"The effect of a firm's internal factors on its profitability: Evidence from Jordan"

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NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
57	0	10

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THE EFFECT OF A FIRM'S INTERNAL FACTORS ON ITS PROFITABILITY: EVIDENCE FROM JORDAN

Abstract

The aim of this study is to investigate the effect of a firm's size, asset growth, asset tangibility, and financial leverage on profitability for all listed corporate firms in Jordan using unbalanced panel data (time series and cross-sectional) regression analysis for a sample of 1,663 observations over the period from 2011 to 2018. The overall results show a significant positive effect of a firm's size and asset growth on profitability. However, asset tangibility presents a significant negative effect on profitability, while financial leverage has an insignificant positive effect on profitability. An analysis of each of the main sectors also point to a consistently positive effect of a firm's size on profitability, while the results for growth in assets and financial leverage are nearly consistent with overall findings, but not those for asset tangibility. Furthermore, the sub-sample industry analysis reveals mixed results due to the different industry shapes and structures. This study is expected to be of value to firm managers, investors, researchers, and regulators.

Keywords	return on assets, firm-specific factors, ASE, emerging markets, panel data
JEL Classification	G30, G32

INTRODUCTION

Profitability is a firm's ability to use its investment to generate earnings exceeding the cost of these investments' use (Nishanthini & Nimalathasan, 2013). Firms consider profitability as a vital measure of success, efficiency, performance, and effectiveness, as it turns firms' available assets into profits (Devi & Devi, 2014). Profitability also indicates the company's ability to produce profits at an asset level, sales, and capital (Margaretha & Supartika, 2016). The determinants of firms' profitability and their improvement are critical. It can teach lessons to both corporate managers and policy makers. This issue has sparked debate in the literature and is still vital in the business arena. Profitable businesses generate value, employ employees, and strive to be more creative and appealing to potential and current investors (Odusanya et al., 2018; Ananzeh et al., 2021). The importance of this study stems from identifying the internal determinants affecting a firm's profitability and how to develop it. This will lead to continued growth, stability, survival, and the possibility to predict a firm's performance. All these attract more investors, raise the stock price and increase a company's value (Khan et al., 2018). This study is expected to be important to firms' managers and investors, as well as to researchers and regulatory bodies.

According to the literature, profitability is affected by both external and firm-specific factors. External factors mainly include the economic growth rate, inflation rate, trade interdependence, interest rate, innovation, technological change, and employment. Internal factors are financial indicators that contribute to evaluating the effi-

ciency, performance, and profitability of firms (Ugwunta et al., 2012; Khan et al., 2018). Hansen and Wernerfelt (1989) revealed that firm-specific factors explain twice as much variance of profit rates as external economic factors.

Many previous studies in developing and developed countries have investigated several internal factors as determinants of profitability for one industry or more, with mainly mixed results. Some indicated a positive effect for one or more of their tested internal factors, and others showed a negative effect for the same internal factor/s. However, these studies did not clarify which internal factors have the most significant effect on a firm's profitability (Škuflć et al., 2016). Nevertheless, few previous studies have been conducted on emerging markets, testing the effect of internal factors on profitability for more than one industry, and this also includes the Jordanian context (e.g., Bhayami, 2010; Malik, 2011; Jaber & Al-khawaldeh, 2014; Pratheepan, 2014; Kaddumi & Ramadan, 2012; Al-Nawaiseh, 2020). To the best of the authors' knowledge, investigating the effect of internal factors on a firm's profitability for all listed firms and all types of industries within the corporate sector has not been examined before in Jordan. Accordingly, in this study, the effects of four important internal factors on (ROA) for all types of industries are investigated for one of the well-known growing and emerging markets in the Middle East region, Jordan. Whether these results agree or differ with the results of previous studies is established through answering the following main question: To what extent do the factors of size, growth, tangibility, and leverage affect the level of ROA of Jordanian firms?

