INTANGIBLE ASSETS AND EARNINGS: EVIDENCE FROM BORSA İSTANBUL[*]

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ABSTRACT

The purpose of this paper is to explore the nature of intangible assets by testing their relationship with the earnings of Turkish listed companies over the period spanning from 1998 to 2017. This period relates to a number of substantial occurrences including Turkey's convergence to IFRS and global financial crises. Dynamic panel data results reveal that the effect of intangible assets on earnings is statistically significant and positive during the 2008 financial crisis and significant and negative during the adoption of IFRS in 2005. The findings demonstrate the role of intangible assets on earnings in an emerging market.

Keywords: Intangible Assets, Earnings, Dynamic Panel Data, Emerging Markets, Accounting Standards

JEL Classification: M41

MADDİ OLMAYAN DURAN VARLIKLAR VE KAZANÇLAR: BORSA İSTANBUL ÖRNEĞİ

ÖZ

Bu çalışma, 1998'den 2017'ye uzanan yirmi yıllık dönemde Borsa İstanbul'da işlem gören şirketlerin kazançları ile maddi olmayan duran varlıkları arasındaki ampirik ilişkiyi araştırmaktadır.

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Bu dönem, Türkiye'nin UFRS'ye geçişi ve küresel finansal krizler dahil olmak üzere bir dizi önemli olayı içermektedir. Dinamik panel veri sonuçları, maddi olmayan duran varlıkların kazançlar üzerindeki etkisinin 2008 mali krizi ve sonrasındaki iki yıllık dönemde istatistiksel olarak anlamlı ve pozitif olduğunu ortaya koymaktadır. Ayrıca, araştırma bulguları 2005 yılında UFRS'nin benimsenmesinin maddi olmayan duran varlıkların kazançlar üzerinde önemli olumsuz etkisi olduğunu göstermektedir. Çalışma, gelişmekte olan bir pazarda maddi olmayan duran varlıkların kazançlar üzerindeki rolünü araştırarak literatüre katkı sağlamayı amaçlamaktadır.

Anahtar Kelimeler: Maddi Olmayan Duran Varlıklar, Kazançlar, Dinamik Panel Veri, Gelişmekte Olan Ekonomiler, Muhasebe Standartları

JEL Sınıflandırması: M41

GENİŞLETİLMİŞ ÖZET

AMAÇ VE MOTİVASYON

Bu makalenin amacı, Türkiye'nin UFRS'ye geçişi ve 2008 küresel finansal krizi de dâhil olmak üzere, birkaç önemli olay esnasında borsada işlem gören şirketlerin kazançlarıyla maddi olmayan duran varlıkları arasındaki ilişkiyi araştırmaktır.

METODOLOJİ

Yapılan araştırma Borsa İstanbul'da 1998-2017 döneminde kesintisiz işlem gören ve üretim endeksinde yer alan 27 imalatçı firmayı kapsamaktadır.

Çalışmanın hipotezleri;

H1: Maddi olmayan duran varlıklar ile satışlardaki büyüme arasında anlamlı ve pozitif ilişki vardır.

H2: Maddi olmayan duran varlıklar ile net kâr marjı arasında anlamlı ve pozitif ilişki vardır.

Maddi olmayan duran varlıklara yapılan yatırımların, firmaların satışlarının büyümesine ve net kâr marjına etkisinin yatırımın yapıldığı cari yıldan ziyade yatırımı takip eden birkaç yılda ortaya çıkabileceği düşünüldüğünden, analiz yöntemi olarak modeldeki bağımsız değişkenin gecikmeli değerlerinin bağımlı değişken üzerindeki etkilerini araştırmaya izin veren ekonometrik analiz yöntemi olan dinamik panel veri analizi tercih edilmiştir.

