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The Role of Sales Growth in Determining the Effect of Operating Leverage on Financial Performance: The Case of Turkey*

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ABSTRACT

This article analyses the impact of sales growth on the association between operating leverage and financial performance. Using a sample of 200 firms listed on Istanbul Stock Exchange over the period from 2008 to 2017, we find that operating leverage has a negative effect on profitability, and that the negative effect of operating leverage is stronger (weaker) for firms with low (high) sales growth. It implies that sales growth mitigates the negative impact of operating leverage on profitability. These results confirm that firms with high operating leverage should increase sales level to enhance their financial performance.

Keywords: *Operating Leverage, Sales Growth, Profitability, Istanbul Stock Exchange.*

Jel Classification*: G31, G32.*

Faaliyet Kaldıracının Finansal Performans Üzerindeki Etkisini Belirlemede Satış Büyümesinin Rolü: Türkiye Örneği

ÖZET

Bu çalışma, satış büyümesinin faaliyet kaldıracı ile finansal performans arasındaki ilişki üzerinde etkisini analiz etmektedir. Borsa İstanbul'da (BİST) 2008-2017 yılları arasında işlem gören 200 firma verilerini kullanarak, faaliyet kaldıracının karlılık üzerindeki etkisinin negatif olduğu ortaya çıkmıştır. Dahası, düşük (yüksek) satışlar büyümesine sahip olan firmalar için faaliyet kaldıracının olumsuz etkisinin daha güçlü (daha zayıf) olduğu gösterilmiştir. Bu sonuçlara göre, satışlar büyümesinin faaliyet kaldıracının karlılık üzerindeki olumsuz etkisini azalttığı anlaşılabilir. Yüksek faaliyet kaldıracına sahip firmaların finansal performansını artırmak için satış düzeyleri yükseltilmelidir.

Anahtar Kelimeler: *Faaliyet Kaldıracı, Satış Büyümesi, Karlılık, Borsa İstanbul (BİST).*

JEL Sınıflandırması: *G31, G32.*

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1. INTRODUCTION

Maximizing a firm's financial performance is one of the most important objectives that a firm aims to achieve. Operating and financial leverage play crucial role in this context. Firms can improve their competitiveness and market share by reducing the unit cost through operating leverage. Operating leverage could also affect the operational risk of a firm.

Operating leverage refers to the ratio of fixed costs over variable costs in the firm's cost structure. In other words, operating leverage is the relation between fixed and variable costs. A firm that operates with higher fixed costs and lower variable costs has higher break-even point (the minimum level of sales to cover fixed costs and achieve profits) and higher operating leverage (Grau and Reig, 2020: 2). Operating leverage may positively or negatively affect firm's financial performance. If the fixed costs increase, the growth in sales could reduce the cost of a unit sold and increase profits with a higher rate, and thus, the increases in operating leverage will lead to improvements in profitability. On the other hand, in the case of higher fixed costs (i.e. higher operating leverage), the decreases in sales will increase the cost of a unit and lower firm's profits with a higher rate. Therefore, sales growth could have important impact on the operating leverage-financial performance relationship. In good times, operating leverage is positively associated with profitability (Chen et al., 2019: 4).

Prior empirical studies show mixed results about the relation between operating leverage and financial performance. For example, Chen et al. (2019) find that operating leverage has positive effect on profitability, whereas Zabolotnyy and Wasilewski (2018) show a negative relationship between operating leverage and profitability. Moreover, Dagogo (2014) and Khan et al. (2017) document insignificant relationship. The reasons for these contradictory findings may be due to previous studies being performed in different institutional and economic environments. In addition, the majority of prior studies investigated the direct impact of operating leverage on financial performance without conditioning this impact on sales growth and economic conditions. The role of sales growth has received less attention in this context. To fill this gap, this study aims at investigating the effect of sales growth on the relationship between operating leverage and financial performance. To address this issue, we examine a sample of 200 listed Turkish firms for the period 2008-2017 by using ordinary least squares (OLS) regressions. This study contributes to the finance literature by investigating the role of operating leverage in determining financial performance. Furthermore, unlike previous studies that examined only the direct effect of operating leverage on financial performance, we condition this effect on sales growth and investigate whether sales growth exerts a significant impact on the relationship between operating leverage and financial performance. To the authors' knowledge, no studies have explored this issue.

