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The role of firm characteristics on the relationship between gender diversity and firm performance

Mehmet Nihat Solakoglu Nazmi Demir

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# The role of firm characteristics on the relationship between gender diversity and firm performance

Gender  
diversity and  
firm  
performance

1407

Mehmet Nihat Solakoglu and Nazmi Demir

*Department of Banking and Finance, Bilkent University, Ankara, Turkey*

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## Abstract

**Purpose** – The purpose of this paper is to understand the effect of gender diversity on firm performance and evaluate how that relationship is influenced by some firm-specific factors for firms in an emerging market.

**Design/methodology/approach** – The authors collected firm level financial data and firm level characteristics for the firms listed in BIST100 index of Borsa Istanbul for the period between 2002 and 2006. Due to endogeneity of gender diversity and firm performance, the authors utilize unbalanced panel data with 2SLS specification. To observe the sensitivity of results across measures of performance, three measures of performance, two accounting-based and one market-based, are utilized.

**Findings** – Overall, the authors find some weak evidence that gender diversity impacts firm performance. In particular, the findings imply significant association between gender diversity and firm performance for firms that are targeting local markets, for firms in the financial sector and for firms that are family or block-owned. Moreover, findings are fragile with respect to the measures of diversity and performance selected.

**Originality/value** – Although the relationship between gender diversity and firm performance are investigated several times in the past, there are not many studies that examines the role of firm-specific factors on that relationship. By revealing the factors that are important, this study provides an explanation why the existing literature leads to mixed results.

**Keywords** Firm performance, Panel data analysis, Gender diversity, Firm characteristics

**Paper type** Research paper

## 1. Introduction

Does gender diversity in top management or in board of directors lead to value creation? This question has been investigated several times in the past, leading to somewhat mixed results. Often, these studies have used an observable and quantifiable (demographic) definition of diversity, such as gender, age, and race, and ignored non-observable (cognitive) diversity, such as knowledge and education, that represent quality differences (Erhardt *et al.*, 2003). However, this choice was not intentional; it was mostly due to lack of data. This study, facing with the same challenge, focus also on the demographic definition of diversity.

The traditional hypothesis states that gender diversity has a positive impact on firm performance[1]. There are several reasons why we should expect diversity, particularly the gender diversity of a board of directors, to have a positive impact on firm performance. First, it is assumed that a heterogeneous board will better understand the

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marketplace, and hence the market segmentation needs for the product or service, with a potentially positive effect on performance. In addition, there will be higher creativity and innovation under a heterogeneous board. Second, a higher level of diversity may lead to a better corporate image and hence to a higher performance. Third, if the selection process for top management and board members includes only male candidates, firms are selecting managers and directors among a smaller sample, and thus may be missing the best available. Therefore, a selection process that includes both genders is expected to lead to better management with a potentially higher performance. Fourth, because a diverse board or top management will have a broader view of the business environment, diversity is expected to improve the decision-making process through the evaluation of more alternatives. In addition, diversity may lead to a more effective global relationship (Carter *et al.*, 2003; Smith *et al.*, 2005; Singh and Vinnicombe, 2004; Hambrick *et al.*, 1996). Finally, without diversity, one can argue that firms may not be able to recruit and retain the best female employees (Daily *et al.*, 1999).

On the other hand, we should also underline the possibility that diversity might lead to lower firm performance if decision making becomes more time-consuming because of diversity. Heterogeneity of the board, in that case, might lead to different objectives and more conflict in the board that lowers the effectiveness of decision-making process. In particular, for firms operating in sectors that require a quick response to market shocks, diversity might be associated with value destruction rather than value creation (Smith *et al.*, 2005; Hambrick *et al.*, 1996; Petrovic, 2008).