An extended analysis was done by dividing the pooled sample into industry sectors: financial, industrial, and services sub-samples. The purpose of this is to compare the results with the primary study sample analysis and with similar previous findings. Furthermore, additional industry analysis was conducted for the primary sector sub-samples to find out if the effect of explanatory variables on ROA varies greatly from one sector to another or not.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

There are two theories with rival models of firm profitability in the modern literature: the structure-conduct-performance (SCP) model and the firm effect model. In each of these, a range of models has now been established. According to the SCP theory, market structure affects firm behavior and profitability. In the firm effect theory, the distribution of firms and profits determines the market structure. According to the general SCP model, which is based on neoclassical theory, firms in concentrated industries are more efficient than firms in perfectly competitive markets. Firm effect models are based on the premise that firms in a sector are heterogeneous. Such models indicate that variations in firm-level characteristics such as performance, organizational structure, and management quality occur, persist, and trigger profitability differences (Stierwald, 2009). Demsetz (1973) suggested the superior firm theory, which

implies that firms are differentiated based on their efficiency levels. More profitable firms have a competitive advantage over their less productive competitors, which is reflected in profitability. Lower manufacturing costs, economies of scale, or improved product quality may all lead to increased cost-efficiency (Stierwald, 2009).

Factors affecting firms' profitability can be analyzed and evaluated at two main levels: external and internal. External factors mainly include growth rate, inflation rate, trade interdependence, and interest rate. Internal factors are financial indicators that contribute to evaluating the efficiency, performance, and profitability of firms. Such internal factors are represented in the same firm effects model and this is what this study is testing (Ugwunta et al., 2012). In several recent international studies in this area, the impact of one or more of these internal factors on firms' profitability was investigated. For example, Grinyer and Mckiernan (1991) explore the impact of firm-specific variables on firm performance. They add certain firm-specific variables to the structure-con-

duct-performance model. As a sample, 45 UK electrical engineering firms classified as small and medium-sized were considered. The results show that the firm's profitability is statically affected by decentralization, market share, capital intensity, restricted control of working capital, and sales growth. McDonald (1999) uses panel data (time series and cross-sectional data) for a period 1984–1993 to examine the determinants of profitability of Australian firms. The results show that profitability is affected by industry concentration and lagged profitability. Goddard et al. (2005) use panel data analysis to examine the determinants of a firm's profitability for a group of European countries over the period 1993–2001. The results show that profitability is statistically negatively affected by a firm's size and gearing ratio, while positively affected by market share and liquidity. In a Greek study, Agiomirgianakis et al. (2009) investigate the impact of both firm-specific factors and macroeconomic environment on firm's profitability in the context of Greece from 1995 to 2003 by using panel data analysis for a sample of 3,094 non-financial companies. The results show a positive impact of both financial leverage and current ratio while an inverse relationship between the variables, such as firm's size, sales growth, investment, and firm's profitability. Nunes et al. (2009) use panel data analysis to examine the determinants of profitability for a sample of 500 Portuguese firms for the period 1999–2003. The results show a positive effect of diversification of activities, motivation, and tendency to innovate on firm's profitability.

In another Australian study, Stierwald (2010) investigated the determinants of firm profitability for a sample of large Australian firms from 1995 to 2005. Findings show that company profitability is primarily influenced by firm-level characteristics, with sector effects playing a minor role, and contemporaneous productivity, lagged productivity, leverage, and size affected firms' profitability. On the other hand, Yazdanfar (2013) uses Seemingly unrelated regression (SUR) for a sample of 12,530 non-financial Swedish firms through the period 2006–2007 to examine the determinants of a firm's profitability. The results show that a firm's profitability is positively affected by growth, lagged profitability, and productivity while negatively affected by industry affiliation and firm variables.

Moving to other less developed countries, Bhayami (2010) investigated the effect of some firm-specific variables on firm profitability in the context of India using backward regression analysis methods through the period 2001–2008. The findings show that inflation rate, operating profit ratio, liquidity, interest rate, and age are the most significant determinants of a firm's profitability. Using a sample of 1,063 listed companies on the Tehran Stock Exchange for a period from 2001 to 2006, Alipour (2011) tested a relationship between working capital and profitability using correlation and multiple regression analysis. Results show a strong relationship between working capital and profitability and a significant relationship for the number of day's accounts payables. However, inventory turnover in days, number of days accounts receivable, and cash conversion cycle profitability indicated a negative relationship in profitability. Malik (2011) examines a sample of 35 life and non-life insurance firms in Pakistan for the period 2005–2009 to determine the effect of leverage, size, age, capital, and loss on firm profitability. A firm's profitability is positively affected by size and capital while negatively by leverage, age, and loss. Using panel data analysis, Kaddumi and Ramadan (2012) examined the effect of working capital management on a firm's performance for a sample of 49 firms listed on the Amman Stock Exchange during the period 2005 to 2009, with results revealing a positively correlated relationship. Pratheepan (2014) uses a sample of 55 firms in the Sri Lankan context to examine the effect of tangibility, leverage, size, and liquidity on a firm's profitability through the period 2003–2012. The results show that a firm's profitability is positively affected by the size while negatively with tangibility. In their study, Chechet and Olayiwola (2014) used panel data regression analysis to examine the effect of equity and leverage on firm's profitability for a sample of 70 firms in Nigeria over 2000–2009. Study findings show a negative relationship between firm's profitability and leverage. Al-Jafari and Al Samman (2015) use a panel data regression analysis to examine the determinants of firm's profitability in the context of Oman using data of 17 firms. The results show that firm's profitability is positively affected by size, growth, fixed capital, and working capital while negatively by leverage.