2. LITERATURE REVIEW

Previous empirical literature has mainly concentrated on the effect of operating leverage on firm risk and financial performance. Firms with high operating leverage are riskier due to the higher volatility of profits. In the case of high fixed costs within cost structure, firm's profits will be very sensitive to changes in sales. A small decrease (increase) in sales will lead to a larger percentage decrease (increase) in profits (Kartal et al., 2013: 70). Therefore, operating leverage exacerbates the variability of cash flows (Johnstone, 2020).

Several studies have showed a positive relationship between operating leverage and firm risk. For example, Mandelker and Rhee (1984), Mensah (1992) and Er and Kaya (2012) showed that beta coefficient (systematic risk) is higher for firms with high operating leverage. Lord (1996) and Lee and Park (2014) found that operating leverage has positive impact on total and systematic risk. Houmes et al. (2012) documented a positive association between operating leverage and equity betas. On the other hand, Huffman (1989) showed a negative relation between operating leverage and beta coefficient.

Prior studies related to the effect of operating leverage on financial performance are limited and also have reached inconclusive results. Medeiros et al. (2006) examined the effect of operating leverage on the stock returns of firms listed on the Brazilian Stock Market during 2001-2004. They found that operating leverage positively affects stock returns. García-Feijóo and Jorgensen (2010) also found that operating leverage is positively associated with stock returns and systematic risk. Chen and Li (2018) investigated the effect that operating leverage (the ratio of fixed costs to the market value of assets) exerts on stock returns. They showed that operating leverage positively predicts stock returns. Similarly, García-Feijóo and Jansen (2020) provide evidence that operating leverage is positively associated with monthly stock returns in a sample of firms in 20 developed countries.

Dagogo (2014) studied the impact of operating leverage on the risk and profitability of Nigerian emerging firms. The results of this study indicated that operating leverage has insignificant effect on operating profitability and operating risk. Khan et al. (2017) analyzed the effect of operating leverage on the profitability of 129 service firms in Pakistan during the period 2009-2014. They found that operating leverage has insignificant effect on return on asset and return on equity. In contrast, Zabolotnyy and Wasilewski (2018) indicated that operating leverage negatively affects profitability. Dayi (2019) analyzed the operating leverage of 20 airlines from different countries during the period 2010-2016. The results showed that operating leverage has positive impact on revenues, indicating that firms with high operating leverage tend to have high revenues. Chen et al. (2019) showed that operating profitability is positively affected by operating leverage. Chen et al. (2019) argue that in good times, increases in operating leverage can lead to improvements in profitability because a firm's quasi-fixed and fixed costs do not increase at the same rate as its sales. High operating leverage (fixed costs) brings high profits in good times (e.g. in times of high sales growth) because of the low unit variable costs. However, in bad times, increases in fixed costs will cause a large loss (Johnstone, 2020: 284). According to these arguments, we propose that in the case of high sales growth, operating leverage will have higher positive (or lower negative) impact on firm's profitability. Thus, we hypothesize the following:

H1: There is a relationship between operating leverage and profitability.

H2: The positive (negative) effect of operating leverage on profitability is stronger (weaker) for firms with high sales growth.

3. DATA AND METHODOLOGY

3.1. Sample Selection

To examine the effect of operating leverage on firm's profitability and the role of sales growth in this effect, this study uses the data of 200 non-financial firms listed on Istanbul Stock Exchange during the period 2008-2017. The sample consists of 52 service and 148 industrial firms. Financial data are collected from the website "www.kap.org.tr". The total unbalanced panel data of this study consists of 1398 firm-year observations.

3.2. Variables

3.2.1. Financial Performance (Profitability)

Prior studies have implemented several ratios to measure firm's profitability, for example, return on assets (Doğan, 2013; Vătavu, 2015; Karadeniz and Kaplan, 2016; Chandra et al., 2019), return on equity (Salim and Yadav, 2012; Vătavu, 2015; Le and Phan, 2017) and the ratio of operating profitability to total assets (Kebewar, 2013; Karadeniz and Kaplan, 2016; Detthamrong et al. 2017). This study uses the aforementioned ratios to proxy for profitability. However, these ratios do not consider the cash flow in measuring a firm's financial performance. Previous studies did not take into account the cash flow-based performance measures. To capture how efficiently a firm uses its assets in generating operating cash flows, we also use the ratio of operating cash flows to total assets (OCF).