The findings of earlier studies, however, do not provide strong evidence in favor of or against gender diversity having a positive effect on firm performance. Some studies provide evidence in favor of positive effect. For example, Farrell and Hersch (2005) find a positive relationship between return on asset (ROA) and the likelihood of adding a woman to the board for 1,000 Fortune firms, but they do not find a significant market reaction. For 2,500 large Danish firms, Smith *et al.* (2005) show that diversity, as measured by the proportion of women in top management positions and on the board positively affects firm performance. Carter *et al.* (2003) demonstrate a positive association between diversity and performance. They also show that agency theory can be used theoretically to justify the link between diversity and performance. Agency theory suggests that a diverse board implies a higher level of board independence and hence better monitoring of managers which might lead to higher performance (Carter *et al.*, 2010). Using demographic diversity, Erhardt *et al.* (2003) show that diversity is positively associated with firm performance. Using an event-study analysis, Gondhalekar and Dalmia (2007) reports weak positive abnormal returns when a female chief executive officers (CEO) is appointed. For a male-CEO appointment, they do not find any significant effect. Campbell and Minguez-Vera (2008) show, however, that share of women directors on the board has a significant and positive impact on firm value, as measured by Tobin's *Q*. Different from other studies, Kang *et al.* (2010) examines the investor reaction to the appointment of female directors to the boards for the firms listed on the Singapore exchange using an event-study analysis. Their findings indicate that investors react positively to the appointment and they are more receptive if the appointment is for an independent board seat.

However, there are also studies that show no or even negative effect of gender diversity on firm performance. For example, Rose (2007) finds no relationship between gender diversity of the board and firm performance as measured by Tobin's *Q* for Danish firms. Similarly, by focussing on CEO gender as a measure of diversity, Wolfers (2006) finds no relationship between diversity and firm performance. Campbell and

Minguez-Vera (2007) also confirms no significant association between female board presence and firm value. Moreover, in an event-study analysis, the latter authors study the stock market reaction to adding a woman to the board and find no significant association. Ahern and Dittmar (2012) investigates the effect of Norwegian law requiring all public-limited firms to have at least 40 percent representation of women on their boards on firm value. They show that the firm value, as measured by Tobin's  $Q$ , declines as a result of this mandated change.

There are also studies that provide explanations for the mixed results observed in the empirical literature. For example, using German data, Joecks *et al.* (2013) show that for women on board to add value to the firm, there is a threshold of 30 percent, and only above this level performance of a diverse board exceeds the completely male board. In addition, using new additions of female directors/managers as a measure of gender diversity for Turkish firms, Solakoglu (2013) show that gender diversity has different effects on firm performance over the different points of the conditional distribution. Hence, the effect might be negative, positive or zero depending on the quantile analyzed.

In this study, we investigate the effect of gender diversity on firm performance for an emerging market, Turkey, using three measures of diversity and three measures of performance[2]. Turkey struggled with both economic and political instability until 2002. Since 2002, however, Turkish economy was able to embark on a set of structural reforms and credible economic policies supported by IMF, prospect of EU accession and single-party majority government. As a result, during 2002-2007 period, real GDP increased by an average of 6.8 percent annually (EC report, 2009). Given the higher presence of women in workplace and the reforms undertaken, Turkey provides a unique sample of firms to investigate the role of gender diversity on firm performance. Furthermore, different from the existing literature, we also consider the effect of block ownership and export dependence on the role of gender diversity on firm performance. Overall, our results indicate that diversity has a weak impact on firm performance. Moreover, the effect of gender diversity on firm performance is fragile with respect to the measures of diversity and performance criteria selected, as our findings change significantly based on the chosen measure.

The remainder of the study is organized as follows. In Section 2, we discuss the data sources used and our estimation methodology. Our model and results are presented and discussed in Section 3. Section 4 provides our conclusions and suggestions for further research.

## 2. Data and methodology

In analyzing the impact of gender diversity on firm performance, we use the largest publicly traded firms in Borsa Istanbul (BIST). Particularly, we select the firms listed in the BIST-100 index, which is the most widely used index to represent the Turkish market portfolio, as of 2006. All data used in this analysis are obtained from the BIST Web page ([www.borsaistanbul.com](http://www.borsaistanbul.com)) for the years between 2002 and 2006. To obtain diversity, board size, ownership structure, and export dependence in sales, we use annual volumes for company information[3]. For financial information, we utilize financial tables provided by the firms to BIST and reported for each year.