Moving the focus to Jordan, Alalaya and Ahmad (2020) investigated the effect of some internal and

external determinants of profitability for all banks in Jordan from 2008 to 2018 using panel data and time series statistical techniques. The results showed a positive effect for the tested internal determinants of profitability, while the external determinants of profitability had a negative effect. In another Jordanian study, Al-Nawaiseh (2020) tested the effect of a firm's growth, size, and age on its profitability for a sample of 22 Jordanian insurance firms listed on the Amman Stock Exchange during the period 2008 to 2017 using simple regression analysis. The results indicated an insignificant effect of the insurance firm's growth, size, and age on its profitability.

However, some researchers investigated the role of one or more of these internal factors on firms' profitability and found opposite effects on profitability to those found elsewhere in the literature for similar contexts. For example, Glancy (1998) tested the effect of some selected internal and external factors on firms' growth and profitability for a selected sample of small industrial firms in Scotland from 1988 to 1990 using some econometric regression models. Empirical results indicated an insignificant effect of the type of industry, size, and even location on firm profitability. Amir et al. (2006) tested the effect of working capital on profitability for a sample of oil and gas Pakistani listed companies from 2001 to 2005 analyzing working capital ratios. The study employed correlation and panel regression models for the analysis. The findings revealed an inverse effect of the inventory turnover variable, age, sales growth, and the accounts receivables turnover variable on a firm's profitability. Asimakopoulos et al. (2009) investigated some specific selected internal factors of profitability for an adopted sample of 119 non-financial companies listed in Greece covering the pre-EMU and the post-EMU periods from 1995 to 2003. Findings revealed that leverage and working capital variables influenced profitability inversely. On the other hand, Salman and Yazdanfar (2012) explored the impact of some selected internal factors on profitability for a sample of 2,500 Swedish micro firms (SMEs) for 2007 using multiple regression models and a quantile regression approach. Findings showed age and size variables had an inverse effect on firms' profitability. Pratheepan (2014) tested the relationship

of some selected internal factors on profitability in Sri Lanka for 55 industrial companies using static panel regression models over 2003–2012, identifying an insignificant negative relationship for liquidity and leverage.

A positive relationship between size and profitability has been theoretically supported by economies of scale and economies of scope. Size qualifies large companies to benefit from superior capabilities in management, product development, marketing, and diversification, together with more capital cost-saving, and a shorter cash conversion cycle (Dahmash, 2015; Dogan, 2013; Bayyurt, 2007; Jónsson, 2007; Gaio & Henriques, 1998; Ravenscraft & Scherer, 1987). Large firms have lower information asymmetry and more ability to obtain external financing, which make these firms more flexible in their policies concerning receivables and inventory (Brennan & Hughes, 1991). Despite the advantages of size, some researchers indicated a possible negative relationship between size and profitability because a larger firm can have higher bargaining power with its customers and suppliers, so it keeps a low level of cash based on its ease of accessibility to capital (Chiou et al., 2006; Moussawi et al., 2006). Hence, a positive relationship is expected between size and ROA.

Firms use growth to measure their performance, based on their belief that it is a sign of progress, success, and an introduction to a sustainable competitive advantage and profitability (Markman & Gartner, 2002). Small firms consider growth as the best measure for their progress and success, and accordingly, these firms expect a positive relationship between their growth and profitability if they rely on their internally generated funds for any expansion process (Glancey, 1998). Any increase in firms' assets or any new assets in firms generate new growth opportunities, which will lead to a higher profitability level, and these new growth opportunities can take the shape of new product lines, new development projects, the replacement of existing assets and the acquisition of other firms (Myers, 1977; Bhutta & Hasan, 2013; Abor, 2015). Some researchers have identified a positive relationship between firms' growth and their profitability (e.g., Al-Jafar & Al Samman, 2015; Yazdnafar, 2013; Nunes et al., 2009; Glancy,

1998). In line with these studies, a positive relationship is expected between growth and ROA.

