the effects of the downfall of the financial industry. October 3rd, 2008 marked the beginning of the largest government bailout in history as President Bush signed the Emergency Economic Stabilization Act of 2008 (EESA) into law. The EESA created the Troubled Asset Relief Program (TARP) which provided the United States Department of the Treasury (Treasury) with broad authority to administer \$700 billion of taxpayer funds to bolster the capital position of the struggling financial institutions, thus reducing the uncertainty in the troubled capital and credit markets. Ultimately, this controversial legislation resulted in a bailout of the banking system by the Treasury. The Capital Purchase Program (CPP), the largest program within TARP, authorized the Treasury to purchase up to \$250 billion of senior preferred shares of qualifying U.S. controlled banks, savings associations, and certain saving and loan holding companies.

In light of the failures within the financial services industry, we examine banks' precipitating decisions and actions that expose some questionable capital management strategies. For example, many financial institutions (including those accepting CPP funds) continued returning cash to shareholders even after the banking industry began to feel repercussions from the deteriorating U.S. housing market in late 2006 and early 2007. As default rates on subprime and adjustable rate mortgages (ARM) accelerated, banks did not appear to protect their capital positions, electing instead to maintain or increase cash distributions through share repurchase and dividend activities. In fact, 84% of 102 of the largest publicly traded US financial institutions repurchased their own stock in 2007, collectively returning \$65.4 billion to their selling shareholders, double the \$31.8 billion they spent on repurchases in 2004. Simultaneously, common dividend payments grew from \$42.1 billion in 2004 to \$59.7 billion in 2007.

Between 2004 and 2007, the 61 sample firms which ultimately received \$165.3 billion in CPP funds made dividend payments of \$157.5 billion to common shareholders and spent an *additional* \$164.2 billion for common share repurchases. While academics, regulators, and practitioners debate the optimal level and composition of bank capital, reducing common equity capital through share repurchases and dividend payments shifts risk from shareholders to deposit funds, governments and ultimately taxpayers, particularly in a time period of declining economic conditions. No research to our knowledge specifically examines the relationship between the structure, magnitude, and timing of the banking industry's cash payout policies and the inadequate level of capital during the financial crisis.<sup>1</sup> As the financial industry increased its risk-taking activities and the complexity of its financial transactions in the four years leading up to the fall of 2008, it simultaneously reduced common equity capital and increased leverage by returning significant funds to shareholders through accelerating dividend payments and share repurchases activities, with most banks maintaining core capital ratings at or above the regulators' "well-capitalized" levels.

We find that much of the prior academic research on the motivations for share repurchase programs specifically excludes financial firms (Dittmar, 2000; Skinner, 2008). Given this limited prior research and the accelerating volumes of repurchases over our sample period, we first explore the motivations of the repurchasing activities between 2004 and 2007 to see if previously studied theories (including free cash flows, signaling and undervaluation, capital structure, and employee stock options) describe the banking firms' repurchasing behaviors. We find that between 2004 and 2006, banks appear to exhibit behaviors consistent with these theories; however, in 2007, we document a significant shift in the motivations for repurchase activities. This payout activity in 2007 is *inconsistent* with economic motivations for share repurchases established in the academic literature and is particularly interesting since it occurs during the year preceding the height of the financial crisis but after the symptoms and warnings of the forthcoming problems were observable.

This finding motivates us to examine whether higher firm cash disbursements to shareholders over this period put the institutions at risk for financial crisis. We use our unique dataset to examine and compare the impact of various forms of shareholder payouts on two measures of a firm's capital position, Tier 1 capital, as reported to U.S. banking regulators, and a measure of equity capital we call the tangible common equity ratio (TCE ratio).

Research has shown that CPP participants reported stronger financial performance than non-CPP firms, yet still held lower levels of capital preceding the fall of 2008 (Ng, Vasvari, and Wittenberg-Moerman, 2010).

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<sup>1</sup> Acharya et. al. (2011) examine the relationship between dividends and bank capital of the largest 25 U.S. banking institutions; however, these authors do not consider share repurchases as a part of their study of bank capital.

Although we recognize that a bank's capital position is a function of a variety of strategic operating decisions including lending, investing, risk management, and capital management decisions, we focus on whether a firm's decision to distribute cash through dividends and share repurchases increased the likelihood that it would participate in the CPP program. We provide evidence of declining levels of capital over the years leading up to the financial crisis and purport that the economically inefficient levels of shareholder payouts left banks with insufficient capital to withstand the risk of the 2008 financial crisis despite maintaining "well-capitalized" Tier1 core capital levels. Finally, in a regression analysis, we find that for every 1% of assets paid out in dividends or share repurchases, a firm's tangible common equity ratio decreased by an annualized rate of 0.32% or 0.44%, respectively.

This study is important for several reasons. First, we provide insight on the impact of shareholder payouts on banks' capital adequacy in periods of declining economic conditions. Second, in response to the increasing worldwide discussion of the composition and adequate levels of bank equity capital, we examine how well two current measures of capital adequacy, the Tier 1 and tangible common equity ratios, captured the increased payout activities of our sample firms. Although the liquidity crisis in 2008 was the result of both declining asset values and tightened credit markets, we provide evidence that firms returning higher proportions of tangible equity capital to their shareholders were more likely to accept infusions of capital from taxpayers. Following the financial crisis, capital returns to shareholders decreased significantly during 2009 and 2010, mostly due to the limitations imposed on CPP participants. However, in early 2011, several of the largest financial institutions, after receiving approval from the Federal Reserve, have once again increased capital payouts to shareholders. This paper provides important support for restrictions on all forms of capital payout activities.

The remainder of this paper is organized as follows. The second section examines motivations for stock repurchases and dividend payments in the financial industry. In the third section we discuss the sample, research methodology, and results, while the fourth section provides summary and concluding remarks.

## **2. CAPITAL DISTRIBUTIONS THROUGH STOCK REPURCHASES AND DIVIDENDS**

Researchers have long examined the determinants of and changes in corporate payout policies as well as the substitutability between dividends and share repurchases. Few of these studies, however, have included financial firms which not only must determine the most efficient means to return capital to shareholders but must also balance these payout policies against the capital requirements of their respective regulatory authorities.

## **2.1 Motivations for Share Repurchases**

The economic motivation for repurchasing shares in light of financial decline is unclear. Theory suggests that firms repurchase stock for a number of reasons: agency costs of free cash flows (Jensen, 1986), signaling and undervaluation (Vermaelen, 1981; Ikenberry, Lakonishok and Vermaelen, 1995; Bhattacharya, 1979; Vermaelen, 1984; Miller and Rock, 1985), capital structure (Dittmar, 2000; Bagwell and Shoven, 1988; Hovakimian, Opler and Titman, 2001), tax consideration, and employee stock options (Fenn and Liang, 2001; Kahle, 2002), earnings management (Bens, Nagar, Skinner, and Wong, 2003; Hribar, Jenkins, and Johnson, 2006). However, most of the prior research in repurchases excludes financial firms and there is limited research on the financial industry.

For financial firms, the return of excess capital to shareholders may reduce the temptation of management to move to higher risk lending and investing activities. In her sample of publicly-traded and privately held financial institutions, Hirtle (2004) finds evidence suggesting that deployment of excess cash is a consideration for larger banks traded on major stock returns. For banks, the relationship between share repurchases and leverage is relatively complex. Banking firms tend to have less equity to total assets than non-financial firms and thus, have more financial leverage which is heavily weighted in short-term borrowings and demand deposits. As a result, a share repurchase transaction has a very different impact on a bank relative to non-financial firm. Smaller capital reserves provide greater potential for profit; however, smaller levels also increase the risk of firm insolvency in periods of falling asset prices or other declining economic conditions. Bank manager share repurchase programs are also subject to capital adequacy requirements set by regulators to maintain the safety and soundness of the bank. Even so, much of the empirical and theoretical research of bank capital and optimal capital structure suggests that banks, like non-financial firms, act to optimize their capital structure such that capital regulations appear as a second order influence on this optimal capital structure.

Berger, DeYoung, Flannery, Lee, and Oztekin (2008) report evidence that banks do appear to manage capital ratios to firm-specific target levels with share repurchases which are used to offset both capital issuances and earnings retained in periods of strong financial performance. During their 1992-2006 sample period, share repurchases significantly offset new share issuance and increases in retained earnings. However, since their sample period reflected a profitable period, their study does not provide information on how banks manage capital ratios in times of losses.