Descriptive statistics for the data are provided in Table I. Under column  $n$ , we provide the number of firms available for the analysis with non-missing data for each year. It appears that the proportion of female CEOs/general managers (GMs) has been increasing over the years, from 2.67 percent in 2002 to 4.71 percent in 2006. The average number of female directors, however, has not increased over time; on the

Table I.  
Descriptive statistics

Year	<i>n</i>	Percentage of CEOs/ GMs	Average number of women on board	Percentage of women on board	Percentage of firms with no women on board	Average number of employees	Median ROA	Median ROE	Number of directors	Duality <sup>a</sup> (%)
2002	79	2.67	0.1035	9.8	53.2	1774.7	0.0495	0.1479	7.4557	7.4
2003	82	3.85	0.1045	9.9	52.4	1972.5	0.0509	0.1251	7.4878	5.0
2004	86	4.88	0.1014	10.0	50.0	2273.5	0.0475	0.1198	7.6395	7.6
2005	89	4.76	0.0945	9.3	51.7	2369.0	0.0403	0.1029	7.8409	9.2
2006	89	4.71	0.0901	9.2	50.6	2521.2	0.0405	0.1249	7.7191	8.2
<i>Sectoral differences (2006)</i>										
Manufacturing	44	0.00	0.0848	9.0	54.5	1749.1	0.0811	0.1268	7.3636	5.1
Finance	29	7.14	0.0677	7.2	58.6	2815.6	0.0208	0.1249	8.5862	7.4
<i>Age differences (2006)</i>										
Younger	43	9.76	0.0951	9.87	48.8	1177.1	0.0550	0.1308	7.3023	10.8
Older	46	0.00	0.0854	8.58	52.2	3157.6	0.0397	0.1219	8.1087	4.5
<i>Size differences (2006)</i>										
Smaller	45	4.88	0.1174	12.06	42.2	274.8	0.0540	0.1104	7.7273	8.1
Larger	44	4.55	0.0634	6.34	59.1	4083.8	0.0366	0.1380	7.7111	6.8
<i>Market orientation differences (2006)</i>										
Local	60	7.02	0.0885	9.17	33.3	2093.1	0.0291	0.1192	8.0000	9.1
Export	29	0.00	0.0934	9.18	86.2	2423.3	0.0800	0.1372	7.1379	3.8

**Notes:** *n*, the number of firms with non-missing observations in that category. To define age categories, an average establishment age of 34 is used. For firm size categories, we use the average number of employees, a value of 791, over the 2002-2006 period. We assume that a firm is export-market oriented if the share of exports in sales (average of five years) is equal to or larger than 20 percent. <sup>a</sup>Shows the duality of the CEO and board chair

contrary, it shows a slight decline. Moreover, the percentage of women on boards of directors declines slightly, and is around 9.2 percent as of 2006. For 2014, the proportion of female directors is slightly higher at around 10.45 percent. When compared to reported numbers for other countries, the proportion of women on boards of directors appears to be an average number. For example, Carter *et al.* (2003) provides 9.2 percent as the relevant number for the USA, while Farrell and Hersch (2005) report a figure of 12.26 percent in 1999 for 1,000 Fortune firms. On the other hand, Campbell and Minguez-Vera (2007) report the figure as 3.2 percent for Spain. For Danish firms during 1998-2001 periods, Rose (2007) report 4 percent as the proportion of women in board of directors.

The proportion of firms with no women on the boards of directors declines slightly between 2002 and 2006. As of 2006, however, this number at 50.6 percent is still quite high, compared to 12.60 percent for the USA in 1999, as reported by Farrell and Hersch (2005). For 2014, there appears to be a significant decline in the proportion of firms with no female directors, as this proportion is around 40.9 percent. For Denmark, however, this number is much higher at 78 percent as reported by Rose (2007). The size of the firms, as represented by the number of employees, shows an increasing trend, which is most likely due to the stability of economic growth observed both in local and global economies. In addition, median firm performance, as measured by ROA and return on equity (ROE), does not show a significant change from 2002 to 2006. Finally, the last column in Table I reports the duality of the CEO/GM and the board president, that is, if the CEO/GM also acts as the president of the board.