A large portion of tangible assets generally increases the firms' profitability because tangible assets are more likely to have an increased market value in the future, while intangible assets will lose value over time. Therefore, the more their tangible assets, the lower the risk of lending to such firms. However, in prior studies a positive relationship was indicated between leverage and tangibility, and a negative or insignificant positive relationship between leverage and profitability (Alasfour & Dahmash, 2019; Antoniou et.al., 2008; Shah & Khan, 2007; John, 1999; Rajan & Zingales, 1995; Long & Maltiz, 1985). Besides, some scholars revealed an inverse relationship between asset tangibility and profitability, arguing that some firms that have owned costly and less productive fixed assets, and they prefer to focus more on improving their human capital and benefit from long-term investment opportunities (Nunes et al., 2009; Diaz & Hindro, 2017). Accordingly, a negative relationship is expected between asset tangibility and ROA.

External financing sources are considered more expensive to firms compared to internal ones, so higher debt levels mean firms mostly have less internally generated funds and more leverage (Nazir & Afza, 2009; Stewart & Majluf, 1984). Thus, a negative relationship is expected between leverage and ROA.

According to the previous literature review, it can be noted that many prior studies on emerging markets investigated several internal factors as determinants of profitability for one industry or more, and most of these have revealed results that are contradictory to those in other research. Neither did such inconclusive overall findings in this body of literature lead to a clarification of which internal factors have the most significant effect on a firm's profitability (Škuflć et al., 2016). Nevertheless, in a few previous studies conducted on emerging markets, the effect of internal factors on profitability was tested for more than one industry, including the Jordanian context (e.g., Al-Nawaiseh, 2020; Jaber & Al-khawaldeh, 2014; Pratheepan, 2014; Kaddumi & Ramadan, 2012; Malik, 2011; Bhayami, 2010).

Accordingly, this study comprises and examines the effect of four important internal factors on ROA, which have been adopted from other previous studies (e.g., Al-Nawaiseh, 2020; Gaio & Henriques, 2018; Al-Jafari & Al Samman, 2015; Pratheepan, 2014; Yazdanfar, 2013; Nunes et al., 2009; Glancy, 1998). In this study, all types of industries are covered using recent data from Jordan. The aim is to explore this context more deeply and to establish whether these results agree with or differ from the findings of previous studies, especially those on emerging markets.

This study's aim is to examine the effect of a firm's size, asset growth, asset tangibility, and financial leverage for all firms listed on the Amman Stock Exchange over the period from 2011 to 2018. So, the following hypotheses will be formulated to achieve the goal of this study:

$H0_1$: There is no significant statistical effect of a firm's size on ROA for Jordanian firms.

$H0_2$: There is no significant statistical effect of asset growth on ROA for Jordanian firms.

$H0_3$: There is no significant statistical effect of tangibility on ROA for Jordanian firms.

$H0_4$: There is no significant statistical effect of leverage on ROA for Jordanian firms.

2. METHODOLOGY

This study covered all firms listed on the Amman Stock Exchange from 2011 to 2018. Since firms can enter and exit the listing during this period, the number of firms varied from year to year. The initial sampling started with 1,869 observations and ended with 1,663, selected according to the following process (Table 1).

Table 1. The selected sample

Years	2011–2018
The initial number of company years	1869
Less	
companies with delisted, unavailable or missing data	118
top and bottom 2.5%	88
Sample company years	1663

This study investigates the effect of size, growth, tangibility, and leverage on ROA. These factors and their measurements are presented in Table 2.

Table 2. Study variables and their measurement

Variable	Measurement
ROA	The ratio of net income to total assets
SIZE	The natural logarithm of total assets
GRO	Total assets in year t minus total assets in year t–1 divided by total assets in year t–1
FIX	The ratio of net tangible assets to total assets
LEV	The ratio of total debt to total assets

Profitability is modeled as a function of these four internal factors. The model is tested using panel data characterized by its ability to reduce any possible collinearity between independent variables, control unobservable variables, control variables changed over time but not across firms, and increase degrees of freedom (Škuflć et al., 2016; Alasfour & Dahmash, 2019).