## **2.2 Motivations for Dividends**

In his 1976 seminal paper, "The Dividend Puzzle," Fischer Black questions why firms continue to pay dividends given the fact that dividend payments are value irrelevant and tax disadvantaged. However, research finds that investors view dividends, particularly dividend initiations and increases, as credible signals of the quality, reduced risk, and expectations of future earnings and cash flows (see Bhattacharya, 1979; Miller and Rock, 1985; Healy and Palepu, 1988; Nissam and Ziv, 2001). Further research suggests that investors like the monitoring and control function that dividends provide over managers, particularly for cash-rich, mature firms (Easterbrook, 1984; Jensen 1986).



Finally, the catering and clientele theories of dividends indicate that certain characteristics of investors themselves, such as investor demand and tax status (Baker and Wurgler 2004; Li and Lie (2006); Allen, Bernardo, and Welch, 2000), drive a preference for investment dividend paying firms.

Research has also examined the propensity to use share repurchases as a substitute for dividends. Grullon and Michaely (2002) document a decline in the growth of dividend payments while simultaneously finding that the volume of share repurchase activity has increased. In their sample, mature firms are more likely to use excess capital to repurchase shares than increase dividends. Again, however, the research on dividend payout policies often ignores the financial firms, and thus, our understanding of financial firm payout policies is limited.

Since the market reacts positively to dividend initiations and strongly and negatively to dividend omissions, dividend policy is viewed as “sticky” as managers resist cuts in dividends out of concern the reductions may signal poor performance (DeAngelo, DeAngelo and Skinner, 1992; Brav et. al., 2005). Perhaps because of this reluctance to cut dividends, Guay and Harford (2000) find that when increases in cash flows are viewed as temporary, managers are more likely to make share repurchases than increase dividends. For banks, Hirtle (1998) contends that the composition of shareholder payouts between dividends and repurchases is especially important as repurchases are easier to cut than dividend payments if earnings and cash are constrained and the bank needs to suddenly preserve capital to remain solvent.

In the recent financial crisis, some conjecture that the reluctance to reduce dividends quickly in response to declining economic conditions more than likely increased the insolvency pressures the banks faced during the fall of 2008. Acharya et al. (2011) find that their 2007 - 2009 sample of TARP participants paid dividends which amounted to 45% of the capital they eventually received from the TARP program.

### **3. RESEARCH DESIGN**

In light of the financial crisis, the call for regulator focus on dividend and share repurchase activity is apparent. First, we examine the motivations for stock repurchases and dividend payments in the financial industry. To understand the capital equity behavior of banks we then explore banking firms’ shareholder payouts in the years leading up to the financial crisis and capital levels. This analysis is especially important given the strong negative response by the financial services industry when more stringent capital and liquidity standards were announced. Empirical support for the additional information contained in the new regulations will help demonstrate the need to identify potential problems in the financial services industry before they reach a crisis level.

#### **3.1. Sample**

Our sample consists of large (market value of equity or total book assets in excess of \$1.5 billion) publicly traded banks listed on Compustat in 2006 with SIC codes 6000-6300. We exclude investment advisory firms, investment banks that are pure brokerage houses, firms that are market exchanges, personal credit institutions, subsidiaries primarily owned by non-US banks, as well as any firm without lending activities.

Our final sample includes 113 firms which we list in Exhibit 1. For each firm, we collect accounting information from Compustat, banking information from Compustat Bank, and share repurchase program and monthly share repurchase information directly from the relevant 10-Q and 10-K filings beginning in 2004, the first year the data is available.

Table 1 provides summary statistics for our sample for the 2006 sample selection year. Consistent with our choice of large firms in excess of \$1.5 billion of assets, the mean asset value for our sample is \$120.6 billion while the mean market value is \$16.5 billion. We note a discernible difference between the mean and median firms indicating that although our sample is constrained to the largest U.S. banking firms, a few of the largest banks dominate our sample means. Thus, we subdivide our sample to parse out the very largest firms. We define *Large Firms* as those reporting a market value of equity greater than or equal to the 85th percentile and *Other Firms* as those below the 85th percentile of the New York Stock Exchange (NYSE) traded firms. We find that the 28 *Large Firms* report larger assets ( $p < 0.01$ ) and market value of equity ( $p < 0.01$ ) than the 85 other firms.

Consistent with interest in capital adequacy measures, we report two measures of capital strength, the Tier 1 capital ratio, defined as core equity to risk weighted assets, and the tangible common equity ratio (TCE Ratio), defined as common equity less intangible assets to tangible assets. While both measures presumably capture a firm's ability to remain solvent in the face of declining asset values or deteriorating economic conditions, the former is a regulatory reporting ratio and includes common stock and some preferred equity and hybrid debt securities. Since the TCE Ratio excludes intangible assets, which hold little liquidity value in adverse economic conditions, some in the financial services industry claim that the TCE Ratio is an "acid" test of a bank's capital position and financial strength to weather a declining economy as it provides a more stringent liquidity measure. For banks with available date, the mean (median) Tier 1 ratio is 9.93% (9.77%), well above the 6% benchmark considered "well capitalized." We also note that our *Large Firms* report a lower capital buffer in both of our measures than the other firms ( $p < 0.01$ ) which is consistent with prior banking studies that find that the larger, more well-diversified institutions hold less capital.

Table 2 reports on the sample firms' shareholder payouts from 2004 and 2007 in gross terms as well as relative to shares outstanding, capital, and earnings. While total payouts increased over the time period, mean (median) share repurchases more than doubled (quadrupled) from \$312.1 million (\$12.8 million) in 2004 to \$656.8 million (\$63.2 million) in 2007. The pace of share repurchases accelerates considerably in 2007 as the median sample firm repurchased over 3.1% of the shares outstanding at an amount that comprised nearly 9% of the tangible common equity. The proportion of dividends paid out remained fairly consistent over the sample period. Through a combination of dividends and repurchases, the median firm increased its payout to shareholders from 59% of 2004 earnings to over 90% of 2007 earnings. The increase over 2006 levels is dramatic as median total payouts to income jumped from 57.9% to 90.1% and repurchases as a proportion of TCE increased from 1.9% to 7.4%.

Given the increasing volume of share repurchase activities and proportion of capital spent on common stock repurchases between 2004 and 2007, we first consider the motivations for financial firms to return capital through share repurchases. We follow a methodology similar to Dittmar's (2000) study of non-financial firms and include variables to proxy for firms' motivations for share repurchases including the agency costs of free cash flows, signaling and undervaluation, capital structure, and employee stock options in our model.

$$RP_t = \alpha_0 + \beta_1 Adj Ret_{t-1} + \beta_2 MB_{t-1} + \beta_3 Cash_{t-1} + \beta_4 FCF_t + \beta_5 Div Payout_t + \beta_6 TCE Ratio_{t-1} +$$

$$\beta_7 Options_t + \beta_8 Size_{t-1} + \varepsilon_t$$

Given our hand collected data, we construct our dependent variable, *RP*, as the exact percentage of common shares repurchased to shares outstanding at the beginning of the year. We elect to use shares repurchased to shares outstanding rather than the market value of shares repurchased to market value of equity as the former is less affected by changes in the market value of a firm's stock and represents the volume of share repurchase activity conducted by the firm.

We include variables in our model to examine existing motivations for share repurchases discussed above. The undervaluation hypothesis suggests that when information asymmetry exists, managers, with their inside knowledge of the firm can signal this information to the market through share repurchase activities. Ofer and Thakor (1987) show that managers choose stock repurchases over dividends when the undervaluation is more significant. We include a measure of past stock price performance. *Adj Ret* is the CRSP value-weighted adjusted annual buy and hold return of each bank measured over the preceding fiscal year, and we expect a negative coefficient as firms are more likely to repurchase stock when it is viewed as undervalued. In addition, the findings of Lakonishok, Shleifer, and Vishny (1994) suggest that low market to book value may lead managers to engage in repurchase activity to mitigate potential undervaluation; thus, we expect a negative coefficient on *MB*.