In Table I, we also report descriptive statistics for several sub-segments for 2006 only. This is because while we try to quantify women's impact on performance, we must also make sure that effects of other factors are accounted for. The first sub-segment we consider is the sectors in which the firms operate. Given that the majority of the firms were in the manufacturing and financial sectors, we report the descriptive statistics for these sectors only. We may think of the financial sector as more service oriented than manufacturing, and, hence, expect a higher representation of women in these industries (Farrell and Hersch, 2005). The results of Table I are somewhat mixed, however, in that respect. Although there are no female CEOs/GMs for 2006 in the manufacturing sector, 7.14 percent of the top managers are female in the financial sector. On the other hand, the proportion of female directors is 9.0 percent and 7.2 percent for the manufacturing and financial sectors, respectively. This finding might be partially due to the larger number of board seats available in financial sector firms, as indicated by the higher average board size. In addition, we observe a larger proportion of firms in the financial sector with no women on their board than in the manufacturing sector.

As discussed by Smith *et al.* (2005), the age of a firm can be important for firm performance. It is possible to expect an inverse *U*-shaped relationship between performance and age, as older firms can be at a point in their product lifecycle of declining earnings, while younger firms are at the start of their product lifecycle. It is also plausible that younger firms are more open to diversity than are older firms. Thus, our second segmentation factor is the age of the firm, in which we categorize firms as young if their establishment age is below an average of 34 years and mature if not[4]. As we expect, for younger firms the percentage with female directors is higher, the percentage with no female director is smaller, and the percentage with female top management positions is greater than for older firms.

In a similar way, we expect firm size to be important for performance (and, perhaps, for diversity), because of market power. That is, we expect larger firms to have a higher

performance (Smith *et al.*, 2005). It is also possible, however, to associate size with inflexibility and to expect a negative relationship between performance and size, particularly for business areas that need a quick response to marketplace requirements. Although the proportion of female top managers is comparable, proportion of women on board is much higher for smaller firms than for larger firms, when firm size is measured by the average number of employees. For instance, for smaller firms, about 12 percent of the boards, on average, include female directors, while for larger firms, only about 6 percent include female directors. Moreover, about 58 percent of the smaller firms, with comparable board sizes, on average, have one or more female directors. On the other hand, for larger firms, this figure is much smaller, at around 41 percent.

For firms operating in an emerging market, foreign markets provide an opportunity to grow through exports beyond what they can achieve in the local market. Thus, export-dependence indicates operations in larger but more competitive markets, where corporate image might play a role. As a result, for the last segmentation factor, we utilize export-market orientation as measured by the share of exports in sales. We use the average share of exports in sales over five years to determine export-market orientation and flag a firm export-market oriented if this average is equal to or larger than 20 percent. To our surprise, we observe that women in non-export-oriented firms held 7 percent of the top management positions as opposed to none in the export-oriented firms. In addition, although the proportion of female board directors is similar for both segments, the percentage of firms with no female directors on the board is much higher for export-market-oriented firms, at 86.2 percent, compared to domestic-market-oriented firms, at 33.3 percent.

Overall, based on descriptive statistics, we observe a slight improvement in gender diversity over time in Turkey when diversity is measured by the existence of women in top managerial positions or on boards of directors. It appears, however, that younger firms and smaller firms have either more female top managers or more board seats held by female directors. On the other hand, we do not confirm sectoral or market orientation differences on gender diversity.

### 3. Model and results

In this study, our main objective is to understand the relationship between gender diversity and firm performance as well as the role of some firm-specific factors on this relationship. We expect that gender diversity has a positive impact on firm performance. Such diversity is represented by three measures: by a dummy variable taking a value of “1” if the CEO/GM of the firm is a woman; by the proportion of female directors on the board; and by the number of female directors. To proxy financial performance, we use two accounting-based measures and one measure based on market performance. Accounting-based measures are ROA and ROE. For the market-based measure, we rely on the average monthly return in a year. We normalize this average return, however, by the total risk of the return in which risk is measured by the standard deviation of the monthly returns in a year. That is, we argue that market performance is the amount of market return per unit of risk undertaken[5].

The analysis is performed using the unbalanced panel data model with the following specification:

$$\text{PERF}_{i,t} = \alpha + \beta \text{DIV}_{i,t} + \sum \gamma_i \text{CTRL}_{i,t} + u_{i,t} \quad (1)$$

where the variable  $\text{PERF}_{i,t}$  is the measure of performance, and  $\text{DIV}_{i,t}$  is the gender



diversity measure for firm  $i$  at time  $t$ . In Equation (1), we also include control variables, denoted by the CTRL that are usually found to be important for firm performance. The factors we consider are the age of the firm as measured by the number of years from the establishment date, the size of the firm as measured by the number of employees, the board size, and a duality dummy as measured by the dual role of top manager and board chair. The firm size, board size and age variables are used in natural logarithms in the model.