3.2.2. Operating Leverage (OL)

To measure the degree of operating leverage, we use the percentage change in earnings before interest and taxes over the percentage change in sales (Horne and Wachowicz, 2008: 423). We take the absolute value of this ratio to measure the sensitivity of earnings before interest and taxes (EBIT) to sales. Firms with high ratio have higher fixed costs. However, Zhao et al (2016) argue that the normal values of the OL ratio are those greater than one. Thus, they exclude the observations where $OL \leq 1$. We also use this method as an additional analysis.

3.2.3. Control Variables

In regression models that investigate the effect of operating leverage on profitability, we control for firm size (Size), investment opportunities (INO), sales growth (SG), tangibility (Tang) and financial leverage (Lev). Larger firms can more easily access capital markets to accumulate funds (Dawar, 2014: 7), have competitive advantage (Wahba, 2013: 9) and have lower bankruptcy costs compared to small firms (Zeitun and Tian, 2007: 45). Therefore, firm size could positively affect firm performance. We control for investment opportunities by using the change in total assets for one year (Fama and French, 2002). Investment opportunities and sales growth can also contribute to better performance (Le and Phan, 2017: 716). Tangibility, which refers to the ratio of tangible assets to total assets, may have positive effect on firm performance because tangible assets serve as collateral and alleviate the agency conflicts between debtholders and shareholders (Titman and Wessel, 1988: 3). Thus, tangible assets reduce the agency costs of debt and enable a firm to borrow at lower costs, leading to

better performance (Chandra et al, 2019: 6). Financial leverage can also exert significant effect on firm performance. However, the empirical findings of previous studies provide inconsistent results about the role of leverage on financial performance, indicating the ambiguity of this role. Increases in leverage could reduce financial performance because of the increased costs associated with high levels of debt. These costs include the agency costs of debt and bankruptcy costs. A firm's financial performance will decrease if the marginal costs of debt exceed the marginal benefits (Bilen and Kalash, 2020: 260-261). Table 1 shows the definitions of variables.

Table 1. Definition of Variables

Variable	Definition
Return on Assets (ROA)	Net Profits / Total Assets
Return on Equity (ROE)	Net Profits / Equity
Operating Profits (OP)	Earnings Before Interest and Taxes / total assets
Operating Cash Flows (OCF)	Operating Cash Flows / Total Assets
Operating Leverage (OL)	|(Δ Earnings Before Interest and Taxes)/Δ sales|
Firm size (Size)	The natural logarithm of total assets.
Investment Opportunities (INO)	The change in total assets for one year.
Sales Growth (SG)	(Sales t – Sales t-1) / (Sales t-1)
Financial Leverage (Lev)	Total liabilities / Total assets
Tangibility (Tang)	Tangible assets / Total assets

3.3. Research Models

In order to investigate the effect of operating leverage on profitability, panel data analysis is used by estimating the following pooled ordinary least squares (pooled OLS) regression models:

$$ROA_{it} = ß_0 + ß_1(OL_{it}) + ß_2(Size_{it}) + ß_3(INO_{it}) + ß_4(SG_{it}) + ß_5(Lev_{it}) + ß_6(Tang_{it}) + ß_7(SG\_Dum_{it}) + ß_8(OL\_SG_{it}) + [Year\ Dummies] + [Industry\ Dummies] + \varepsilon_{it} \quad (1)$$

$$OP_{it} = ß_0 + ß_1(OL_{it}) + ß_2(Size_{it}) + ß_3(INO_{it}) + ß_4(SG_{it}) + ß_5(Lev_{it}) + ß_6(Tang_{it}) + ß_7(SG\_Dum_{it}) + ß_8(OL\_SG_{it}) + [Year\ Dummies] + [Industry\ Dummies] + \varepsilon_{it} \quad (2)$$

$$ROE_{it} = ß_0 + ß_1(OL_{it}) + ß_2(Size_{it}) + ß_3(INO_{it}) + ß_4(SG_{it}) + ß_5(Lev_{it}) + ß_6(Tang_{it}) + ß_7(SG\_Dum_{it}) + ß_8(OL\_SG_{it}) + [Year\ Dummies] + [Industry\ Dummies] + \varepsilon_{it} \quad (3)$$

$$OCF_{it} = ß_0 + ß_1(OL_{it}) + ß_2(Size_{it}) + ß_3(INO_{it}) + ß_4(SG_{it}) + ß_5(Lev_{it}) + ß_6(Tang_{it}) + ß_7(SG\_Dum_{it}) + ß_8(OL\_SG_{it}) + [Year\ Dummies] + [Industry\ Dummies] + \varepsilon_{it} \quad (4)$$

Where:

SG_Dum is a dummy variable takes a value of one when SG is greater than the median value and zero otherwise.