To examine whether the decision to repurchase stock is positively related to excess cash, we include cash holdings at the beginning of the year (*Cash*) and cash flow generated during the year (*FCF*) in our model. After controlling for investment opportunities proxied by market to book value of equity (*MB*) and given that banks should use repurchases as a way to distribute excess capital to investors, we expect to find a positive and significant relation between share repurchases and our excess cash measures.

We also control for dividend payouts (*Div Payout*) since management may use either dividends or share repurchases to distribute excess cash flows. Dittmar's (2000) and Skinner's (2008) find that share repurchases are not dividend substitutes and instead suggest that firms use both dividends and share repurchases to return capital to investors.

As discussed above, financial firms manage their capital cushions in light of future expected economic opportunities, regulatory requirements, and management's subjective assessment of risk exposure and future need for outside funding. Banks should only repurchase stock when they find they have excess capital and limited alternative investment opportunities.

Thus, we include tangible common equity ratio, *TCE Ratio*, as a measure of a bank's capital and expect a positive relationship between the *TCE Ratio* and share repurchase transactions.

Finally, we consider the stock option compensation hypothesis which suggests that stock options may motivate managers to repurchase stock to meet the demands of stock compensation redemptions while mitigating the effect of stock dilution. We include a measure of options exercised during the current year to shares outstanding at the beginning of the year, *Options*, to test this hypothesis and expect a positive coefficient. Consistent with prior research, we also include *Size*, measured as the percentile of the firm's market value to the NYSE at the end of the prior year, as a control variable.

Table 3 presents descriptive statistics and the Pearson and Spearman correlations for our 2004-2007 sample firms for which regression data is available. We partition the data based on whether or not the firm repurchased shares. We find that repurchasers are significantly larger (median size 0.65 vs. 0.40) and have a higher dividend payout ratio (median 0.46 vs. 0.32). As predicted, repurchases are positively and significantly associated with cash and free cash flow as well as options, and negatively related to prior period returns and the market to book ratio; these results lend support for the free cash flow, undervaluation, and stock option hypotheses. Surprisingly, we find no significance between our measure of regulatory capital, *TCE Ratio*, and repurchases.

### 3.2. Empirical Results

Results from estimating the Tobit model for 403 firm year observations with available data are provided in Table 4, Panel A, models 1-3. In model 1-3, our findings are consistent with employee stock options hypothesis as the coefficient on *Options* is positive and significant ( $p < 0.01$ ) across all models. The coefficients on *Cash* and *TCE Ratio* are positive and significant ( $p < 0.01$ ) which suggest that firms make share repurchases when they have the excess cash and capital available. Finally, *MB* and *Adj. Ret* are negative and but not always significant suggesting mixed support for the undervaluation hypothesis. As noted earlier, we observe an upward trend of repurchases over time, both in volume and in relation to capital and earnings, despite increased financial challenges within the banking industry, and we question whether there is a shift in the motivation for share repurchases around 2007 (See Table 2). For this reason, we test for a structural shift in the share repurchase behavior of our sample firms, both by the inclusion of an indicator variable for 2007 in Models 2 - 3 and a size interaction with 2007 in Model 3, as our results also appear to indicate a change in behavior of the *Other Firms* around this time. We find that not only is the 2007 indicator variable positive and significant across models ( $p < 0.01$ ), but statistical comparisons indicate the coefficient is also larger than that of either the 2006 ( $p < 0.00$ ) and 2005 ( $p < 0.00$ ) indicator variables. This finding suggests that, even after controlling for the motivations for repurchasing activities, banks made higher volumes of share repurchases in 2007 than in the prior years. Further statistical comparisons of the combined size coefficient ( $Size * 2007 + Size$ ) indicate that in 2007, unlike in the prior years, repurchasing firms were significantly smaller ( $p < 0.00$ ) sized banks.

Finally, in Model 4, we limit our sample to the 286 firm year observations with non-zero repurchases to examine how the firm characteristics influence the volume of shares repurchased. Results are similar to the full sample except we now find a negative and significant ( $p < 0.01$ ) relation between *Div Payout* and percent of repurchases indicating that firms with higher dividend payouts repurchase less shares. We also find positive and significant coefficients on the yearly indicators indicating a rising proportion of shares repurchased over time. Interestingly, cash levels are not related to the volume of shares repurchased.

Table 4, Panel B reports the results of running our model annually for the sample firms, similar to Dittmar (2000). Running the regressions separately allows us to examine whether the motivations for repurchasing activity remain consistent over the sample period or change across the years, although we acknowledge that the models will suffer reduced power given the smaller sample sizes. For each year 2004 – 2006, the positive and significant ( $p < 0.01$ ) coefficients on *Options* and *Size* remain, indicating that large firms and firms with high levels of option exercises are more likely to repurchase stock. The *TCE Ratio* is significant ( $p < 0.04$ ) in every year other than 2006 while the *Adj. Ret.* and *Cash* are not statistically significant in any model.

We observe interesting differences for 2007. Overall, we note a remarkable decline in the 2007 model's overall predictive ability as the pseudo  $R^2$ , which ranged from 0.23 to 0.27 between 2004 and 2006, drops to 0.05 in 2007, suggesting that the model of traditional share repurchase motivations does not fit the banking firms in 2007 as well as it did in prior years. We also find no evidence that the volume of 2007 share repurchases are driven by size, prior period stock performance, cash, market to book, or employee stock compensation redemptions. This non-significance is particularly surprising for stock options as we find the coefficient on this variable is positive and significant in all previous models (Table 4, Panels A and B). We interpret the results in Table 4, Panel B, particularly the declining model fit, as behavior inconsistent with efficient capital management motivations for share repurchase activities of banks in 2007. This is particularly important given that indicators of financial problems such as the accelerating default rate on subprime mortgages were known during this time period and by August 2007 at the latest. The results in Panel B could suggest that financial institutions elected to payout excess cash to their shareholders in an effort to perhaps maintain a market for their own shares, rather than conserve capital in anticipation of future needs. If a macro-prudential approach to regulation is enacted, then regulators would have the structure in place to require additional capital is maintained when indicators warrant such action.

### **3.3 Tangible Equity Ratios, Firm Payout Policies and the Capital Purchase Program (CPP)**

Given incidences of credit freezes in the market as early as August of 2006 when the first subprime mortgage companies failed, share repurchases made in 2007 could have had the dual effect of reducing capital below an optimal level and increasing firm risk, making it more difficult for a bank to make future capital issues in the public and private markets. In this section, we examine whether the financial institutions' payout policies prior to the crisis increased the probability the bank would participate in the CPP program.

While other studies have addressed the financial crisis and evaluated the success of the CPP program (Bayazitova and Shivdasani, 2009; Veronesi and Zingales, 2010), research has not yet examined the association between the banking firms' shareholder payouts in the years leading up to the financial crisis and capital levels.

At the inception of the CPP program in October of 2008, 87 of our initial 113 sample firms remained viable and eligible to apply for the government-supplied capital. Of these firms, 61 applied for and received CPP funds (CPP Firms). Four other banks, which applied for CPP funds, either withdrew their applications or were not strong enough to qualify and are included in the 26 non-CPP sample firms. We compare the common shareholder capital payouts between these two groups of firms to determine whether the CPP firms distributed capital to shareholders at higher levels in the years preceding the financial crisis.

Table 5 shows a comparison of the CPP and non-CPP firms in the 20 quarters preceding the financial crisis and the four quarters of 2008. The first column shows the mean and median total capital payout, including common stock dividends and share repurchases to prior quarter assets for the 24 quarter sample period. For both groups of firms, the median firm increased its total capital distribution in 2007 and, due to declining asset values and sustained capital payouts, hit a peak between the second and third quarters of 2007, well after the signs of deteriorating economic conditions in the financial industry became apparent. Both the median CPP and non-CPP firm returned a significant amount (18 -33%) of the quarters' beginning assets to shareholders. Median dividends to assets are significantly lower for non-CPP participants over all quarters through 2007. Tier 1 ratios are significantly lower for CPP participants in most quarters and remain above the "well-capitalized" level throughout the sample period. We also find significantly lower and declining levels of the TCE ratio for firms accepting CPP funds.