As indicated earlier, gender diversity includes only demographic diversity, and we do not control for qualification differences. Moreover, the issue of reverse causality needs to be tested and controlled when investigating the effect of gender diversity on firm performance[6]. As discussed in the literature, gender diversity can lead firms to perform better. However, it is also possible that high performing firms pay more attention to gender diversity and hire more women managers. Hence, both dependent and independent variables simultaneously cause each other to change – hence the source of reverse causality. A test of endogeneity using an artificial regression approach, as suggested by Davidson and MacKinnon (1989, 1993), confirms that the endogeneity problem exists for firm performance and gender diversity. Because of the endogeneity of gender diversity, we utilize two stage least squares (2SLS) in the panel data setting to eliminate that problem[7].

Table II reports the coefficient estimates for Equation 1 for the random effects panel data specifications only as indicated by the Hausman test. For all diversity measures, there is weak evidence that firm performance, as measured by ROA, reacts positively to gender diversity. However, there is no statistically significant association between gender diversity and firm performance under the other two performance measures.

As discussed earlier, there are several factors that may be important for firm performance and for the representation of women in top management positions or on boards of directors. Table III reports the estimates based on segments created by these factors. The first segment we consider is the type of industry, acknowledging that industry characteristics can be important for performance (Farrell and Hersch, 2005). Since the majority of the firms in our sample are in either manufacturing or finance, we estimate Equation (1) for these two sectors and report the results in the first part of Table III. To save space, we only report the coefficient estimates on the gender diversity variables. As before, we do not find any significant relationship between firm performance and gender diversity, either for manufacturing or financial sectors, when diversity is measured with the CEO/GM dummy. On the other hand, for the financial sector, gender diversity, as measured by the proportion and number of female directors, influences ROA positively.

We also report the estimation results for segments based on export-market orientation. We flag firms as export-market oriented if at least 20 percent of their sales are from exports. Firms operating in international markets are expected to have a higher performance, as they operate in larger markets (Smith *et al.*, 2005). On the other hand, they might face fiercer competition and have to work with lower profit margins. In addition, gender diversity is expected to be more important for export-oriented firms, as it promotes a more effective global relationship (Carter *et al.*, 2003). However, contrary to our expectations, we do not discover a strong relationship between performance and gender diversity for export-oriented firms. There is weak evidence that having a female CEO/GM causes ROA to be higher. For firms with local-market orientation, however, results indicate that gender diversity has a positive influence on accounting-measures of firm performance[8].

**Table II.**  
The effect of gender  
diversity of firm  
performance

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Variables	Diversity = female CEO/GM		Diversity = % female on board		Diversity = no. of female directors	
	ROA	$r_{\mu}/\sigma_r$	ROA	ROE	ROA	ROE
Constant	0.0109 (0.0882)	-0.1025 (0.4027)	0.1633 (0.1361)	-0.0137 (0.0979)	-0.8740 (0.6860)	0.2142 (0.1408)
Firm Age	-0.0204 (0.0183)	-0.0664 (0.0853)	-0.0086 (0.0283)	-0.0228 (0.0197)	0.0049 (0.1448)	-0.0166 (0.0284)
Firm Size	-0.0097 (0.0058)*	0.0199 (0.0268)	-0.0067 (0.0089)	-0.0090 (0.0063)	-0.0104 (0.0454)	-0.0067 (0.0090)
Board Size	0.0919 (0.0401)**	0.1740 (0.1772)	0.0812 (0.0613)	0.0988 (0.0421)*	0.5442 (0.2589)**	0.0755 (0.0608)
Duality Dummy	-0.0365 (0.0415)	0.0117 (0.1716)	-0.0217 (0.0614)	-0.0239 (0.0420)	0.0423 (0.2276)	-0.0207 (0.0589)
Diversity	0.1189 (0.0695)*	0.5147 (0.3260)	0.0106 (0.1025)	0.1889 (0.1054)*	0.8580 (0.7696)	-0.1502 (0.1518)
					0.0376 (0.0136)***	0.1753 (0.1012)*