BULGULAR VE TARTIŞMA

Maddi olmayan duran varlıkların satışların büyümesi ve net kâr marjı üzerindeki etkilerinin araştırıldığı dinamik panel veri analizi sonuçlarına göre, maddi olmayan duran varlıklara yapılan yatırımlar cari yılda satış büyümesini istatistiksel olarak anlamlı ve pozitif yönde etkilerken, bu etkinin

takip eden yılda negatife, ikinci yılda ise tekrar pozitife döndüğü görülmüştür. Ayrıca, cari yıl ve takip eden iki yıllık toplam etkinin de pozitif olduğu tespit edilmiştir. Diğer yandan, maddi olmayan duran varlıklara yapılan yatırımların cari yılda net kâr marjını istatistiksel olarak anlamlı ve negatif yönde etkilediği, takip eden yıl pozitif, ikinci yılda ise yine negatif yönde etkilediği, bununla beraber toplam etkinin satışların büyümesi modelinde olduğu gibi- pozitif yönde olduğu tespit edilmiştir.

UFRS ve 2008 finansal krizi sonrasında maddi olmayan duran varlıkların satışların büyümesi ve net kâr marjı üzerindeki etkileri incelendiğinde ise, UFRS sonrası dönemin her iki bağımlı değişkeni de istatistiksel olarak anlamlı ve negatif yönde, 2008 krizinin ise istatistiksel olarak anlamlı ve pozitif yönde etkilediği görülmektedir. Diğer bir ifadeyle, maddi olmayan duran varlık yatırımları olan firmaların kriz sonrası dönemde satışlarının büyüdüğü ve net kâr marjı oranlarının bu durumdan olumlu etkilendiği söylenebilir.

SONUÇ VE UYGULAMALAR

Borsa İstanbul (BİST) 100 endeksinde işlem gören ve imalat sanayinde faaliyet gösteren şirketlerin maddi olmayan duran varlıklar kalemlerinde esas olarak know-how, telif hakları, lisans anlaşmaları ve patentler gibi üretime yönelik unsurlar bulunmaktadır. Araştırma bulguları doğrultusunda bu unsurların işletmelerin satışlarındaki büyümeyi ve net kâr marjını desteklediği tespit edilmiştir.

Araştırma örneklemini oluşturan şirketlerin maddi olmayan duran varlıklarının ağırlıklı olarak Haklar hesabından oluştuğu anlaşılmaktadır. Araştırma örneklemindeki firmalardan bir tanesi olan Trakya Cam Sanayi, ABD'li Pilkington firmasından satın aldığı float teknolojisine ait lisans hakları sayesinde düzcam üretmektedir. Diğer bir şirket olan Otokar ise, Atlas model hafif kamyonları, Foton Motors ile gerçekleştirdiği lisans anlaşması ile sağlamaktadır. TOFAŞ, İtalyan FIAT Chrysler firması ile yaptığı lisans anlaşması sayesinde FIAT marka otomobil ve hafif ticari araç üretimi yapmaktadır. Araştırma bulguları, Haklar hesabının satışlara etki ettiğini göstermektedir.

UFRS'lerin ilk olarak uygulandığı 2005 yılında, maddi olmayan duran varlıkların satışların büyümesi ve net kâr marjı üzerinde istatistiksel olarak anlamlı ve negatif etkisinin olduğu görülmektedir. UMS 38 Maddi Olmayan Duran Varlıklar Standardı'nın beklenen etkisinin neden tam olarak gerçekleşmediğini bir Avustralya vak'asını inceleyerek anlayabiliriz (Cheung ve diğerleri, 2008). Bulgular, Avustralya'daki birçok işletmenin maddi olmayan duran varlıklarını tahmin edildiği gibi finansal tablo dışı bırakmadığını göstermektedir. Böylece, UFRS öncesi dönemde içsel olarak yaratılan maddi olmayan duran varlıklar ile maliyet üzerinden satın alınanlar arasındaki ayırım kullanıcılara ulaşmamıştır. Bu nedenle 2005/2006 döneminde birçok işletme, maddi olmayan duran varlıklarının maliyet bedelinden satın alındığını bildirmiştir.

1. INTRODUCTION

Former Federal Reserve Chairman Alan Greenspan explained in 2002 that conceptual value makes up an increasing part of the gross national product of developed countries (Daum, 2003). Several academics (Ipate & Parvu, 2016; Andonova & Ruiz Pava, 2016; Teece, 1998; Villalonga, 2004) state that intangible assets, in contrast to tangible assets, are a fundamental basis for the establishment of economic value and competitive advantage. Intangible assets include resources such as designs, plans, brand value, in-house software, as well as copyrights, technology licenses purchased through consulting services. Intangible assets can create a competitive advantage if it is unique, rare, cannot be imitated, or changed. Those are the characteristics of a knowledge economy that is primarily associated with industries such as pharmaceuticals, media, software, and financial services. These companies can create value through public reputation, recognition of brands and products, and innovative power.