OL_SG is an interaction term between the degree of operating leverage and sales growth, computed as (OL * SG_Dum). The interaction term is used to examine the

moderating effect of sales growth on the operating leverage-financial performance relationship.

We also include industry and time dummies in regression models to control for industry-specific characteristics and time effects.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Descriptive Statistics, Correlation Matrix and Univariate Tests

The descriptive statistics for variables used in this study are presented in table 2. We see that OL has a mean of 6.3, indicating that a 1% change in sales leads to 6% change in operating profits (earnings before interest and taxes). The mean values of profitability measures (ROA, OP, ROE, OCF) are 0.043, 0.075, 0.076 and 0.06 respectively. The mean of financial leverage is 0.488. Tangible assets amount to 33.8% of the total assets. Sales growth has a mean of 0.197.

Table 2. Descriptive Statistics

	Mean	Median	Minimum	Maximum	Std. Deviation	N
OL	6.342	2.988	0.006	50.793	8.356	1398
Size	19.837	19.658	14.871	24.952	1.628	1398
INO	0.105	0.109	-2.229	0.960	0.196	1398
SG	0.197	0.139	-1.000	9.930	0.631	1398
Lev	0.488	0.487	0.006	2.527	0.255	1398
Tang	0.338	0.334	0.000	0.930	0.191	1398
ROA	0.043	0.037	-0.511	0.995	0.097	1398
ROE	0.076	0.069	-0.417	0.563	0.092	1398
OP	0.075	0.084	-0.937	0.880	0.197	1374
OCF	0.060	0.052	-0.694	1.955	0.127	1398

Table 3 shows the non-parametric Spearman rank correlation coefficients among variables. We find that operating leverage is negatively and significantly correlated with profitability measures (ROA: $r = -0.163$ $p<0.01$; OP: $r = -0.179$ $p<0.01$; ROE: $r = -0.177$ $p<0.01$). However, the correlation between OL and OCF is negative but insignificant. Moreover, sales growth, investment opportunities and firm size are positively related to profitability, whereas financial leverage has negative correlation. We also see that the correlation coefficients between the explanatory variables are modest, indicating the absence of multicollinearity problem. To further check the multicollinearity issue, we use the Variance Inflation Factor (VIF) test. We find that the tested values of VIF are all less than 5, which confirms the absence of multicollinearity problem as VIF values lower than 10 are acceptable (Hair et al., 2014).

Table 3. Correlation Coefficients

	OL	Size	INO	SG	Lev	Tang	ROA	ROE	OP	OCF
OL	1.000									
Size	-0.048	1.000								
INO	-0.137**	0.128**	1.000							
SG	-0.300**	0.002	0.369**	1.000						
Lev	-0.034	0.236**	0.194**	0.108**	1.000					
Tang	0.088**	0.102**	-0.007	-0.050	-0.011	1.000				
ROA	-0.163**	0.210**	0.167**	0.170**	-0.423**	-0.198**	1.000			
ROE	-0.177**	0.259**	0.213**	0.192**	-0.129**	-0.252**	0.889**	1.000		
OP	-0.179**	0.234**	0.196**	0.211**	-0.186**	-0.170**	0.862**	0.796**	1.000	
OCF	-0.042	0.269	-0.063*	-0.034	-0.149**	0.096**	0.455**	0.407**	0.443**	1.000

* P < 0.05, ** P < 0.01.

Table 4 panel A presents the mean and median values of profitability measures according to the quartiles of OL. We find that firms with low OL (the first quartile Q1 of OL) have higher profitability compared to firms with high OL (the fourth quartile Q4). We employ T and Man-Whitney tests to examine whether the two groups (Q1 & Q4) have different profitability level. The results indicate that ROA, OP and ROE of the first quartile of OL are significantly higher than those of the fourth quartile, indicating that firms with high operating leverage have lower profitability.

In panel B of table 4, the firm-years are divided into two groups based on the median value of OL. Firm-years with high (low) operating leverage are those ranked in above (below) the median value. We then compare the profitability measures of the two groups. Consistent with the results of panel A, we find that firms with high OL (OL > median value) have lower profitability compared to firms with low OL (OL<= median value). The differences between the two groups regarding profitability measures are significant at 1% level. However, we see that the results of OCF are not significant.