This median TCE ratio for CPP firms falls below 6% as early as Q1 2006 and remains below 6% through the end of 2008 as the CPP distributions from the U.S. government did not increase tangible common equity. This finding is consistent with Ng, et. al. (2010) who find that CPP participants, though appearing financially healthier than non CPP participants, faced greater liquidity needs. It is interesting to note that the difference in TCE ratio between the CPP and non-CPP firms is consistently more significant than the difference in Tier 1 capital. Banks appear to manage their regulatory ratios and consistently have a cushion or a target Tier 1 capital ratio in excess of regulatory requirements. However, the quality of the equity capital in terms of liquidity may be better measured by the TCE ratio which is different between the two groups of firms, particularly after 2005. This finding suggests there is different information available to regulators obtained by separately monitoring these two capital adequacy measures.

Overall, the results in Table 5 indicate that in the years leading up to 2008, both the CPP and non-CPP firms returned a high proportion of available capital to their investors. The CPP firms appear to weaken their tangible assets and their ability to absorb losses (as measured by the TCE ratio) more than the non-CPP firms, and much of this regulatory capital was later replenished by the government and taxpayers.

This finding and the move by regulators to more conservative capital adequacy measures along with the Basel III emphasis on tangible common equity leads us to test the impact of time, performance, and capital payout decisions on the TCE ratio. For these tests, we consider three separate samples: a full sample of banking firms with all available regression variables; a sample of CPP firms or firms that were eligible to apply for CPP funding in the fall of 2008; and a sample of "other firms" which excludes the largest, more well-diversified banks which tend to hold lower levels of capital. The descriptive statistics for each of these samples is reported in Table 6. Consistent with the results in Table 5, we observe a decrease in the TCE ratio over the 2004-2007 time periods in each of our samples although this decline appears smaller for the smaller banks. Correlations indicate that changes in quarterly TCE ratios are related to repurchases, loan growth, and operating performance.

We regress the change in TCE on measures of time, performance and capital payout decisions for all quarterly observations with available data over the 2004-2007 time period for each of our samples. We choose this model to be consistent with the capital structure literature which suggests that cash flows, growth, leverage, and risk are determinants of equity capital targets. We use the following model

$$\Delta TCE\ ratio_q = \alpha_0 + \beta_1 TCE\ ratio_{q-1} + \beta_2 Size_{q-1} + \beta_3 Div_q + \beta_4 RP_q + \beta_5 \Delta NPAT_q + \beta_6 Loan$$

$$Growth_q + \beta_7 EBTP_q + \beta_8 MB_{q-1} + \varepsilon_t$$

where

$\Delta TCE\ ratio_q$  is the percentage change in the TCE ratio from the beginning to the end of the quarter.  $TCE\ ratio_{q-1}$  is the TCE ratio at the end of the prior quarter and is included to ensure that

$\Delta TCE\ ratio_q$  captures capital changes with regard to the prior capital position. *Size* is the French break point related to the NYSE market percentile measured at the end of the prior quarter. Dividends (*DIV*) and repurchases (*RP*) during the quarter are divided by total assets at the end of the prior quarter and  $\Delta NPAT$  is the percentage change in non-performing assets over the quarter. *LoanGrowth* is the percentage change in the ratio of net loans to total assets from the beginning to the end of the quarter. *EBTP* is quarterly pretax earnings before the provision for loan losses divided by the average assets for the quarter. *MB* is the market to book ratio measured at the end of the prior quarter and measures the ability for a firm to raise capital in the market. We also include year fixed effects, quarterly indicator variables to capture any seasonality, and Newey and West standard errors (lag 5) to correct for serial correlation in our observations.

The results are reported in Table 7. The coefficients on dividends and repurchases are negative and significant ( $p < 0.001$ ) after controlling for current operations and time which is consistent with the mechanical impact the capital payouts have on tangible common equity. Operational performance, *EBTP*, has a positive and significant impact on TCE ( $p < 0.001$ ) as mechanically a bank's earnings increase its equity position.

Statistical comparisons of the capital distribution variables (*Div + RP*) and the operational performance (*EBTP*) coefficients are insignificant which appear to indicate that over this time period firms returned capital to common shareholders at the same pace they earned it from operations, a result not surprising given the mean payout percentage of net income in excess of 90% reported in Table 2. We also compare the coefficients on *Div* and *RP* and find they are indistinguishable indicating the capital payouts in the form of dividends have a similar impact on TCE as share repurchases, a finding which supports regulators' recent policies to simultaneously consider the impact of share repurchases and dividends upon a banks internal capital planning.

Among our samples, it appears that the prior tangible common equity position had the most impact on the non-large banks. For these firms, larger declines in the TCE ratio are noted for firms with higher starting capital positions. Although the full and CPP samples also report negative coefficients on *TCE Ratio*, these coefficients are less negative and mildly significant. Additionally, the changes in tangible equity are more (negatively) affected by changes in the quality of the bank's assets as noted by the negative and significant ( $p < 0.03$ ) coefficient on  $\Delta NPAT$ , a result which is not noted when the larger banks are included.

Finally, we note the change in the TCE ratio is positive and significant in the third quarter perhaps reflecting the cyclical nature of the lending markets. In addition, while we note an overall decline in the TCE ratio in our sample period, we find a positive and significant increase in 2006, the year before the symptoms of the mortgage crisis began to appear and a year of a high volume of mortgage activities. Interestingly, the positive and significant coefficient on 2006 is not noted when the large banks are excluded perhaps indicating a systemic impact in that year that only affected the largest banks.

#### **4. CONCLUSION**

This paper adds to the literature that examines the multiple factors that contributed to the financial crisis. We provide evidence that financial institutions share the excess cash, undervaluation, and stock compensation motivations for share repurchase programs as their non- financial counterparts. However, for 2007, we find that these common and economically efficient share repurchase motivations are only weakly descriptive of the share repurchase behaviors of our sample of banking firms. We note increasing dividend and share repurchase payments between 2004 and 2007, in relation to both reported earnings and equity capital, and particularly large volume increase in shares repurchased between 2006 and 2007. Given this increased share repurchase activity in a market of known economic deterioration and declining stock prices, we question whether the banking firms engaged in share repurchase activities in an attempt to bolster their falling stock prices. We also examine whether the level of shareholder payouts (both repurchases and dividends) during the years 2004-2007 increased the probability of a firm's eventual participation in the CPP. The 59 sample firms that participated in the CPP returned more capital to common shareholders between 2004 and 2007 than the capital infusions they eventually received under the CPP. In fact, we provide strong evidence that firms which paid out higher proportions of tangible equity capital between 2004 and 2007 in the form of share repurchases and dividend payments, were more likely to receive CPP capital infusions. While there is much academic and political discussion about the success



of the CPP program and TARP in general, one measure of success, increased confidence in the financial markets, is difficult to quantify. While we acknowledge that this study contributes to one small piece in the analysis of the causes and consequences of the financial crises, we believe that we have highlighted the need for financial regulators to consider all facets of a firm's capital payout program and the effect on the bank's capital position as the various regulators continue to draft new financial regulations. The impact of payout policies, including both share repurchases and dividends, for financial institutions need consideration as the legislation is implemented. Equally important will be the development of consistent definitions and appropriate measures of Tier 1 and TCE ratios.