According to the US Bureau of Economic Analysis (BEA), the annual investment in intellectual property products in the United States (US) has grown at an annualized rate of 6,2% between 2012 and 2018 and 35,9% in Turkey between 1998 and 2017. This metric consists of accumulated spending on R&D, intellectual property rights, and software. During the same period, corporate earnings in the US have grown at an annualized rate of 5,5% and in Turkey, 43,1% between 1998 and 2017. In contrast, tangible asset investments have fallen over the same period (Arslan & Kızıl, 2019). The studies of Zhang (2004), Riahi-Belkaoui (2003), and Sullivan (2000) suggest that there is a relationship between intangible assets and financial performance. Their positive and significant findings point to the usefulness of intangibles in general as a sustainable source of wealth creation. Therefore, one may argue that the role of intangible assets as strategic resources deserves investigation (Riahi-Belkaoui, 2003). Studies on the nature of intangible assets in emerging markets have been gaining attention in recent years (Maditinos et al., 2011; Kweh et al., 2013; Nimtrakoon, 2015; Haji & Gazali, 2018. As an emerging market, Turkey is in a highly competitive economic region and fully integrated into the global economy, but only a handful of influential papers have documented the nature of intangibles from different perspectives (Bozbura, 2004; Fındık & Ocak, 2016; Özcan, 2017).

This paper addresses the empirical relationship between intangibles and earnings in the context of Borsa Istanbul (BIST) by exploring three research questions. First, is there a significant relationship between intangible assets and earnings in Turkey? Second and third, have Turkey's formal adoption of IFRS in 2005 and the financial crisis in 2008 affected the relationship between intangibles and earnings?

Relevant literature suggests that significant changes in corporate reporting d have considerable effects on earnings (Harrison, 1977; Elliott & Philbrick, 1990; Goncharow & Zimmermann, 2006).

The adoption of IFRS[†] is considered a significant change in corporate reporting, and it is an essential development for companies not only within the European Union (EU) but also for those situated on the periphery of Europe. As an emerging market, Turkey has close political and economic ties with the EU and provides us with a valuable case in this regard. IFRS adoption literature (Dahmash et al., 2009; Morricone et al., 2009; Oliveira et al., 2010; Chalmers et al., 2012; Sahut et al., 2011; Özcan, 2017) advocates that IFRS had an unfavorable effect on the value relevance of intangible assets. Other researchers (Joos & Lang, 1994) argue that the relationship between intangibles and corporate performance stems from cross-country differences in accounting philosophies. Accordingly, we extend the IFRS adoption literature that has investigated the impact of IFRS adoption in a variety of countries and contexts.

Turkey's IFRS adoption experience is worth investigating because, in the pre-IFRS period (1998-2005), intangible assets were recognized at cost and amortized in equal installments over five years (Communique, 1989-XI/1). Turkish adoption of International Financial Reporting Standards (IFRS) transformed the intangible asset accounting practices for firms listed in Borsa Istanbul. Capitalization of research expenditures and internally generated intangible assets like brands, customer lists are prohibited (IASB, 2004). The state applied strict guidelines for recognizing development costs. Goodwill is written down only to the extent that it is impaired. These regulations indicate the significance given to the intangibles in financial statements and validate a significant change in corporate reporting to reflect today's economic realities. Our results suggest that the effect of intangibles on sales growth and net profit margin is statistically significant and negative during the adoption of IFRS in 2005. We discuss the details of these results in the subsequent sections.

Our sample consists of the largest 27 Turkish listed manufacturing firms spanning over the 1998–2017 period. According to the resource-based view, resources should be associated with above median-sample performances (Wernerfelt, 1984; Riahi-Belkaoui, 2003). Our research design follows the resource-based view by employing sales growth and net profit margin as the measures of earnings. However, one may argue that performance should be observed from a much broader perspective. This study follows Penman (2009), who advocates that earnings would give the value of intangibles.