Table 4. Univariate Tests

Panel A.	Q1 (Low OL) N=347	Q2 N=347	Q3 N=354	Q4 (High OL) N=350	T-Test (P value)	Mann- Whitney U Test (P value)
OL	0.632 (0.635)	1.97 (1.886)	4.956 (4.699)	17.744 (14.11)	(0.000)***	(0.000)***
ROA	0.055 (0.049)	0.057 (0.050)	0.044 (0.037)	0.017 (0.020)	(0.000)***	(0.000)***
OP	0.085 (0.082)	0.093 (0.081)	0.071 (0.063)	0.053 (0.045)	(0.000)***	(0.000)***
ROE	0.100 (0.103)	0.103 (0.098)	0.066 (0.079)	0.029 (0.046)	(0.000)***	(0.000)***
OCF	0.057 (0.052)	0.071 (0.063)	0.062 (0.060)	0.050 (0.040)	(0.5)	(0.208)
Panel B.	Low OL (OL <= Median Value)		High OL (OL > Median Value)		T-Test (P value)	Mann- Whitney U Test (P value)
OL	1.3 (1.2)		11.36 (8)		(0.000)***	(0.000)***

ROA	0.055 (0.048)	0.031 (0.028)	(0.000)***	(0.000)***
OP	0.089 (0.081)	0.063 (0.054)	(0.000)***	(0.000)***
ROE	0.100 (0.101)	0.049 (0.061)	(0.000)***	(0.000)***
OCF	0.064 (0.059)	0.056 (0.048)	(0.235)	(0.223)

* P < 0.05, ** P < 0.01. Figures without parentheses are mean values. Median values are in parentheses.

4.2. Regression Results

Table 5 presents the results of basic OLS regression models that estimate the effect of operating leverage on profitability. We find that operating leverage has negative and significant effect on ROA (β =-0.001, p <0.01), OP (β =-0.001, p <0.01), ROE (β =-0.002, p <0.01) and OCF (β =-0.001, p <0.1). The negative coefficients indicate that the increases in operating leverage lead to decreases in return on assets, operating profitability, return on equity and the ratio of operating cash flows to total assets. These results are in line with Zabolotnyy and Wasilewski (2018), but contrary to those of Dagogo (2014), Khan et al. (2017) and Chen et al. (2019).

Table 5. The Effect of Operating Leverage on Profitability

	Model 1 ROA	Model 2 OP	Model 3 ROE	Model 4 OCF
Constant	-0.143*** (0.000)	-0.105*** (0.000)	-0.320*** (0.000)	-0.211*** (0.000)
OL	**-0.001*** **(0.000)**	**-0.001*** **(0.000)**	**-0.002*** **(0.000)**	**-0.001*** **(0.053)**
Size	0.015*** (0.000)	0.013*** (0.000)	0.025*** (0.000)	0.017*** (0.000)
INO	0.064*** (0.000)	0.054*** (0.000)	0.096*** (0.000)	-0.07*** (0.000)
SG	0.017*** (0.000)	0.004 (0.265)	-0.002 (0.792)	-0.001 (0.921)
Lev	-0.192*** (0.000)	-0.111*** (0.000)	-0.135*** (0.000)	-0.091*** (0.000)
Tang	-0.112*** (0.000)	-0.094*** (0.000)	-0.265*** (0.000)	0.002 (0.90)
Adjusted R^2	0.374	0.215	0.141	0.082
F	56.68*** (0.000)	26.49*** (0.000)	16.07*** (0.000)	9.37*** (0.000)
N	1398	1398	1374	1398

- This table presents the regression results for the effect of operating leverage on profitability measures.
- N is the number of observations.
- P values are reported in parentheses.
- *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively.