The estimated regression equation of this study is as follows:

$$ROA_{it} = \beta_{0it} + \beta_1 SIZE_{it} + \beta_2 GRO_{it} + \\ + \beta_3 FIX_{it} + \beta_4 LEV_{it} + \varepsilon_{it},$$

(1)

where ROA – return on assets, $SIZE$ – firm's size, GRO – asset growth, FIX – tangible assets, LEV – leverage, β_0 – constant, E – error term, and β_S – slopes.

3. RESULTS

3.1. Summary statistics

Table 3 presents the summary statistics of the main pooled sample variables of this study.

Table 3. Summary statistics

Variable	Mean	Std Dev	Min	Max
ROA	0.647	8.258	−38.23	24.900
SIZE	17.216	1.809	13.030	23.924
GRO	1.020	0.220	0.441	5.772
FIX	0.225	0.264	−4.68	0.974
LEV	1.452	3.093	−20.217	37.028

Note: Years (2011–2018), N = 1,663.

Table 3 reveals a moderated mean ROA of 0.647. The standard deviation indicates a variety within the sample firms. Firm size has a high mean value of 17.216 and a low standard deviation. The mean value of growth is 1.020, and its standard deviation is the lowest. The mean for tangibility is moderate and equal to 0.225 with a standard deviation of 0.264. Leverage has a higher mean value of 1.452 and a standard deviation of 3.093.

The multicollinearity analysis between independent variables is performed using the variance inflation factor (VIF) method (see Table 4).

Table 4. Multicollinearity analysis

Variable	Variance inflation factor (VIF)
SIZE	1.6496
GRO	1.79946
FIX	1.28367
LEV	1.57068

According to Myers (1990), there is no concern if the VIF value is less than 10. Table 4 reveals that all values conform to this principle, indicating no multicollinearity problem between the independent variables.

Hausman's test was used to select the more appropriate estimation method between the fixed effect estimator model and the random effect estimator model to test the model presented in equation (1) (Hausman, 1978). Table 5 summarizes the results of this test.

Table 5. Hausman's test results

Chi-square value	Chi-square d.f.	Probability value
220.0372	4	0

These results show a probability value of 0. As this is less than the cutoff of 0.05, the fixed effect estimator model is the appropriate estimation method.

3.2. Results of the model

Table 6 presents the regression analysis results of the estimated model from equation (1) for the pooled sample and the other three major industry sector samples. To overcome any heteroscedasticity problem, an unbalanced panel regression analysis was used (White, 1980).

Table 6. Determinants of firms' profitability: pooled data and the three main sectors

Sample	Main pooled	Financial sector	Industrial sector	Services sector
	Sample	Sample	Sample	Sample
Years	(2011–2018)	(2011–2018)	(2011–2018)	(2011–2018)
Number of observations	1,663	789	470	404
Constant C (M)	−2.627	−9.872	−44.137	−41.326
t-statistic (Ho: 0)	−2.581	−3.969	−7.17	−5.925
p-value	0.01	0	0	0
Size	0.127	0.231	1.603	2.318
t-statistic (Ho: 0)	2.383	2.127	4.558	6.903
p-value	0.017	0.034	0	0
Growth	1.214	6.019	19.232	3.438
t-statistic (Ho: 0)	2.267	3.046	5.053	0.776
p-value	0.024	0.002	0	0.438
Fixed	−0.729	0.501	−5.743	1.155
t-statistic (Ho: 0)	−1.963	0.36	−2.74	0.717
p-value	0.05	0.719	0.006	0.474
Leverage	0.01	−0.025	−0.135	−0.605
t-statistic (Ho: 0)	0.294	−0.471	−0.702	−3.472
p-value	0.769	0.638	0.483	0.001
R Square	0.865	0.579	0.377	0.285
Adjusted R Square	0.841	0.506	0.256	0.13
F-Statistic	0	0	0	0
Akaike information criterion	5.355	6.004	7.189	7.384

Table 7 shows the regression analysis results for the financial sector sub-samples.