Dynamic panel data findings demonstrate that intangible assets have a significant positive effect on sales growth and net profit margins during the following two periods of the initial investment. Results also reveal that intangibles have an adverse impact on sales growth during the current period. Thus, we observe that during the financial crisis of 2008, intangible asset investments had a statistically significant and positive impact on sales growth and net profit margin.

[†] Turkish Accounting Standards Board (TASB) issued Turkish Accounting Standard (TAS) 38 *Intangibles*, Turkish Financial Reporting Standard (TFRS) 3 *Business Combinations*, which are equivalents of IAS 38 and IFRS 3.

Our analysis should be relevant in international and Turkish contexts. This is because it provides insights regarding accounting for intangible assets and the implications of the adoption of IFRS. Additionally, our research findings offer empirical input for broader perspectives of intangible assets and demonstrate the role of intangible assets on earnings in an emerging market.

The following section includes the development of the hypotheses, sample selection, and variables. In the third section, we present the proposed panel regression models. The results, practical implications, limitations, and future research are discussed in sections four, five, and six respectively.

2. RESEARCH DESIGN

2.1. Development of Hypotheses

A wide range of evidence (Clarke et al., 2011; Chen et al., 2005; Tahat et al., 2018; Haji & Ghazali, 2018) advocate that intangible asset drive corporate financial performance. Because the effects of intangibles on performance are generally not directly observable, academics used a variety of approaches to infer the nature of the possible relationship. These studies mostly focus on the value relevance of intangibles by paying attention specifically to market values (Gamayuni, 2015). On the other hand, our research focuses on earnings. Penman (2009) wrote that the value of Coca Cola's brand is not on the income statement, but earnings from the brand are in the income statement. He argues that an income statement or earnings perspective is the accounting measure of value-added from employing tangible assets along with the intangibles. Thus, earnings would reflect the value of intangibles, so there should be a relation between them. Our study follows his path to understand and test the relationship between intangibles and earnings mainly by utilizing sales growth and net profit margin, which are elements of the income statement. Therefore, we propose the following hypotheses:

H1: There is a significant positive relationship between intangible assets and sales growth.

H2: There is a significant positive relationship between intangible assets and net profit margin.

2.2. Sample Selection and Variables

The sample of the study is drawn from the biggest, by market capitalization, 100 Turkish listed firms (BIST100 Index), over a period of twenty years spanning from 1998 to 2017. This period relates to several substantial occurrences, including corporate reporting changes, Turkey’s convergence to IFRS, and the global financial crisis. We exclude finance and insurance companies due to the different accounting standards under which they operate. Our sample comprises 540 company-year observations (i.e., 27 x 20 = 540) of 27 manufacturing companies whose financial history goes back to 1998. We extracted the necessary accounting dates from the firms' consolidated annual reports.

We use two measures of earnings (Sales Growth and Net Profit Margin) to ascertain that the correlation between earnings and intangible assets is not specific to certain performance measures (Haji & Gzahali, 2018). Sales growth (SG) and net profit margin (PMargin) are the dependent variables, while intangible assets are the independent variable in this study. We include intangible assets in the analysis by taking their natural logarithms (LnIA) that will occur due to the numerically significant values obtained from the company financials. Our analysis indicates that intangible assets are generally valued at cost. In addition, some intangible assets consist of brand accounts, and these accounts are tested for impairment at the end of each financial period. However, the number of impaired brand accounts is insignificant and does not affect the overall assessment.

Table 1. Measurement of Research Variables

Acronym	Definition	Type	Operationalization
SG	Sales Growth	Dependent Variable	(Current Period Net Sales - Previous Period Net Sales) / Previous Period Net Sales
PMargin	Net Profit Margin	Dependent Variable	Net Profit / Net Sales
LnIA	Natural Logarithm of Intangible Assets	Independent Variable	Log of Total Intangible Assets
WCT	Working Capital Turnover	Control Variable	Net Sales / Average Amount of Working Capital
AT	Asset Turnover	Control Variable	Net Sales / Average Total Assets
IT	Inventory Turnover	Control Variable	Cost of Goods Sold / Average Inventory
Lev	Leverage	Control Variable	Total Debt / Total Assets
LnSales	Natural Logarithm of Net Sales	Control Variable	Log of Net Sales
Size	Asset Growth	Control Variable	(Current Period Total Assets - Previous Period Total Assets) / Previous Period Total Assets

While determining the control variables y, we try to identify variables that can affect the dependent variable together with the independent variable and increase the explanatory power of the model. These variables are working capital turnover (WCT), inventory turnover (IT), asset turnover (AT), leverage (Lev), the natural logarithm of net sales (LnSales), and asset growth (Size). Table 1 provides a summary of the measurement and operationalization of all research variables.