**Notes:** Standard errors are provided in parentheses.  $r_{\mu}/\sigma_r$  represent the ratio of average monthly return in a year to standard deviation of monthly return. \*, \*\*, \*\*\* Statistically significant at 10, 5, and 1 percent levels, respectively

Segments	Diversity = female CEO/GM			Diversity = % female on board			Diversity = no. of female directors		
	ROA	ROE	$r_d/\sigma_r$	ROA	ROE	$r_d/\sigma_r$	ROA	ROE	$r_d/\sigma_r$
Manufacturing	0.3782 (0.3094)	2.7064 (3.3614)	0.2393 (3.2686)	0.1416 (0.1332)	0.8483 (0.9291)	0.2192 (0.2495)	0.0275 (0.0171)	0.1120 (0.1204)	0.0370 (0.0330)
Finance	0.0744 (0.1696)	-0.2637 (0.2121)	-0.2395 (0.1589)	1.1179 (0.3851)***	1.6929 (1.8560)	-0.1189 (0.3852)	0.1405 (0.0397)***	0.3678 (0.2226)*	-0.0159 (0.0403)
Local market oriented	0.0983 (0.0764)	0.4983 (0.1535)***	-0.0298 (0.0938)	0.2427 (0.1301)*	1.2978 (0.7862)*	-0.1204 (0.1677)	0.0448 (0.0161)***	0.2361 (0.0992)**	-0.0101 (0.0220)
Export-market oriented	0.5367 (0.3235)*	6.0978 (7.1854)	2.2839 (5.6425)	-0.0152 (0.1762)	1.1969 (1.5784)	-0.2843 (0.3288)	0.0145 (0.0317)	0.3281 (0.2760)	-0.0361 (0.0566)
Share < 30%	0.0186 (0.0909)	-0.1201 (0.5324)	-0.4057 (0.3526)	-0.0327 (0.0910)	0.3311 (0.5160)	0.1393 (0.3502)	0.0077 (0.0134)	0.0926 (0.0773)	0.0453 (0.0509)
Share ≥ 30%	0.1323 (0.0910)	0.7235 (0.3958)*	0.0372 (0.1099)	0.2709 (0.1276)**	0.8355 (0.9476)	-0.2647 (0.1666)	0.0504 (0.0161)***	0.1635 (0.1220)	-0.0392 (0.0217)*

**Notes:** Standard errors are provided in parentheses.  $r_d/\sigma_r$  represent the ratio of average monthly return in a year to standard deviation of monthly return. \*\*\*, \*\*, \* Statistically significant at 10, 5, and 1 percent levels, respectively

**Table III.**  
The role of firm  
characteristics on  
gender diversity and  
firm performance  
relationship

As the final segmentation, we consider ownership patterns and focus on block ownership. Many companies in Turkey, including the large ones, have several shareholders with large share holdings, with the majority of shareholders being families or holding companies. It has been extensively discussed in the literature that firm performance and ownership structure are related, and the main hypothesis argues that firms with block ownership (e.g. family ownership) will have higher performance (e.g. Demsetz and Villalonga, 2001; Maury and Pajuste, 2005; Maury, 2006; Barth *et al.*, 2005; Davies *et al.*, 2005; Kim *et al.*, 2004). Hence, we split the firms based on the largest shareholder's holding. We set the ownership control at 30 percent, as discussed in Demirağ and Serter (2003), and not at a lower rate, to account for less dispersion of ownership control in Turkish companies.

Results are presented in the last part of Table III. Consistent with our expectations, we find that the gender diversity has a positive and significant influence on firm performance for firms with ownership control greater than or equal to 30 percent. Only for this group of companies does the market-based performance measure decline significantly, when diversity is measured by the number of female directors. There seems to be no relationship between gender diversity and performance when a major shareholder controls less than 30 percent of the shares.

#### 4. Concluding remarks

This study investigates the role of gender diversity on firm performance for the largest listed firms in Turkey, taking into account certain firm-specific factors and their effect on this role. The analysis uses three measures of gender diversity – a dummy variable taking the value of “1” when the CEO/GM is a woman, the proportion and the number of women on the boards of directors, along with three measures of performance – two accounting- and one market-based. Overall, this study provide some evidence that women add a new perspective to the firm strategy to improve firm performance. Further, our results imply that gender diversity may have a larger role if firms have more women directors rather than women CEOs/GMs.