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## Exhibit 1 – Sample Firms

1	Accredited Home Lenders	59	<b>JP Morgan Chase &amp; Co.</b>
2	Alabama National Bancorporation	60	<b>Keycorp</b>
3	Amcore Financial Inc.	61	<b>Lehman Brothers Holding</b>
4	Associated Banc-Corp	62	<b>M&amp;T Bank Corp</b>
5	Astoria Financial Corp.	63	MAF Bancorp Inc.
6	Bancorpsouth Inc.	64	<b>Marshall &amp; Ilsley Corp.</b>
7	<b>Bank of America Corp</b>	65	MB Financial Inc.
8	Bank of Hawaii Corp.	66	Mercantile Bankshares Corp.
9	<b>Bank of New York Mellon</b>	67	<b>Merrill Lynch &amp; Co. Inc.</b>
10	Bankatlantic Bancorp	68	<b>Morgan Stanley</b>
11	Bankunited Financial Corp.	69	<b>National City Corp.</b>
12	<b>BB&amp;T Corp.</b>	70	National Pen Bancshare
13	<b>Bear Stearns Companies</b>	71	NBT Bancorp Inc.
14	BFC Financial Corp.	72	New York Community Bancorp
15	BOK Financial	73	Newalliance Bancshares
16	Boston Private Financial Holdings	74	<b>Northern Trust Corp.</b>
17	Capitol Federal Financial	75	Northwest Bancorp Inc.
18	Cathay General Bancorp	76	Old National Bancorp
19	Central Pacific Financial Corp.	77	Pacific Capital Bancorp.
20	Chittenden Corp.	78	Pacwest Bancorp
21	<b>Citigroup Inc.</b>	79	Park National Corp.
22	Citizens Republic Bancorporation	80	<b>PNC Financial Services Group</b>
23	City National Corp	81	Popular Inc.
24	Colonial Bancgroup	82	Provident Bankshares Co.
25	<b>Comerica Inc.</b>	83	Provident Financial Services Inc.
26	Commerce Bancorp Inc.	84	<b>Regions Financial Corp.</b>
27	Compass Bancshares Inc.	85	Signature Bank (NY)\
28	Corus Bankshares Inc.	86	SKY Financial Group Inc.
29	<b>Countrywide Financial Corp.</b>	87	South Financial Group Inc.
30	Cullen/Frost Bankers Inc.	88	Sovereign Bancorp Inc.
31	CVB Financial Corp.	89	Sterling Financial Corp.
32	Delta Financial Corp.	90	<b>Suntrust Banks Inc.</b>
33	Downey Financial Corp.	91	Susquehanna Bancshares
34	East West Bancorp Inc.	92	SVB Financial Group
35	<b>Fannie Mae</b>	93	<b>Synovus Financial Corp.</b>
36	First Citizens Bancshares	94	TCF Financial Corp.
37	First Commonwealth Financial Corp.	95	Trustmark Corp.
38	First Horizon National	96	<b>U.S. Bancorp</b>
39	First Midwest Bancorp. Inc.	97	UCBH Holdings Inc.
40	First Niagara Financial	98	UMB Financial corp.
41	Firstfed Financial Corp.	99	Umpqua Holdings Corp.
42	Firstmerit Corp	100	<b>UnionBanCal Corp.</b>
43	<b>Fifth Third Bancorp</b>	101	United Bankshares Inc.
44	Flagstar Bancorp Inc.	102	United Community Banks
45	FNB Corp.	103	Valley National Bancorp
46	Franklin Bank Corp.	104	<b>Wachovia Corp.</b>
47	Fremont General Corp.	105	Washington Federal Inc.
48	Fulton Financial Corp.	106	<b>Washington Mutual Inc.</b>
49	<b>Goldman Sachs Group Inc.</b>	107	Webster Financial Corp.
50	Greater Bay Bancorp	108	<b>Wells Fargo &amp; Co.</b>
51	Hancock Holding Co.	109	Westamerica Bancorporation
52	Hudson City Bancorp Inc.	110	Whitney Holding Corp.
53	Huntington Bancshares	111	Wilmington Trust Corp

54	Indymac Bancorp Inc.	112	Wintrust Financial Corp.
55	International Bancshares Corp.	113	Zions Bancorporation
56	Investors Bancorp Inc.		
57	Investors Financial Services		
58	Irwin Financial Corp.		

Large firms indicated in bold print.

**Table 1 - Descriptive statistics of sample for selection year 2006**

		All Firms		Large Firms			Other Firm	
		N		N			N	
Assets	Mean	113	120,631	28	444,643	***	85	13,898
	Median		12,891		191,074	***		9,828
MVE	Mean	113	16,461	28	59,112	***	85	2,412
	Medium		2,151		28,532	***		1,709
Tier 1 Ratio	Mean	101	9.933	20	8.544	***	81	10.276
	Median		9.770		8.515	***		9.900
TCE Ratio	Mean	113	6.340	28	4.974	***	85	6.790
	Median		6.311		4.830	***		6.480
Return on TCE	Mean	113	0.196	28	0.248		85	0.179
	Median		0.196		0.268	***		0.173
Market to Book	Mean	113	1.992	28	2.075		85	1.965
	Median		1.912		2.004			1.855

*Assets* is the book value of assets measured as of the end of 2006 (millions); *MVE* is the market value of common stock outstanding, measured as of the end of the fiscal year 2006 (millions); *Tier 1 Ratio* is the tier 1 capital ratio calculated according to FDIC and OTC thrift rules and reported during the fourth quarter of fiscal 2006 (percent); *TCE Ratio* is calculated as tangible common equity divided by tangible assets as of the end of fiscal 2006 (percent); *Return on TCE* is fiscal 2006 net income divided by average common tangible equity; *Market to Book* is the ratio of the market value of common equity divided by the book value of common equity. *Large Firms* are defined as having a fiscal 2006 market value of equity of at least the 85th percentile of the NYSE while *Other Firms* have a fiscal 2006 market value of equity of less than then 85th percentile of the NYSE. \*\*\* and \*\* indicate a 0.01 and 0.05 difference respectively between the large firms and other firms using a two sample mean test and Wilcoxon sum rank tests of the medians.

Table 2: Descriptive Statistics of firm payouts 2004 - 2007

Panel	A - All Firms	N	\$ DIV	\$ RP	% RP	RP / TCE	DIV / NI	PO / NI	% Change CSOS
2004	- Mean	112	379.7	312.1	0.0172	0.0351	0.3952	0.6700	0.0643
	- Median		52.0	12.8	0.0091	0.0273	0.4150	0.5859	0.0119
2005	- Mean	112	423.9	561.1	0.0220	0.0649	0.4284	1.0519	0.0181
	- Median		54.3	23.9	0.0114	0.0328	0.4108	0.6481	0.0033
2006	- Mean	113	472.7	681.1	0.0242	0.0732	0.3960	0.7171	0.0450
	- Median		56.0	28.0	0.0140	0.0387	0.4315	0.7080	0.0064
2007	- Mean	102	584.7	656.8	0.0360	0.0941	0.4477	1.0092	0.0125
	- Median		75.5	63.2	0.0315	0.0848	0.4597	0.9004	-0.0090

Panel	B - Large Firms	N	\$ DIV	\$ RP	% RP	RP / TCE	DIV / NI	PO / NI	% Change CSOS
2004	- Mean	31	1,258.2 ***	1,062.9 ***	0.0303 ***	0.1022 **	0.4104	0.8234 *	0.0853
	- Median		565.0 ***	530.8 ***	0.0242 ***	0.0794 **	0.4271	0.7786 ***	0.0156
2005	- Mean	30	1,446.0 ***	2,001.1 ***	0.0405 ***	0.1208 ***	0.4136	0.9324	-0.0017 **
	- Median		609.0 ***	537.5 ***	0.0330 ***	0.1092 ***	0.4636	0.9412 ***	-0.0100 **
2006	- Mean	28	1,731.5 ***	2,625.7 ***	0.0453 ***	0.1457 ***	0.4094	0.9648 ***	0.0260
	- Median		879.8 ***	968.2 ***	0.0389 ***	0.1238 ***	0.4562	0.9374 ***	-0.0077 **
2007	- Mean	29	1,892.8 ***	2,207.3 ***	0.0453 *	0.1245	0.4487	0.9453	0.0187
	- Median		914.0 ***	1,098.3 ***	0.0414 **	0.1343 **	0.4663	0.8994	-0.0028

Panel	C – Other Firms	N	\$ DIV	\$ RP	% RP	RP / TCE	DIV / NI	PO / NI	% Change CSOS
2004	- Mean	80	43.5	24.7	0.0121	0.0095	0.3894	0.6105	0.0561
	- Median		34.8	4.6	0.0043	0.0065	0.4135	0.4879	0.0118
2005	- Mean	82	49.9	34.3	0.0153	0.0444	0.4338	1.0957	0.0253
	- Median		39.2	9.1	0.0065	0.0193	0.4083	0.5355	0.0056
2006	- Mean	85	58.1	40.5	0.0171	0.0493	0.3916	0.6356	0.0513
	- Median		41.5	12.4	0.0066	0.0189	0.4218	0.5791	0.0096
2007	- Mean	73	65.0	57.3	0.0324	0.0824	0.4473	1.0347	0.0100
	- Median		47.4	40.0	0.0300	0.0746	0.4567	0.9013	-0.0106

$\$ DIV$  is common dividends paid during the year (millions);  $\$ RP$  is the total value of share repurchases and shares accepted in lieu of employee stock exercise prices and other tax withholdings for employee stock compensation redemptions (millions);  $\% RP$  is the number of shares repurchased during the year to common shares outstanding at the end of the prior year;  $RP / TCE$  is the dollar amount of shares repurchased to tangible common equity measured at the end of the prior fiscal year;  $DIV / NI$  is common dividends  $t$  divided by income available to common shareholders at  $t-1$ ;  $PO / NI$  is total payouts to common shareholders (dividends plus share repurchases) divided by net income available to common shareholders at  $t-1$ ; is net income divided by average assets.  $\% Change CSOS$  is the percentage reduction in common shares outstanding between  $t-1$  and  $t$ . A firm is considered a large firm if its market value of equity at the end of the prior year is at least in the 85 percentile of the NYSE. . \*\*\*, \*\*, and \* indicate a 0.01, 0.05, and 0.10 difference respectively between the large firms and other firms using a two sample means test and Wilcoxon sum rank tests of the medians.