Table 7. Regression analysis for the financial sector

Sub-sample	Diversified	Real estate	Insurance	Banks
Years	(2011–2018)	(2011–2018)	(2011–2018)	(2011–2018)
Number of observations	259	241	164	125
Constant C (M)	−17.547	−25.787	−13.575	−6.389
t-statistic (Ho: 0)	−2.78	−4.828	−1.114	−1.023
p-value	0.006	0	0.268	0.309
Size	0.593	0.993	−0.292	0.526
t-statistic (Ho: 0)	1.771	3.591	−0.39	2.09
p-value	0.078	0	0.697	0.039
Growth	7.42	8.686	21.909	−1.258
t-statistic (Ho: 0)	3.063	4.029	3.417	−0.813
p-value	0.003	0	0.001	0.418
Fixed	−15.37	5.632	−7.483	−4.297
t-statistic (Ho: 0)	−1.85	3.179	−1.192	−0.201
p-value	0.066	0.002	0.235	0.841
Leverage	−0.115	−1.245	−0.946	−0.025
t-statistic (Ho: 0)	−1.506	−2.162	−2.14	−0.321
p-value	0.134	0.032	0.034	0.749
R Square	0.486	0.301	0.517	0.856
Adjusted R Square	0.38	0.144	0.395	0.818
F-Statistic	0	0.001	0	0
Akaike information criterion	6.358	6.35	6.492	4.207

Table 8 gives the regression analysis results for the industrial sector sub-samples.

Table 8. Regression analysis for the industrial sector

Sub-sample	Extracting and construction	Pharmaceutical and chemical	Beverages and food	Paper and textile
Years	(2011–2018)	(2011–2018)	(2011–2018)	(2011–2018)
Number of observations	170	136	94	70
Constant C (M)	−55.965	−54.784	−34.383	−26.34
t-statistic (Ho: 0)	−6.202	−2.915	−2.293	−1.926
p-value	0	0.004	0.025	0.063
Size	2.334	1.7	0.965	0.898
t-statistic (Ho: 0)	4.747	1.84	0.991	1.081
p-value	0	0.069	0.326	0.288
Growth	18.849	28.056	23.011	13.803
t-statistic (Ho: 0)	2.661	2.409	4.167	2.563
p-value	0.009	0.018	0	0.015
Fixed	−8.375	−10.536	−2.356	10.495
t-statistic (Ho: 0)	−2.598	−1.974	−0.434	2.108
p-value	0.011	0.051	0.666	0.043
Leverage	0.033	−0.154	−1.533	−6.183
t-statistic (Ho: 0)	0.189	−0.5	−1.59	−5.239
p-value	0.851	0.618	0.117	0
R Square	0.505	0.465	0.669	0.748
Adjusted R Square	0.325	0.239	0.478	0.474
F-Statistic	0	0.002	0	0.002
Akaike information criterion	7.252	7.417	6.431	6.819

Table 9 provides the regression analysis results for the services sector sub-samples.

Table 9. Regression analysis for the services sector

Sub-sample	Educational and commercial	Health care and transportation	Hotel and tourism	Technology and utilities
Years	(2011–2018)	(2011–2018)	(2011–2018)	(2011–2018)
Number of observations	130	105	101	68
Constant C (M)	−34.283	−81.82	−100.529	−36.968
t-statistic (Ho: 0)	−4.442	−4.006	−4.787	−1.622
p-value	0	0	0	0.124
Size	2.416	3.651	2.532	2.201
t-statistic (Ho: 0)	5.235	2.943	2.87	2.381
p-value	0	0.005	0.007	0.03
Growth	−2.262	21.125	57.044	3.121
t-statistic (Ho: 0)	−1.203	2.438	4.069	0.212
p-value	0.232	0.019	0	0.835
Fixed	7.387	0.532	−1.176	−10.918
t-statistic (Ho: 0)	3.364	0.101	−0.279	−1.679
p-value	0.001	0.92	0.782	0.113
Leverage	−1.604	−1.285	1.086	−0.503
t-statistic (Ho: 0)	−1.457	−3.807	0.513	−1.012
p-value	0.148	0.001	0.611	0.327
R Square	0.527	0.786	0.723	0.808
Adjusted R Square	0.37	0.444	0.272	0.197
F-Statistic	0	0.003	0.061	0.275
Akaike information criterion	6.873	7.262	7.063	7.112

Table 10. Determinants of firms' profitability: pooled data using market variables