3. PANEL REGRESSION MODELS

We assume that the effects of intangible asset investments on sales growth and net profit margin would begin to emerge in a few years. Therefore, we conduct dynamic panel data analysis because it

allows us to investigate the effect of the lagged values of the independent variable on the dependent variable (Bouallegui, 2006). Another reason is the lagged values of sales growth and net profit margin, which are the dependent variables of the model, are also among the explanatory variables. Various academics advocate the predictive power of the *System Generalized Method of Moments (GMM)* method and the two-step estimator (Arellano & Bover, 1995; Blundell & Bond, 1998; Blundell & Bond, 2000; Baltagi, 2005; Hayakawa, 2007). According to Khadraoui and Smida (2012), the two-step GMM estimator is asymptotically more effective, considering that error terms may have varying variance. A panel data regression model is as follows (Baltagi, 2008):

$$y_{it} = \alpha + X'_{it}\,\beta + u_{it} \qquad i = 1, \ldots, N; \;\; t = 1, \ldots, T \tag{1}$$

In the model, i denotes the households, individuals, firms, countries, and t denotes time. The i subscript, therefore, denotes the cross-section dimension, whereas t denotes the time-series dimension; α is a scalar, β is $K \times 1$, and X'_{it} is the *it*th observation on *K* explanatory variables (Baltagi, 2008).

Dynamic panel data models allow the modeling of individual dynamics. Also, if the current values of dependent or independent variables are affected by their past values, model parameters can be estimated by using linear dynamic estimation methods. The general expression of dynamic models is as follows (Baltagi, 2005):

$$Y_{it} = \delta Y_{it-1} + \beta X'_{it} + u_{it} \qquad i = 1, \ldots, N; t = 1, \ldots, T \tag{2}$$

$$u_{it} = v_{it} + \mu_{it}$$

The most important problem encountered in this model is that the lagged dependent variable is included as an independent variable in the model. In general, in dynamic models, it is known that Y_{it-1} is correlated with u_{it-1} due to past shocks. Besides, in panel data models Y_{it} is a function of u_{it-1}, as Y_{it-1} is a function of μ_{it}. Therefore, in model (2), Y_{it} is correlated with the error term, including μ_{it}. Since there are two dependent variables in the study, two different models are established. These are;

$$SG_{it} = \alpha_0 + \beta_1 SG_{it-1} + \beta_2 AT_{it} + \beta_3 WCT_{it} + \beta_4 IT_{it} + \beta_5 LnIA_{it} + \beta_6 LnIA_{it-1} + \beta_7 LnIA_{it-2} + \beta_8 D1 * LnIA_{it} + \beta_9 D2 * LnIA_{it} + \varepsilon_{it} \tag{3}$$

SG_{it}= Sales growth

SG_{it-1}= One period lagged value of the sales growth.

AT_{it}= Asset turnover.

WCT_{it}= working capital turnover.

IT_{it}=Inventory turnover.

$LnIA_{it}$= Natural logarithm of the current value of intangible assets.

$LnIA_{it-1}$= One period lagged natural logarithm of intangible assets.

$LnIA_{it-2}$= Two periods lagged t natural logarithm of intangible assets.

$D1 * LnIA_{it}$= IFRS dummy variable multiplied with intangible assets.

$D2 * LnIA_{it}$= 2008 financial crisis dummy variable multiplied with intangible assets.

$$PMargin_{it} = \alpha_0 + \beta_1 PMargin_{it-1} + \beta_2 Lev_{it} + \beta_3 LnSales_{it} + \beta_4 Size_{it} + \beta_5 LnIA_{it} + \beta_6 LnIA_{it-1} + \beta_7 LnIA_{it-2} + \beta_8 D1 * LnIA_{it} + \beta_9 D2 * LnIA_{it} + \varepsilon_{it} \quad (4)$$

$PMargin_{it}$= Net profit margin.

