

FIRM LIFE CYCLE, PROFITABILITY AND THE IMPACT OF FINANCIAL CRISIS: EVIDENCE FROM DEVELOPING MARKET

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Abstract

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This study investigates the effect of the 2007–2009 financial crisis on the profitability of companies in selected companies in Jordan using a cash flow-based, firm life cycle approach which Dickinson (2008) developed. The study includes five stages of a company including introduction, growth, maturity, shake-out, and decline stages. Annual data is used for Jordanian firms for the time period 2000–2018. Following the Dickinson (2008) model, panel data regression has been used as the anchor technique for analysis. The results of the study indicate that the return on net worth significantly explains the profitability of firms and that the fixed effects in panel regressions are more appropriate for such a study. The maximum impact of the financial crisis on the profitability of firms was found for the firms in the introduction stage. The estimated model for growth stage firms can be used to forecast the profitability of firms during a financial crisis and hence will help companies in financial planning and performance management.

Keywords: Firm Life Cycle, Panel Data, Ratios, Firm Performance, Profitability, Financial Crisis

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1. INTRODUCTION

Financial ratios are important tools for effective performance management in companies. There are multiple categories of business ratios used for this purpose, based on the objectives of their usage.

It may be market ratios or financial ratios. One popular categorization of financial ratios is to classify them into four segments: turnover, profitability, liquidity, and leverage ratios. These financial ratios enable analysts and subsequent users to examine an organization from four

perspectives. Chandler (1962) in his study observed that a firm goes through different stages of its life, which he referred to as the life cycle of the firm. A firm life cycle (FLC) is similar to a product life cycle initially utilized in marketing strategies but subsequently found significance in financial studies (Yan & Zhao, 2010). Deriving a firm life cycle based on a product life cycle is a difficult task for decision-makers, as both cycles have different time horizons and utility.

Gort and Klepper (1982) suggest that firms usually follow five different life cycle stages, while Miller and Friesen (1984) observed that the firms move in a random pattern across life cycle stages. There may be a scenario where no trend or pattern is followed in an FLC, such that a firm may shut down operations soon after starting business or a consumer product firm which may mature and decline without entering the growth stage. Additionally, some firms will move from a mature phase to another phase (such as the decline phase), while others may move to the growth stage and reinvent themselves. Thus, due to the differences across life cycle stages and the common traits between firms within the same life cycle stage, developing a standard uniform practice is a challenging task, and the literature needs more studies in this field. Fairfield et al. (2009) suggested that within-industry homogeneity in forecasting profitability is uncommon, as many firms in the same industry follow different FLCs.

The financial performance of a firm is associated with FLC stages. Faff et al. (2016) connect the firm's life cycle stages with its investment, financing, and cash policies. Habib and Hasan (2019) found that FLC stages have a significant impact on its investment, financing activities, and dividend payout policy. Al-Hadi et al. (2019) studied social performance and financial distress in the context of FLC. A study of firm performance, considering life cycle stages under the influence of a financial crisis, is imperative and useful. Gort and Klepper (1982) categorized the life cycle of firms into five stages: introduction, growth, maturity, decline, and shakeouts stages. First, the introduction stage is the situation where innovation is made commercial, and available business opportunities are exploited by a firm. This stage is characterized by low investments in assets, a new production process with high business risk, and high borrowing costs. Managerial optimism drives investment at this stage (Gort & Klepper, 1982; Jovanovic, 1982). Second, the growth stage is explained as the situation where a firm starts to grow in business, profits start flowing in, investments increase, and reinvestment of profits is common. Growth firms are usually found to have higher debt (Gort & Klepper, 1982; Spence, 1977). Third, the maturity stage is the stage where the optimization of the production process with earning expectations is at the highest level. Depreciation usually finances capital investments. Additionally, at this stage, competition is intense, and the market is saturated. Since growth expectations are low, high dividends are expected at this stage. Hannan and Freeman (1984) introduce the concept that mature firms are less competitive, while Spence (1977) found that their efficiency is maximized by a good understanding of operations. Myers (1977) and Jensen (1986) found that in

the maturity stage, a firm focuses more on servicing debt and distribution of profits. Fourth, the shake-out stage is not clearly explained in the literature, but it can be understood as the stage when the industry becomes volatile and the number of producers decreases (Abuhumous, 2023). Finally, the decline stage which is the life cycle ending stage and is characterized by falling sales, declining earnings, and an increase in unutilized production capacity.