**Table 3: Characteristics of Repurchasing Firms**

Panel A: Descriptive Statistics

	Full Sample			Repurchasers			No Repurchases		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
RP	403	0.0233	0.0133	286	0.0329 ***	0.0285 ***	117	0.0000	0.0000
Size	403	0.5975	0.5500	286	0.6505 ***	0.6500 ***	117	0.4679	0.4000
Adj. Ret	403	-0.1114	-0.0910	286	-0.1254 **	-0.0972 **	117	-0.0771	-0.0757
Cash	403	0.0565	0.0318	286	0.0644 ***	0.0327 ***	117	0.0373	0.0280
Options	403	0.0125	0.0090	286	0.0125	0.0091	117	0.0126	0.0090
Div. Payout	403	0.4100	0.4267	286	0.4446 **	0.4590 ***	117	0.3253	0.3204
MB	403	2.1874	2.0662	286	2.1914	2.0656	117	2.1776	2.0662
TCE Ratio	403	0.0639	0.0619	286	0.0653 *	0.0627	117	0.0605	0.0602
FCF	403	0.0206	0.0177	286	0.0192 **	0.0173	117	0.0240	0.0179

Panel B: Pearson Correlation Coefficients

	Size	Adj Ret	Cash	Options	Div Payout	MB	TCE Ratio	FCF
RP	0.2608 (0.000)	-0.1160 (0.020)	0.2843 (0.000)	0.2505 (0.000)	-0.0532 (0.286)	-0.1694 (0.001)	0.0145 (0.772)	0.0510 (0.307)
Size		0.1944 (0.000)	0.4227 (0.000)	0.2202 (0.000)	0.1374 (0.006)	0.0944 (0.058)	-0.2283 (0.000)	0.1639 (0.001)
Adj. Ret			0.2546 (0.000)	0.2668 (0.000)	-0.1541 (0.002)	0.0801 (0.109)	0.1008 (0.043)	0.2973 (0.001)
Cash					-0.1933 (0.000)	-0.0460 (0.357)	-0.1663 (0.001)	0.4105 (0.000)
Options						-0.2403 (0.000)	-0.3187 (0.000)	0.4436 (0.000)
Div. Payout							-0.0677 (0.175)	0.1888 (0.000)
MB								0.0904 (0.070)
TCE Ratio								-0.3453 (0.000)

RP equals the number of shares repurchased (non-employee redemptions) divided by common shares outstanding at the end of the prior year. Size is measured as the Ken French break point related to the NYSE market percentile measured at the end of the last month of the prior fiscal year; Adj Ret is the firm's annual return adjusted by the CRSP value weighted market return; Cash is the firm's cash and short term assets divided by total assets, measured at the end of the prior year; Options are the number of options exercised during the year divided by common shares outstanding at the end of the prior fiscal year; Div Payout is common dividends *t* divided by income available to common shareholders at *t-1*; are the number of options exercised during the current year deflated by the common shares outstanding measured at the end of the prior year; MB is the ratio of the market value of equity to the book value of equity, measured at the end of the prior year; TCE Ratio is tangible common equity divided by tangible assets, measured at the end of the prior year; FCF is equal to the current year operating income before depreciation less taxes paid, common dividends and preferred dividends paid divided by the book value of assets measured at the end of the prior year. All continuous variables are winsorized at the top and bottom 1%. P values reported in parenthesis. \*\*\*, \*\*, and \* indicate a 0.01, 0.05, and 0.10 difference respectively between the repurchasing and non-repurchasing firms using a two sample means test and Wilcoxon sum rank tests of the medians.



**Table 4 - Panel A**

Panel Tobit and Linear regressions of the motivations for repurchases by bank

	Predicted Sign	Tobit Models			Regression
		Model 1	Model 2	Model 3	Model 4
Intercept	±	-0.0320 (0.004)	-0.0494 (0.000)	-0.0637 (0.000)	-0.0079 (0.478)
Adj Ret	-	-0.0443 (0.000)	-0.0182 (0.125)	-0.0183 (0.118)	-0.0088 (0.427)
MB	-	-0.0060 (0.014)	-0.0040 (0.106)	-0.0039 (0.108)	-0.0064 (0.002)
Cash	+	0.1048 (0.000)	0.0785 (0.009)	0.0736 (0.010)	-0.0082 (0.31)
FCF	+	-0.2394 (0.156)	-0.1845 (0.269)	-0.1357 (0.432)	0.2074 (0.273)
Div Payout	±	-0.0086 (0.292)	-0.0076 (0.355)	-0.0057 (0.472)	-0.0268 (0.001)
TCE Ratio	+	0.3361 (0.000)	0.3512 (0.000)	0.3553 (0.000)	0.2550 (0.000)
Options	+	0.5813 (0.000)	0.6526 (0.000)	0.6862 (0.000)	0.6678 (0.000)
Size	+	0.0495 (0.000)	0.0506 (0.000)	0.0685 (0.000)	0.0357 (0.000)
2005	±		0.0115 (0.007)	0.0120 (0.004)	0.0121 (0.000)
2006	±		0.0151 (0.001)	0.0160 (0.000)	0.0130 (0.000)
2007	±		0.0267 (0.000)	0.0715 (0.000)	0.0496 (0.000)
Size * 2007	±			-0.0699 (0.000)	-0.0459 (0.000)
N		403	403	403	286
Pseudo (adj) R <sup>2</sup>		0.2449	0.2871	0.3416	0.3676

Models1 - 3 report the results estimating a Tobit model for all firm year observations with available information and Model 4 reports the results of the multivariate regression for firms with non-zero repurchases. The dependent variable is *RP* or the number of common shares repurchased (non-employee redemptions) during the year divided by common shares outstanding at the beginning of the year. *Adj Ret* is the firm's annual return adjusted by the CRSP value weighted market return; *MB* is the ratio of the market value of equity to the book value of equity, measured at the end of the prior year; *Cash* is the firm's cash and short term assets divided by total assets, measured at the end of the prior year; *FCF* is equal to the operating income before depreciation less taxes paid, common dividends and preferred dividends paid divided by the book value of assets measured at the end of the prior year; *Div Payout* is common dividends *t* divided by income available to common shareholders at *t-1*; *TCE Ratio* is tangible common equity divided by tangible assets, measured at the end of the prior year; *Options* are the number of stock options exercised during the year divided by common shares outstanding at the end of the prior fiscal year; *Size* is measured as the Ken French break point related to the NYSE market percentile measured at the end of the last month of the prior fiscal year; *2005*, *2006*, and *2007* are indicator variable of 1 for firm observations in the respective year and 0 otherwise. All continuous variables are winsorized at the top and bottom 1%. White heteroskedastic consistent *p* values are reported in parenthesis.