$PMargin_{it-1}$ = One period lagged value of net profit margin.

Lev_{it} = Leverage.

$LnSales_{it}$ = Natural logarithm of net sales.

$Size_{it}$= Asset growth.

$LnIA_{it}$= Natural logarithm of the current value of intangible assets.

$LnIA_{it-1}$= One period lagged the natural logarithm of intangible assets.

$LnIA_{it-2}$= Two periods lagged the natural logarithm of intangible assets.

$D1 * LnIA_{it}$= IFRS dummy variable multiplied with intangible assets.

$D2 * LnIA_{it}$= 2008 financial crisis dummy variable multiplied with intangible assets.

4. RESULTS

4.1. Descriptive Statistics and Correlation Analysis

We provide descriptive statistics of the variables in Table 2, Panel A. Accordingly, sales of enterprises in the sample grew by an average of 59% and their assets by 41% compared to the previous year. These rates show that the companies in the sample have a very high growth momentum. The average of the inventory turnover, which indicates the number of times a company has sold and replaced inventory during a given period, is 13.52 (27 days), which also supports the growth rate in sales. Finally, the average leverage ratio of the enterprises in the sample is 47%. This ratio shows that third parties finance approximately half of the assets.

Table 2. Descriptive Statistics and Correlations

Panel A: Descriptive Statistics (*n* = 27, *t* = 20)

Variable	Mean	Std. Dev.	Min	Max
SG	0.54	3.84	-0.92	71.92
PMargin	0.22	1.50	-0.30	22.28
LnIA	14.20	4.13	0	21.67
WCT	1.94	1.14	0.01	9.89
AT	1.00	0.54	0.01	4.51
IT	11.31	48.81	0.79	786.76
Lev	0.44	0.19	0.01	0.86
LnSales	19.81	2.37	11.29	24.71
Size	0.35	0.68	-0.44	11.32

Panel B: Pearson Correlations

	SG	LnIA	WCT	AT	IT		PMargin	LnIA	Lev	LnSales	Size
SG	1					**PMargin**	1				
LnIA	-0.0034	1				**LnIA**	-0.1007	1			
WCT	-0.0026	0.0179	1			**Lev**	-0.1898	0.2012	1		
AT	-0.0545	-0.1301	0.7478	1		**LnSales**	-0.2397	0.7368	0.2601	1	
IT	0.0021	-0.0586	-0.0556	-0.1027	1	**Size**	0.0729	-0.1183	0.0839	-0.1632	1

Table 2, Panel B shows the Pearson correlation coefficients. Since a multicollinearity problem may arise when there is 70% or more correlation between independent variables in a model, one of these highly correlated variables is removed. Later, we evaluated Table 2, panel B in line with this explanation and removed AT and WCT from the first model and LnSales from the second model since they were highly correlated with LnIA. The analysis is continued in this way.

4.2. Unit Root Tests

Before performing statistical analysis on a time series, it is necessary to examine whether the process that created the series is constant over time, in other words, whether the series is stationary. When an econometric analysis is performed between non-stationary series, we may encounter a misleading result called false regression. In other words, biased results can be obtained (Tatoğlu, 2013).

First-generation tests are developed for cases where there is no correlation between units, and the second-generation tests are taken from prior literature in cases where there is a correlation between units. We benefit from Pesaran's (2004) Cross-Section Dependence (CD) Test to check the correlation between units. The results (Table 3) reveal that a correlation between units is defined at a 1% significance level in all variables. Accordingly, the second generation Pesaran Cross-Sectionally

Augmented Dickey-Fuller (CADF) Test is applied to control for the stability of the series. Pesaran's CADF Test results indicate that the first differences of the variables containing unit roots are collected, and the stability of the series is ensured. Therefore, we continue the analysis with the above-mentioned variables.

Table 3. Unit Root Tests

Variable	Pesaran (2004) CD Test	Pesaran's CADF Test			
		In Level		First Difference	
		t-bar	Z[t-bar]	t-bar	Z[t-bar]
SG	36.15*	-2.117***	-1.921**		
WCT	7.80*			-3.019*	-6.516*
IT	5.08*	-2.206**	-2.375*		
LnIA	59.88*	-2.254**	-2.619*		
PMargin	4.18*	-2.501*	-3.876*		
Lev	8.86*			-3.697*	-9.970*
Size	34.44*	-2.366*	-3.188*		

*, **, *** shows %1, %5 and %10 significance levels, respectively.