Out of the five stages in the life cycle of the firm, this study focuses on four of them, excluding the shake-out stage. The vagueness in the definition of this stage makes it hard to measure and estimate (Abuhumous, 2023). The financial categories used in this study are the profitability, activity, liquidity, and leverage financial ratios. The study uses a moderated methodology derived from Gort and Klepper (1982), and Dickinson (2008) with a focus on firm life cycles. Ahmed et al. (2021) also employ Dickinson's (2008) FLC method for life cycle categorization. Previous researchers studied and analyzed the financial performance of firms using financial ratios based on FLC from different perspectives (La Rocca et al., 2011; Yan & Zhao, 2010). Although Alzoubi (2019) conducted a study for Jordanian firms with a focus on cash holdings in connection to the firms' life cycle stage crisis, the author does not address the financial crisis matter, and integrating a financial crisis with FLC and profitability is missing. The integration of the financial crisis remains an important factor for a developing country such as Jordan that is finding some presence in the global market. There are no previous studies that integrate lifecycle-based profitability analysis in the context of financial crises. Tariq et al. (2020) extended the study during the maturity and growth stages in the FLC, but the decline stage remains unstudied.

The aim of the study is to investigate the effect of financial crisis on the profitability of companies in Jordan using the four stages of the cash flow-based, firm life cycle approach.

RQ: How the financial crisis impacts the profitability of companies in Jordan using the turnover, profitability, liquidity, and leverage ratios during the FLC stages of introduction, growth, maturity, and decline?

The remainder of this paper is structured as follows. Section 1 introduces the concept and the need for the study. Section 2 provides a summary of relevant literature on the subject. Section 3 covers the research methodology. Section 4 presents data analysis and discussion. Section 5 offers the conclusion of the research work.

2. LITERATURE REVIEW

2.1. The life cycle in the firm

The life cycle of a firm is significant for its business strategy and has thus been of interest to researchers. Erbetta et al. (2022) and Miller and Friesen (1984) term the life cycle stages as unique and multifaceted. In any business, there are unique firm-level factors such as borrowing costs, and common industry-level factors such as input costs which are equally applicable to an industry or market. Researchers extensively study FLC from

different perspectives, including prediction of organizational behaviour (Amin et al., 2023; Miller & Friesen, 1984), focus of various stakeholder groups (Mulchandani et al., 2023; Jawahar & McLaughlin, 2001), evaluating organizational effectiveness (Amin et al., 2023; Quinn & Cameron, 1983), innovation at different stages (Koberg et al., 1996), management priorities (Smith et al., 1985), international human resource management practices (Milliman et al., 1991), association between life cycle stages and firm traits (DeAngelo et al., 2006), capital structure (Talreja et al., 2023; Owen & Yansom, 2010), growth opportunity (Fama & French, 2001), issues faced by managers (Kazanjian, 1988), impact of macroeconomic parameters on firm performance (Ahmad & Nasrin, 2017), and profitability (Warusawitharana, 2012).

Anthony and Ramesh (1992) conducted one of the initial studies on the subject, focused on variables such as capital expenditures, sales growth, and dividend payout, demonstrating the usefulness of the firm life cycle to market performance. Dickinson (2008) observed that the differences in average profitability across the life cycle stages are substantial and persistent. Miller and Friesen (1984) suggest that firms within a life cycle stage are similar, but they can deviate from the sequencing of life cycle stages, and the time duration for different stages would be different. Wasilewski and Żurakowska-Sawa (2020) later supported this proposition. Their research studies companies within the industry, and the findings support the similarity within the industry and variation across industries.

Adizes (1979) analyzed the research and development behaviours of firms at different life cycle stages. Kwon and Moon (2009), and Park and Park (2010) examined the return on equity (ROE) and profitability in the context of FLC and found that the usefulness of profitability at the growth stage is lower than in the mature stage. Kim and Yang (2012) support that the growth stage has greater cost stickiness than the other stages; Talreja et al. (2023) later confirmed these results. In addition, Tariq et al. (2020) found that mature firms are more efficient in terms of green innovation in compared to growth firms. Anthony and Ramesh (1992) and Black (1997) used parameters such as age, sales growth, capital expenditures, and dividend payout to categorize firms into various stages of life cycles, while Dickinson (2008) used cash flow patterns to identify life cycle stages. Hasan and Cheung (2018) found evidence of the association between organization capital and FLC. Ahmed et al. (2021) found that corporate investment efficiency was lower during the introduction and decline stages and higher at the growth and maturity stages of an FLC. Chen et al. (2021) used a sample of Taiwanese-listed firms during the years from 1992 to 2018 and tested the profitability of moving averages (MA) over the FLC and support that the MA's abnormal performance is higher in the introduction and shakeout/decline stages but lower in the growth and mature stages.