Sample	Main pooled Sample	Main pooled Sample
Years	(2011–2018)	(2011–2018)
Number of observations	1448	1448
Constant C (M)	0.175	0.133
t-statistic (*Ho*: 0)	1.096	0.766
p-value	0.273	0.444
Size	0.023	0.024
t-statistic (*Ho*: 0)	1.964	1.807
p-value	0.050	0.071
Growth	0.433	0.427
t-statistic (*Ho*: 0)	7.984	7.771
p-value	0.000	0.000
Fixed		0.211
t-statistic (*Ho*: 0)		3.099
p-value		0.002
Leverage		−0.015
t-statistic (*Ho*: 0)		−0.159
p-value		0.874
R Square	0.665	0.671
Adjusted *R* Square	0.609	0.615
F-Statistic	0.000	0.000
Akaike information criterion	1.261	1.247

4. DISCUSSION

Table 6 indicates that ROA is positively affected by a firm's size and asset growth. This is consistent with previous studies arguing that large firms benefit from economies of scale and economies of scope, capital accessibility, superior management, diversification capabilities, and the low level of information asymmetry (Gaio & Henriques, 2018; Dahmash, 2015; Dogan, 2013; Bayyurt, 2007; Jónsson, 2007). Accordingly, the first null hypothesis (*H1*) is rejected because there is a significant statistical effect of a firm's size on Jordanian firms' ROA.

The positive effect of growth on ROA is also consistent with previous studies (e.g., Al-Jafar & Al Samman, 2015; Yazdnafar, 2013; Nunes et al., 2009). These studies indicated the existence of new growth opportunities through the acquisition of other firms, new plants, new product lines, more branches, and ultimately, all these forms of growth would positively influence these firms' ROA (Abor, 2015; Bhutta & Hasan, 2013; Myers, 1977). Hence, the second null hypothesis (*H2*) is rejected, since there is a significant statistical effect of growth on ROA of Jordanian firms.

The estimates also show an inverse effect of tangibility on ROA. The inverse effect of tangible assets looks strange and contrasts with the findings in earlier studies (e.g., Alasfour & Dahmash, 2019; Antoniou et. al., 2008; Shah & Khan, 2007; John, 1999). However, this inverse statistical effect indicates that firms that invest more in tangible assets own costly and less productive fixed assets, and it has been reported that they prefer to focus more on enhancing their human capital and benefiting from long-term investments (Diaz & Hindro, 2017; Nunes et al., 2009). Based on this result, the third null hypothesis (*H3*) is rejected as there is a significant statistical effect of tangibility on ROA of Jordanian firms.

It is clear from the estimates that there is an insignificant positive effect of leverage on ROA, thus null hypothesis (*H4*) is also rejected. This insignificant positive effect of leverage on ROA is similar to prior studies that showed that firms with greater debt are expected to have higher leverage by using more external funds, which is more costly and risky and less internally generated. Accordingly, the firm's profitability will be decreased (e.g., Nazir & Afza, 2009; Antoniou et al., 2008; Shah & Khan, 2007; Frank & Goyal, 2002; Rajan & Zingales, 1995). The estimated regression model

of the pooled sample implies a high explanatory power (with an adjusted R-square of 86.5%). These results are in line with recent studies testing the internal factors that determine profitability (e.g., Škuflć et al., 2016; Al-Jafar & Al Samman, 2015).

Another robustness analysis is made for financial, industrial, and services sectors, as shown in Table 6. The results imply a positive effect of size for the three main sectors, which is consistent with the main pooled sample and in line with previous studies (e.g., Gaio & Henriques, 2018; Dahmash, 2015; Dogan, 2013; Bayyurt, 2007; Jónsson, 2007). Table 6 indicates a positive effect of growth on ROA only for financial and industrial sectors, which agrees with earlier research (e.g., Abor, 2015; Al-Jafar & Al Samman, 2015; Bhutta, & Hasan, 2013; Yazdnafar, 2013; Nunes et al., 2009; Myers, 1977). The estimates show the inverse statistical effect of tangibility on ROA for the industrial sector only, which is in line with the main pooled sample. This finding is consistent with some earlier research (Nunes et al., 2009).

Leverage is insignificant for financial and industrial sectors, and this is also inconsistent with the pooled sample. However, it is inversely significant for the services sector. These results are not far from earlier studies' results (Nazir & Afza, 2009; Antoniou et.al., 2008; Shah & Khan, 2007; Frank & Goyal, 2002; Rajan & Zingales, 1995). Table 7 indicates a positive significant statistical effect of size for real estate companies and banks only, consistent with the main pooled sample and the financial sector sample of which they form part. Growth has a significant positive effect on ROA for firms in the financial sector sample, except for banks, and these effects are consistent with the main pooled sample. The tangibility of assets has a positive significant statistical effect on ROA for real estate firms only, and this effect is inconsistent with the main pooled sample and the financial sector sample. Leverage has a significant negative effect on ROA for real estate and insurance sub-firms, which inconsistent with the main pooled sample and the financial sector sample.