The study also considers the effect of industry differences, export dependence, and ownership structures of firms on the diversity-performance relationship. We find some evidence that gender diversity influences firm performance for firms in the financial sector, for local market-oriented firms, and for firms with block ownership. Additionally, our findings indicate that the performance measure ROA is more responsive to the gender diversity effect than the other two measures. Although both ROE and ROA are accounting-based performance measures, they differ from each other because of the financial leverage. Hence, ROA represent economic returns and perhaps higher economic returns due to higher risk aversion by women[9]. In addition, the findings of this study provide some explanation why the existing literature provide mixed results on the relationship between gender diversity and firm performance.

We consider the following reasons for the weak evidence that our results provide. First, there might be a threshold number of female directors needed before they can add new perspectives to improve future performance (Shrader *et al.*, 1997; Joecks *et al.*, 2013). In our sample, not many firms had more than one female director on the board. The second reason is related the stability of female directors/managers in the same position. It may take some time for women directors to influence the board members to affect the firm strategy and hence the firm performance. In our future work, we intend to pursue these lines of research.

## Notes

1. As indicated by Petrovic (2008), organizational performance is used to measure board output which is influenced by board composition and dynamics.
2. The term gender diversity refers to women on board and woman in management in this study.
3. Some of the firm level information, e.g. exports, were not available after 2008. As a result, we were restricted to use data between 2002 and 2006. We intentionally left out years 2007 and 2008 from the analysis because of the mortgage crisis and global financial crisis.
4. We use 34 because it is the sample average.
5. An alternative and a better measure of performance that takes into account the future performance is Tobin's *Q*. Unfortunately, the required data are not available for the firms in our sample during the estimation period.
6. Reverse causality is one of the sources for endogeneity problem. This problem causes the covariance between independent variable(s) and the error term to be different from 0. As a result, coefficient estimates can be biased.
7. For the 2SLS approach, we use the lagged gender diversity variable and the lagged performance measure as the instruments in our estimations.
8. For 2006, about 79 percent of the firms that are marked as export-dependent are in manufacturing sector, whereas only 36 percent are in manufacturing for local market orientation. This might be one reason why we observe no significant association between gender diversity and firm performance for export-oriented firms.
9. In controlled experiments, it has been shown that women are more risk averse than men. Hence, ROA, which takes into account financial leverage, may be more sensitive to gender diversity, as our results indicate. Some examples are: Croson and Gneezy (2009), Charness and Gneezy (2012) and Eckel and Grossman (2008). We would like to thank an anonymous referee for indicating this important point.

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### About the authors

Mehmet Nihat Solakoglu is currently an Associate Professor in the Banking and Finance Department of the Bilkent University in Ankara, Turkey. He received his PhD in Economics and Masters Degree in Statistics from the North Carolina State University. After graduation, he worked for American Express in USA. His main interests are in applied finance and international finance. His papers have been accepted/published in journals such as *Applied Economics*, *Journal of International Financial Markets, Institutions, and Money*, *Applied Economics Letters*, *Emerging Markets Finance and Trade* and *Economic Systems Research*. His current interests are in herding in financial markets, the role of news arrival on return and return volatility, the effect of exchange rate risk on trade and the role of gender diversity on firm performance. Mehmet Nihat Solakoglu is the corresponding author and can be contacted at: nsolakoglu@bilkent.edu.tr

Nazmi Demir received his MSc and PhD from the University of California, Davis in Agricultural Economics in 1970 and his Associate Professorship in Economic Policy in Turkey in 2000. He is specialized in Leontief input-output, inefficiency models, herd-behavior in equity markets and economics of environment and agriculture. He is the Board member of various international research centers for 18 years. After a long-term government employment at high positions in various departments such as Development Planning, Agrarian Reform and Administrative Duties in Turkey, he joined Bilkent University in the Department of Economics as an Instructor first and then as the Chairman of the Banking and Finance Department, teaching microeconomics and macroeconomics, statistics, banking and finance, computerized financial applications. He has published (articles, books chapters) in journals such as *Developing Economics*, *Economic Letters*, *Applied Economic Letters*, *Canadian Journal of Agricultural Economics* and *Economic Systems Research*.