**Table 4 - Panel B**

Annual Tobit Regressions explaining the probability that a bank makes a share repurchase

	Predicted Sign	2004	2005	2006	2007
Intercept	±	-0.0419 (0.021)	-0.0666 (0.001)	-0.0410 (0.035)	0.0154 (0.620)
Adj Ret	-	-0.0084 (0.636)	0.0002 (0.994)	-0.0417 (0.147)	-0.0189 (0.373)
MB	-	-0.0032 (0.358)	-0.0021 (0.633)	-0.0032 (0.593)	-0.0063 (0.266)
Cash	+	0.0504 (0.279)	0.0462 (0.416)	0.1167 (0.121)	0.0109 (0.879)
FCF	+	-0.6486 (0.070)	-0.4937 (0.252)	-0.4447 (0.181)	0.3064 (0.465)
Div Payout	±	-0.0022 (0.868)	0.0054 (0.673)	-0.0059 (0.698)	-0.0284 (0.095)
TCE Ratio	+	0.2770 (0.021)	0.4657 (0.008)	0.2330 (0.115)	0.3655 (0.037)
Options	+	0.4801 (0.000)	1.3265 (0.000)	1.2244 (0.001)	0.3063 (0.306)
Size	+	0.0673 (0.000)	0.0731 (0.000)	0.0609 (0.000)	0.0091 (0.572)
N		99	104	103	97
Nrepurchases		63	69	71	83
Pseudo R <sup>2</sup>		0.2678	0.2642	0.2311	0.0490

The dependent variable is *RP* or the number of common shares repurchased (non-employee redemptions) during the year divided by common shares outstanding at the beginning of the year. *Adj Ret* is the firm's annual return adjusted by the CRSP value weighted market return; *MB* is the ratio of the market value of equity to the book value of equity, measured at the end of the prior year; *Cash* is the firm's cash and short term assets divided by total assets, measured at the end of the prior year; *FCF* is equal to the operating income before depreciation less taxes paid, common dividends and preferred dividends paid divided by the book value of assets measured at the end of the prior year; *Div Payout* is common dividends *t* divided by income available to common shareholders at *t-1*; *TCE Ratio* is tangible common equity divided by tangible assets, measured at the end of the prior year; *Options* are the number of stock options exercised during the year divided by common shares outstanding at the end of the prior fiscal year; *Size* is measured as the Ken French break point related to the NYSE market percentile measured at the end of the last month of the prior fiscal year. All continuous variables are winsorized at the top and bottom 1%. White heteroskedastic consistent *p* values are reported in parenthesis

Table 5: Quarterly Comparisons of CPP and Non-CPP across Payout Activities and Capital Adequacy Ratios 2004 - 2008

		Non- CPP firms						CPP FIRMS					
		N	Payout	Div	RP	Tier 1	TCE	N	Payout	Div	RP	Tier 1	TCE
Q1 2004	Mean	24	0.2270	0.1091	0.1180	12.36 **	7.91	57	0.2355	0.1343	0.1012	10.20	6.83
	Median		0.2038	0.1017 *	0.0530	11.47 **	7.39 *		0.2040	0.1473	0.0167	9.80	6.56
Q2	Mean	23	0.3121	0.1292	0.1830 *	12.05 *	7.65 *	58	0.2210	0.1386	0.0825	10.35	6.31
	Median		0.2498	0.1118 *	0.0555	11.12	6.88 **		0.1949	0.1453	0.0162	9.91	6.06
Q3	Mean	24	0.2238	0.1073 *	0.1165	11.76 *	7.94 **	58	0.1839	0.1353	0.0487	10.14	6.52
	Median		0.1608	0.1097 *	0.0127	11.59 **	7.32 **		0.1710	0.1439	0.0016	9.58	6.27
Q4	Mean	25	0.1879	0.1021 **	0.0858	11.39	7.44	59	0.2217	0.1555	0.0662	10.41	6.55
	Median		0.1228	0.1066 **	0.0095	11.60 **	7.31 *		0.1823	0.1436	0.0041	9.73	6.17
Q1 2005	Mean	24	0.2930	0.1047 *	0.1247	11.21 *	7.57 **	57	0.2800	0.1362	0.1438	9.92	6.18
	Median		0.1412	0.1108 *	0.0238	10.70 *	7.06 **		0.2150	0.1455	0.0495	9.60	6.10
Q2	Mean	25	0.1981	0.1113	0.0868	11.36 **	8.01 **	57	0.2463	0.1365	0.1097	9.79	6.32
	Median		0.1646	0.1127	0.0021	10.47 **	7.23 **		0.1995	0.1483	0.0342	9.60	6.17
Q3	Mean	25	0.2260	0.1044 *	0.1217	11.32 **	7.83 **	57	0.2068	0.1331	0.0736	9.77	6.25
	Median		0.1531	0.1116 **	0.0147	10.42 ***	7.10 **		0.1901	0.1459	0.0222	9.49	6.17
Q4	Mean	25	0.2397	0.1074 **	0.1323	11.19 *	7.58 *	59	0.2261	0.1504	0.0757	9.87	6.20
	Median		0.1550	0.1114 **	0.0404	10.70 **	6.91 **		0.2004	0.1441	0.0067	9.30	6.02
Q1 2006	Mean	27	0.2140	0.1052 **	0.1088	10.96 *	7.63 **	58	0.2681	0.1360	0.1321	9.66	6.03
	Median		0.1540	0.1069 **	0.0341	10.65 **	7.15 ***		0.2192	0.1502	0.0687	9.09	5.97
Q2	Mean	27	0.2246	0.1091 **	0.1155	10.61 **	7.93 ***	58	0.2537	0.1425	0.1102	9.57	5.90
	Median		0.1686	0.1151 **	0.0359	10.71 **	7.09 ***		0.2033	0.1502	0.0289	9.43	5.91
Q3	Mean	27	0.1853	0.1025 *	0.0828	10.64 **	8.10 ***	58	0.2144	0.1310	0.0835	9.67	6.22
	Median		0.1451	0.1118 **	0.0122	10.47 **	7.51 ***		0.1646	0.1470	0.0040	9.36	6.22
Q4	Mean	27	0.1905	0.1060 ***	0.0845	10.54 *	7.97 ***	59	0.2382	0.1605	0.0777	9.77	6.25
	Median		0.1627	0.1087 **	0.0222	10.94 **	7.58 ***		0.1745	0.1496	0.0086	9.56	6.06
Q1 2007	Mean	27	0.2164 *	0.1067 **	0.1096	10.45 **	8.06 ***	58	0.2835	0.1383	0.1453	9.63	6.15
	Median		0.1847	0.1140 **	0.0935	10.41 **	7.82 ***		0.2548	0.1486	0.0977	9.52	6.01
Q2	Mean	27	0.3253	0.1303	0.1950	10.29 *	7.83 ***	58	0.3335	0.1427	0.1908	9.52	5.93
	Median		0.3332	0.1140 **	0.1089	10.18 **	7.27 ***		0.2525	0.1510	0.1325	9.51	5.85

Q3	Mean	27	0.3326	0.1064 **	0.2262	10.80 *	7.68 ***	58	0.2953	0.1444	0.1509	9.37	5.91
	Median		0.3010	0.1104 **	0.1832	10.19 **	7.30 ***		0.2608	0.1463	0.1028	9.25	5.94
Q4	Mean	27	0.2588	0.1062 **	0.1526	10.05 **	7.55 ***	59	0.2484	0.1559	0.0925	9.06	5.89
	Median		0.1856	0.1067 **	0.0215	10.20 **	7.11 ***		0.2128	0.1525	0.0150	9.15	5.93
Q1 2008	Mean	26	0.1522	0.1021 *	0.0501	9.85 **	7.52 ***	58	0.1732	0.1325	0.0407	9.04	5.79
	Median		0.1294	0.1059 *	0.0047	9.94 **	7.54 ***		0.1608	0.1469	0.0005	9.07	6.02
Q2	Mean	26	0.1226	0.0916 *	0.0310	9.76	7.37 ***	58	0.1455	0.1251	0.0205	9.27	5.61
	Median		0.1122	0.0955 *	0.0001	10.01	7.19 ***		0.1451	0.1360	0.0000	9.24	5.74
Q3	Mean	26	0.1096	0.0920	0.0175	9.70	7.24 ***	58	0.1215	0.1156	0.0059	9.37	5.54
	Median		0.1123	0.0944	0.0000	10.00	6.97 ***		0.1096	0.1096	0.0000	9.21	5.75
Q4	Mean	26	0.1024	0.0919	0.0105	9.64 ***	6.57 **	59	0.1249	0.1223	0.0026	11.31	5.43
	Median		0.0949	0.0809	0.0000	9.96 ***	6.92 *		0.1039	0.1036	0.0000	11.20	5.75