Table 8 shows a positive significant statistical effect of size on ROA for extraction and construction companies and pharmaceutical and chemical companies only, which is consistent with the main pooled sample and the industrial sector sample. There is a significant positive effect of growth on ROA for all firms in these industry sub-samples, which is consistent with the main pooled and industrial sector samples. Tangibility indicates a significant inverse effect for industrial sub-samples firms, except for beverages and food sub-sample firms, and these effects are consistent with the main pooled and industrial sector samples. Leverage implies a negative significant statistical effect for paper and textile sub-sample firms only, and these effects are inconsistent with the main pooled sample and the industrial sector sample.

Table 9 demonstrates a significant positive effect of size on ROA for all services sub-samples, which is consistent with the pooled and services sector samples. Growth has a significant positive effect on ROA for both the health care and transportation sub-sample firms and technology and utilities sub-sample firms. These effects are consistent with the main pooled sample, contrast with the services sector sample. The tangibility of assets has a significant positive effect on ROA for educational and commercial sub-sample firms only, and this is inconsistent with the pooled sample and services sub-sample. Leverage has a negative significant statistical effect on ROA for health care and transportation firms only. These two effects were consistent with the services sector sample but not with the main pooled sample.

Based on the previous results of the main industry sector samples and the other sub-sector samples, it can be concluded that different industry shapes and structures can play a vital role in changing the effect of the explanatory variables of size, growth, tangibility, and leverage on ROA.

The accounting variables could present some problems as financial statements are not submitted to market assessments before their publication. Therefore, another robustness check was done with market variables (see Table 10). Tobin Q was used as a proxy for profitability, the logarithm of market capitalization as a proxy for size, and market to book value as a proxy for growth opportunities. The final number of observations for the new sample was 1,448 after excluding missing and unavailable data. First, an analysis was executed for these three market variables, and then another analysis

was done for the same three variables after adding the tangibility and leverage variables. Tangibility and leverage variables are the same variables that are tested in the main model as there is no specific market measure to replace tangibility and there is a shortage of data concerning the market value of debt, since there are few companies in Jordan issued corporate bonds, and most of corporate debt are generated from banks loans.

Table 10 indicates that the estimated regression model of the pooled sample seems to have a high explanatory power (with adjusted R-square of 67.1%). Tobin Q is positively affected by tangibility and the market to book value, which is similar to previous results (see Table 6). The logarithm of market capitalization does not affect Tobin Q, which is not the case for the size variable. Leverage has a similar result as in the previous analysis.

CONCLUSION

The aim of this study was to investigate the effect of a firm's size, asset growth, asset tangibility, and financial leverage on ROA using a static model applied on unbalanced panel data for an integrated sample of firms listed on the Amman Stock Exchange from 2011 to 2018. An extended analysis was undertaken for the main sector samples and the sub-samples of these main sectors to investigate if the effect of the explanatory variables on the firm's ROA changes at these levels.

The pooled sample showed a positive effect of the firm's size and asset growth on ROA. However, ROA was inversely affected by asset tangibility, and insignificantly by leverage. The main sector samples had the same results regarding size and asset growth, excluding the services sector. The effect of asset tangibility for the pooled sample was consistent with the main industrial sector sample. The leverage effect was consistent for the main financial and industrial sector samples.

When exploring the data at a more detailed level of industry sub-sectors, mix of results arose concerning the effect of the explanatory variables on ROA. The results of this study indicate that a firm's size and asset growth have the most positively significant effect on ROA, and are almost the most consistent variables at the main pool level. However, the results clearly point to the important role of industry shape and structure. These change the effect of the explanatory variables of firm's size, asset growth, asset tangibility, and leverage on ROA, and this varies from one industry to another. In addition, the results of this study support the argument that firms' profitability is not always affected most significantly by any particular internal factors.

Based on the results of this study, several recommendations emerge. Corporate management should consider the most positive effects of size and growth on ROA, minimize the less productive fixed assets, depend less on external risky and costly finance sources, and rely much more on internally generated funds. Further research may include investigating the effect of additional internal factors on ROA in the same context or other contexts. The effect of macro economic factors on ROA can also be explored.

AUTHOR CONTRIBUTIONS

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