To investigate the effect of sales growth on the relationship between operating leverage and profitability we include an interaction term [OL * (SG_Dum)] to capture the interactive effect of operating leverage and sales growth. In addition, we estimate the baseline models separately for two subsamples. The first subsample represents firm-years with low sales growth (SG<= median value), whereas the second subsample represents firm-years with high sales growth (SG> median value). Table 6 presents the results of interaction term and subsamples. In the first model in table 6, operating leverage has a significant negative effect on ROA (β =-0.001, p <0.01), while the effect of interaction term [OL * (SG_Dum)] is positive and significant (β =0.001, p <0.1). This suggests that the negative effect of OL on ROA is mitigated by sales growth (i.e. weaker for firms with high sales growth). Models 2 and 3 in table 6 also confirm this result, where the negative effect of operating leverage on ROA is significant only for firms with low sales growth (Model2: β =-0.002, p <0.01). On the other hand, this effect is not significant in firms with high sales growth as we see in model 3 (β =-0.0003, p =0.539). The other models in table 6, where the dependent variable is OP (models 4, 5, 6), ROE (models 7, 8, 9) or OCF (models 10, 11, 12), show similar results.

Table 6. The Effect of Sales Growth on the Relationship between Operating Leverage and Profitability

	Dependent Variables					
	ROA			OP		
	Model 1	Model 2 (SG<= median value)	Model 3 (SG> median value)	Model 4	Model 5 (SG<= median value)	Model 6 (SG> median value)
Constant	-0.157*** (0.000)	-0.074** (0.035)	-0.135*** (0.001)	-0.132*** (0.000)	-0.072* (0.054)	-0.073* (0.088)
OL	**-0.001*** (0.000)**	**-0.002*** (0.000)**	**-0.0003 (0.539)**	**-0.001*** (0.000)**	**-0.002*** (0.000)**	**-0.0001 (0.924)**
Size	0.016*** (0.000)	0.011*** (0.000)	0.016*** (0.000)	0.014*** (0.000)	0.011*** (0.000)	0.012*** (0.000)
INO	0.059*** (0.000)	0.021 (0.108)	0.083*** (0.000)	0.047*** (0.000)	-0.019 (0.179)	0.104*** (0.000)
SG	0.013*** (0.000)	0.122*** (0.000)	0.005 (0.216)	-0.001 (0.699)	0.122*** (0.000)	-0.102*** (0.004)
Lev	-0.195*** (0.000)	-0.169*** (0.000)	-0.218*** (0.000)	-0.115*** (0.000)	-0.099*** (0.000)	-0.124*** (0.000)
Tang	-0.113*** (0.000)	-0.078*** (0.000)	-0.146*** (0.000)	-0.095*** (0.000)	-0.063*** (0.000)	-0.122*** (0.000)
SG_ Dum	**0.013** (0.032)**			**0.019*** (0.003)**		
OL * (SG_Dum)	**0.001* (0.074)**			**0.001** (0.023)**		
Adjusted R^2	0.381	0.425	0.392	0.231	0.301	0.236
F	51.54*** (0.000)	35.54*** (0.000)	30.80*** (0.000)	25.63*** (0.000)	21.15*** (0.000)	15.28*** (0.000)
N	1398	703	695	1398	703	695
	Dependent Variables					
	ROE			OCF		
	Model 7	Model 8 (SG<= median value)	Model 9 (SG> median value)	Model 10	Model 11 (SG<= median value)	Model 12 (SG> median value)
Constant	-0.349*** (0.000)	-0.113 (0.213)	-0.358*** (0.000)	-0.222*** (0.000)	-0.119* (0.059)	-0.234*** (0.000)
OL	**-0.003*** (0.000)**	**-0.003*** (0.000)**	**0.00003 (0.984)**	**-0.001 (0.179)**	**-0.001** (0.032)**	**-0.0005 (0.528)**
Size	0.027*** (0.000)	0.016*** (0.000)	0.031*** (0.000)	0.017*** (0.000)	0.013*** (0.000)	0.017*** (0.000)
INO	0.085*** (0.001)	0.004 (0.919)	0.151*** (0.000)	-0.075*** (0.000)	-0.186*** (0.000)	0.035 (0.166)
SG	-0.01 (0.251)	0.170*** (0.000)	-0.023** (0.021)	-0.004 (0.494)	0.089*** (0.001)	-0.013** (0.035)

Lev	-0.140*** (0.000)	-0.113*** (0.000)	-0.0165*** (0.000)	-0.093*** (0.000)	-0.077*** (0.000)	-0.099*** (0.000)
Tang	-0.266*** (0.000)	-0.202*** (0.000)	-0.326*** (0.000)	0.002 (0.919)	0.009 (0.717)	0.004 (0.881)
SG_ Dum	**0.025* (0.0088)**			**0.014 (0.153)**		
OL * (SG_Dum)	**0.003* (0.075)**			**0.0002 (0.829)**		
Adjusted R^2	0.148	0.139	0.172	0.083	0.142	0.092
F	15.06*** (0.000)	8.4*** (0.000)	10.45*** (0.000)	8.47*** (0.000)	8.73*** (0.000)	5.69*** (0.000)
N	1374	690	684	1398	703	695

- This table presents the regression results for the role of sales growth in determining the effect of operating leverage on profitability measures.
- N is the number of observations.
- P values are reported in parentheses.
- *, **, *** indicate significance at the 10%, 5%, 1% levels, respectively.