4.3. Sales Growth Model Results

Sales growth model results[‡] (Table 4) reveal that the intangible asset investments significantly ($p < 0.05$) and positively (0.294) effect sales growth during the initial investment period. We also observe that the effect of intangibles on sales growth is negative (-0.201) in the following year and again becomes positive (0.045) during the second year of the intangible investment. However, the total effect (0.294 - 0.201 + 0.045) is positive. Accordingly, the significant and positive effect of intangible assets on sales growth continues even in the second year after the investment.

Table 4. Sales Growth and Net Profit Margin Test Results

	Sales Growth Model		Net Profit Margin Model	
Variable	**Coef.**	**p Value**	**Coef.**	**p Value**
SG L1	-0.007	0.000		
PMargin L1			0.710	0.000
LnIA	**0.294**	0.000	**-0.012**	0.000
LnIA L1	**-0.201**	0.000	**0.025**	0.000
LnIA L2	**0.045**	0.000	**-0.006**	0.000
WCT	-0.029	0.266		
IT	-0.015	0.000		
Lev			-0.415	0.000
Size			-0.123	0.000
D1xLnIA	**-0.124**	0.000	**-0.004**	0.000
D2xLnIA	**0.002**	0.000	**0.000**	0.014

[‡] The pattern of results is unaltered. We did not report the outputs of these models, but they are available from the authors on request.

Table 4 (continue). Sales Growth and Net Profit Margin Test Results

	Statistic	p Value	Statistic	p Value
Wald Test	241649	0.000	1.34	0.000
Sargan Test	97.29	1.000	433.37	0.000
The difference in Hansen GMM	25.92	1.000	24.26	1.000
The difference in Hansen iv	20.91	1.000	20.01	1.000
AR (1)	-1.30	0.193	-1.31	0.192
AR (2)	0.04	0.970	-0.96	0.337

The findings obtained in the study are consistent with the works of Tahat et al. (2018), Andonova & Ruiz-Pava (2016), Fındık & Ocak (2016), Gamayuni (2015), Haji & Ghazali (2018), Ghapar et al. (2014) and Villalonga (2004). These studies detected significant positive relationships between intangible assets and various performance indicators. Since dynamic panel data analysis allows the inspection of various variables, we utilize dummy variables and observe the potential impact of intangible assets on sales growth and net profit margin during the financial crisis of 2008. Results reveal that the effect of intangible assets on sales growth is statistically significant and positive (0.002) during the 2008 financial crisis (D2xLnIA). In other words, companies with high levels of intangible assets increased their sales during the financial crisis. Besides, the authors find that during the adoption of IFRS in 2005, intangible assets have a significant negative (-0.124) impact on sales growth (D1xLnIA). This finding is in line with Cheung et al. (2008), Morricone et al. (2009), Chalmers et al. (2012), and Mısırlıoğlu et al. (2013).

4.4. Net Profit Margin Model Results

According to the net profit margin model results, intangible assets have a statistically significant negative impact on net profit margin during the year of investment (-0.012). We also observe that the effect of intangibles on sales growth is positive (0.025) in the following year and becomes again negative (-0.006) during the second year of the intangible investment. However, the total effect (-0.012 + 0.025 – 0.006) is positive.

Besides, we observe that the intangible assets affect net profit margin statistically and positively (0.000) during the 2008 financial crisis (D2xLnIA). In other words, companies with intangible assets achieved greater net profit margin than other enterprises during the financial crisis and in the following periods. We also find that during the adoption of IFRS in 2005, the effect of intangible assets on net profit margin (D1xLnIA) is statistically significant and negative (-0.004).

4.5. Testing the Assumptions

Dynamic panel data models have some underlying assumptions for the reliability of estimation methods. There are several tests (Wald, Sargan, Hansen & AR(2)) that measure whether these

assumptions hold. The hypotheses for these tests are as follows:

- **Wald Test**

  H_0 = Independent variables are not sufficient to explain the dependent variable.
- **Sargan Test**

  H_0 = Instrumental variables are exogenous.
- **Hansen Test**

  H_0 = Instrumental variables are valid.
- **AR2 Test**

  H_0 = There is second degree autocorrelation.