Sample includes all firms which could have applied for CPP funds beginning in 3Q 2008 which have all available data for the quarter. The sample excludes Morgan Stanley and Goldman Sachs which were not organized as bank holding companies prior to 4Q 2008. CPP firms received capital infusions from the government in 2008 or 2009 while non-CPP firms did not. *Payout* is the sum of common dividends paid and all (program and employee compensation redemptions) share repurchases during the quarter divided by assets at the end of the prior quarter ( $Assets_{q-1}$ ). *DIV* is common dividends paid during the quarter divided by  $Assets_{q-1}$ . *RP* is the value of common shares repurchased divided by Assets at the end of the prior quarter. *Total Payout*, *DIV*, and *RP* are expressed as percents (i.e. \* 100).  $Tier1_q$  is the Tier 1 to risk-based assets as reported at the end of the quarter to banking regulatory authorities.  $TCE_q$  is tangible common equity divided by tangible assets as of the end of the quarter expressed as a percent. \*\*\*, \*\*, and \* indicate a 0.01, 0.05, and 0.10 significance respectively of two sample test of means and the Wilcoxon sum rank tests of medians (two tail).

**Table 6: Quarterly Bank Descriptive Statistics**

Panel A: All Years 2004 - 2007

	Full Sample			CPP Sample		"Other firms" Variable			N
	Mean	Median	N	Mean	Median	N	Mean	Median	
ΔTCE Ratio	1441	-0.00879	-0.00239	1212	-0.00931	-0.00200	1126	-0.00652	-0.00028
TCE Ratio <sub>q-1</sub>	1441	0.06800	0.06426	1212	0.06927	0.06471	1126	0.07090	0.06592
Size	1441	0.59455	0.55000	1212	0.58391	0.55000	1126	0.49702	0.50000
Div	1441	0.00128	0.00138	1212	0.00134	0.00141	1126	0.00119	0.00127
RP	1441	0.00111	0.00027	1212	0.00118	0.00038	1126	0.00100	0.00012
ΔNPAT	1441	0.00030	0.00002	1212	0.00027	0.00002	1126	0.00034	0.00003
Loan Growth	1441	0.01900	0.01400	1212	0.01841	0.01355	1126	0.01953	0.01387
EBTP	1441	0.00488	0.00494	1212	0.00494	0.00500	1126	0.00465	0.00477
MB	1441	2.13265	2.00927	1212	2.15700	2.03233	1126	2.12894	2.00394

Panel B: Pearson Correlation Table of Full Sample (p values in parenthesis)

Variable	TCE <sub>q-1</sub>	Size	Div	RP	ΔNPAT	Loan Growth	EBTP	MB
ΔTCE Ratio	-0.1211 (0.000)	-0.0072 (0.786)	-0.0404 (0.125)	-0.2441 (0.000)	-0.0394 (0.135)	-0.3798 (0.000)	0.0660 (0.012)	0.0216 (0.413)
TCE Ratio <sub>q-1</sub>		-0.1841 (0.000)	-0.0260 (0.324)	0.1693 (0.000)	-0.0456 (0.083)	0.0976 (0.000)	0.0634 (0.016)	-0.0840 (0.001)
Size			0.3517 (0.000)	0.1252 (0.000)	-0.1260 (0.000)	-0.0502 (0.057)	0.3482 (0.000)	0.1729 (0.000)
Div				0.1339 (0.000)	-0.0648 (0.014)	-0.0555 (0.035)	0.3845 (0.000)	0.1693 (0.000)
RP					-0.0229 (0.385)	-0.0674 (0.011)	0.1616 (0.000)	0.0664 (0.012)
ΔNPAT						-0.0180 (0.496)	-0.1894 (0.000)	-0.2108 (0.000)
Loan Growth							0.0350 (0.184)	0.0261 (0.321)
EBTP								0.4588 (0.000)

*Full Sample* includes all quarterly observations with all available information. *CPP Sample* includes all firms which were eligible to apply for CPP funds starting in October 2008 while "*Other Firms*" excludes the largest banks ( $Size \geq 0.85$ ).  $\Delta TCE Ratio$  is the percentage change in the tangible common equity ratio measured between the beginning and the end of the quarter,  $q$ .  $TCE Ratio_{q-1}$  is tangible common equity ratio reported at the end of the prior quarter. *Size* is measured as the Ken French break point related to the NYSE market percentile measured at the end of the prior quarter. *Div* is measured as common dividends paid during the quarter divided by total assets at the end of the prior quarter ( $Assets_{q-1}$ ). *RP* are share repurchases made during the quarter divided by  $Assets_{q-1}$ .  $\Delta NPAT$  is the percentage change in non-performing assets from the beginning to the end of the quarter. *Loan Growth* is the percentage change in the ratio of net loans to total assets measured between the beginning to the end of the quarter. *EBTP* is quarterly pretax earnings before the provision for loan losses divided by average assets from the beginning to the end of the quarter. *MB* is the ratio of market value of equity to the book value of equity measured at the end of the prior quarter

**Table 7: Analysis of Firm Payouts on Change in Tangible Common Equity Ratio**

	Predicted Sign	Full Sample	CPP Sample	"Other" Firms
Intercept	±	0.0114 (0.405)	0.0160 (0.346)	0.0240 (0.185)
TCE Ratio <sub>q-1</sub>	-	-0.1777 (0.082)	-0.1891 (0.085)	-0.3196 (0.011)
Size	-	-0.0081 (0.383)	-0.0131 (0.222)	0.0026 (0.847)
Div	-	-8.0567 (0.002)	-8.1267 (0.002)	-9.0986 (0.001)
RP	-	-10.9541 (0.000)	-9.5352 (0.000)	-9.2125 (0.000)
ΔNPAT	-	-2.3123 (0.096)	-2.1677 (0.158)	-2.9797 (0.025)
Loan Growth	-	-0.9164 (0.000)	-0.9526 (0.000)	-0.9597 (0.000)
EBTP	+	6.4539 (0.000)	5.4533 (0.001)	6.0716 (0.000)
MB	-	-0.0012 (0.654)	-0.0015 (0.627)	-0.0036 (0.286)
Q1	±	-0.0026 (0.406)	0.0085 (0.104)	0.0055 (0.312)
Q2	±	-0.0110 (0.065)	-0.0081 (0.210)	-0.0071 (0.312)
Q3	±	0.0290 (0.000)	0.0303 (0.000)	0.0310 (0.000)
2005	±	-0.0026 (0.692)	-0.0117 (-0.15)	-0.0024 (0.778)
2006	±	0.0127 (0.029)	0.0147 (0.028)	0.0113 (0.128)
2007	±	0.0019 (0.762)	0.0035 (0.633)	0.0018 (0.819)
N		1441	1212	1126
Adj. R <sup>2</sup>		0.2844	0.2801	0.2822

*Full Sample* includes all quarterly observations with all available information. *CPP Sample* includes all firms which were eligible to apply for CPP funds starting in October 2008 while *"Other Firms"* excludes the largest banks (*Size* ≥ 0.85). *ΔTCE Ratio* is percentage change in the tangible common equity ratio measured between the beginning and ending of quarter, *q*. *TCE Ratio<sub>q-1</sub>* is tangible common equity ratio reported at the end of the prior quarter. *Size* is measured as the Ken French break point related to the NYSE market percentile measured at the end of the prior quarter. *Div* is measured as common dividends paid during the quarter divided by total assets at the end of the prior quarter (*Assets<sub>q,t</sub>*). *RP* are share repurchases made during the quarter divided by *Assets<sub>q,t</sub>*. *ΔNPAT* is the percentage change in non-performing assets from the beginning to the end of the quarter. *Loan Growth* is the percentage change in the ratio of net loans to total assets measured between the beginning and the end of the quarter. *EBTP* is quarterly pretax earnings before the provision for loan losses divided by average assets from the beginning to the end of the quarter. *MB* is the ratio of market value of equity to book value of equity measured at the end of the prior quarter. Newey and West adjusted *p* values (to correct for serial correlation) reported in parentheses.