Generally, the results of tables 5 and 6 are consistent with the first and second hypotheses. Operating leverage has negative effect on profitability. In addition, this effect is significant only for firms with low sales growth. In other words, increases in the degree of operating leverage reduce the profitability of low-sales growth firms, whereas operating leverage has no significant effect on the profitability of high-sales growth firms. That is because firms should increase their sales to cover the increased fixed costs (i.e. high operating leverage), and consequently to generate profits. Thus, the decreases in sales and increases in fixed costs will decrease the margin per unit sold and reduce firm's profitability.

The results also show a significant negative impact of financial leverage on profitability, which is in line with the results of several studies (e.g. Külter and Demirgüneş, 2007; Soumadi and Hayajneh, 2012; Olokoyo, 2013; Uluyol et al., 2014; Işık, 2017; Gharsalli, 2019). The negative impact indicates that firms with high debt have lower profitability, confirming the trade-off theory of corporate leverage which suggests that the increases in debt exacerbate the agency cost of debt (Myers, 1977) and bankruptcy costs (Fama and French, 2002), and consequently reduce firm's performance. Tangibility also exerts negative impact on profitability, which is compatible with the results of Zeitun and Tian (2007), Soumadi and Hayajneh (2012), Vătavu (2015) and Işık (2017), but contrary to those of Kebewar (2013) and Dawar (2014). The decreases in tangible assets lead to better profitability because firms with high ratio of intangible assets have more investment opportunities, more research and development intensity and more innovation (Kebewar, 2013). We also find a positive relationship between firm size and profitability, indicating that larger firms have better performance. This finding is consistent with the majority of previous studies. Similarly, investment opportunities have positive effect on profitability, which is compatible with the results of Soumadi and Hayajneh (2012) and Chandra et al (2019), but inconsistent with Kebewar (2013).

4.3. Robustness Check

In unreported findings, we also repeat the regression models by including only the OL values that are greater than one (OL >1) as argued by Zhao et al (2016). The results we obtained by conducting this method are similar to those reported in tables 5 and 6.

To control for the effects of unobservable firm characteristics, we re-estimate the models of this study by using the firm fixed effects method. The results reached by using firm

fixed effects models are somewhat similar to those of pooled OLS. Although the results show insignificant coefficients on OL, we find positive and significant coefficients on the interaction term [OL * (SG_Dum)], which indicates that the relationship between operating leverage and financial performance is contingent on sales growth.

5. CONCLUSION

This study examines the relationship between operating leverage and profitability by using the data of 200 firms listed on Istanbul Stock Exchange during the period 2008-2017. We contribute to the finance literature by conditioning the operating leverage-profitability relationship on sales growth. Empirical literature related to operating leverage and its effect on profitability is limited and provides mixed and inconclusive results. This study fills this gap by examining the role of sales growth in determining the effect of operating leverage on financial performance. The results of this study provide new empirical evidence and contribute to some extent in explaining the contradiction in the results of previous studies.

The results of univariate tests showed that the profitability measures (return on assets, return on equity, the ratio of earnings before interest and taxes to total assets) of firms with high operating leverage are significantly lower than those of firms with low operating leverage. In addition, the regression results indicated that the increases in operating leverage reduce the return on assets, return on equity and operating profitability. Moreover, we find that the relationship between operating leverage and profitability is contingent on sales growth. In other words, the negative effect of operating leverage on profitability is alleviated by sales growth. The negative impact is significant only for firms with low sales growth, whereas operating leverage exerts an insignificant effect on the profitability of firms with high sales growth. These results confirm that firms with high operating leverage should increase sales level to enhance their profitability and overall performance. When operating leverage (the ratio of fixed costs over variable costs) increases, the growth in sales level enables a firm to cover the increased fixed costs and achieve better performance. This study concentrates only on the Turkish market. However, as the results associated with the impact of operating leverage on firm performance are still inconclusive, future studies can examine other markets and compare the results.

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