Wald Test results shows that the null hypothesis is rejected at 5% level of significance in both models. That is, both models are significant as a whole. According to the Sargan test results of the models null hypothesis is rejected at 5% level of significance. But, Hansen test results reveal that the null hypothesis is not rejected at 5% level of significance for both models. In other words, instrumental variables used in regression are valid. Finally, according to the results of AR (2) test in which the second-degree autocorrelation is tested in models, null hypothesis is rejected. In other words, there is no autocorrelation problem in both models.

5. PRACTICAL IMPLICATIONS

Companies included in the Borsa Istanbul (BIST) 100 index and operate in the manufacturing industry constitute the study sample. These companies have mainly production-oriented elements such as know-how, copyrights, license agreements and patents in their intangible assets. Above components support growth in sales and net profit margin in line with the research findings. These businesses usually import such intangibles to have a certain quality in their manufacturing processes and to comply with international standards. We observe that the intangible assets of the companies that make up the research sample are predominantly from the rights account. This account includes intellectual property rights such as brand names, trade names, copyrights, patents, trademarks, or know-how. For example, Trakya Cam Sanayi, one of the companies in the research sample, produces float glass thanks (do you mean tanks?) to the float technology license rights purchased from the US company Pilkington. Another company, Otokar, provides Atlas model light trucks with a license agreement with Foton Motors. TOFAS manufactures FIAT brand cars and light commercial vehicles by using its license rights with the Italian company FIAT Chrysler. We can state that these rights are reflected in sales by increasing preference. Research findings are in support of this information.

Another issue worth mentioning is related to the IFRS adoption research findings. We analyze the IFRS adoption effects of intangibles on corporate earnings by limiting the sample to firm-years before the adoption of IFRS in Turkey, which spans to the pre-IFRS period (1998–2005) and post-IFRS period (2005–2017). Results indicate that the effect of intangibles on sales growth and net profit margin is statistically significant and negative during the adoption of IFRS in 2005. But why was the anticipated impact of IAS38 *Intangible Assets* not fully realized? An Australian case provides us an understanding of this matter (Cheung et al. 2008). Their findings suggest that many entities in Australia did not derecognize their intangibles as projected. Thus, the distinction between internally generated intangibles and those purchased at cost did not reach to users in the pre-IFRS period. In the 2005/06 period, many entities reported that their intangible assets had been purchased at cost. This possible outcome is in line with the findings of Mısırlıoğlu et al. (2013), who analyzed the Turkish case. Mısırlıoğlu et al. (2013) indicate that the limitations in both the knowledge and the experience of preparers led to an unsuccessful IFRS adoption during the initial years. Another reason for the adverse effect of intangibles on sales growth and net profit margin during the adoption of IFRS is probably because the transition to IFRS did not occur at the same time in all businesses. Capital Markets Board of Turkey allowed voluntary transition from December 2003. However, mandatory transition occurred in December 2005. Also, the period of transition to IFRS (2005) and the financial crisis (2008) are very close, and crisis periods may disrupt the financial statements. Nevertheless, the results call for alternative measures to identify the mentioned adverse effects.

6. CONCLUSION

This study considers intangibles as strategic assets. A test of the relationship between intangible assets and earnings using 27 Turkish listed firms yielded positive and significant results. The results point to the effectiveness of intangibles in general as a sustainable source of superior wealth creation.

The results indicate that during the financial crisis of 2008, intangible assets had a statistically significant and positive impact on sales growth and net profit margin. Based on these findings, the hypotheses of the research are accepted.

The results of this study are limited to Turkish listed companies to capture the specific effects of intangibles in an emerging market. A possible avenue of research is to replicate the study with other emerging markets or specific technology indexes and explore alternative measures of intangibles in general.

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AUTHORS' DECLARATION

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

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AUTHORS' CONTRIBUTIONS

Conception/Design of Study- KT, BG; Drafting Manuscript- KT, BG; Critical Revision of Manuscript- KT, BG; Final Approval and Accountability- KT, BG.

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