2.2. Financial ratios

Ratio analysis is a significant tool for assessing the financial performance of a firm. Financial ratios have been of interest to researchers and studied in the context of firm life cycle stages. Bulan et al. (2007)

show that firms pay dividends when they reach the maturity stage in their life cycle, while Mueller and Yun (1998) present that smaller firms are better at managing the cost of capital compared to mature firms. La Rocca et al. (2011) found that, contrary to conventional rationale, debt is significant in the early stages of firms and is the preferred choice of financing for firms. Hasan et al. (2015) studied the life cycle stage along with the related cost of equity and found a higher cost of equity in the introduction and the decline stages. This cost was observed to be lower for growth and mature-stage firms. Yoo et al. (2019) studied research and development expenditures in the context of life cycle stages. Wang et al. (2020) studied working capital and firm performance in the context of firm life cycle stages and found that working capital is negatively associated with firm performance, but this observation did not hold for the full life cycle of the firm. Alzoubi (2019) conducted a study on a Middle East sample (Jordanian firms) and concluded that during the introduction and growth stages, holding cash becomes irrelevant, while during the maturity and decline stages, holding cash has a significant negative effect. La Rocca et al. (2011) and Opler et al. (1999) studied debt levels in the context of firm life cycles, Warusawitharana (2012) studied the relationship between growth firms and profitability in mature firms, while Almeida et al. (2004) also studied profitability in the context of FLCs. Yoo et al. (2019) used asset turnover ratio (ATO) as a measure of asset efficiency, while liquidity in the context of a firm life cycle is studied by Wang et al. (2020) and Alzoubi (2019). As a result, the researchers propose the following hypothesis:

H1: The firm performance is positive within the mature stage of the firm life cycle when controlling for the 2008 financial crisis.

H2: The firm performance is positive within the growth stage of the firm life cycle when controlling for the 2008 financial crisis.

H3: The firm performance is negative within the introduction and decline stages of the firm life cycle when controlling for the 2008 financial crisis.

H4: The firm performance is negative within the decline stages of the firm life cycle when controlling for the 2008 financial crisis.

3. RESEARCH METHODOLOGY

The objective of the study is to analyze profitability in the context of a firm life cycle under the influence of a financial crisis between late 2007 and early 2009. The research uses a moderated methodology based on Gort and Keppler (1982) and cash flow classification as used by Dickinson (2008) and Black (1997), which are the two pioneer studies on firm life cycles. This study is based on the annual financial ratios for Jordanian companies for the time period 2000-2018 for five variables (see Table 1). These ratios represent the four critical functions of a business firm: profitability, activity, liquidity, and leverage. The sample data was extracted from the Amman Stock Exchange (ASE), Jordan (www.ase.com.jo/en), and analyzed using the software EViews 11.0. The ASE has 74 companies listed in the non-financial sector, of which 42 companies were used the fit the time frame of

the analysis. There were 42 companies used from the non-financial sector of Jordan in 2018.

Table 1 refers to the study variables used. Here, net profit margin (NPM) is used as a proxy for profitability as it is an acceptable measure of the performance of the firm. NPM has been measured with the firm's net income as a percentage of sales. Warusawitharana (2012) and Ahmad and

Murray (2019) have also used NPM in their studies. The current ratio is used as a representative of business liquidity (Alzoubi, 2019); the debt ratio is used as a proxy for leverage (La Rocca et al., 2011); return on net worth is used as a proxy for shareholder's profitability, and asset turnover ratio is used as a proxy for operational efficiency of the firm (Yoo et al., 2019).

Table 1. Variables used in the study

Variables	Code	Used as	Formula
Independent variables			
Assets turnover ratio	ATO	%	Sales/Total assets
Debt ratio	Debt ratio	%	Debt/(Debt + Equity)
Dummy variable	Dummy	0 or 1	0 for pre 2008 and 1 for post 2008
Current ratio	CR	%	Current assets/Current liabilities
Return on net worth	RoNW	%	Income/(Share capital + Total reserves)
Dependent variable			
Net profit margin	NPM	%	Net income/Sales

The operating, investing, and financing (OIF) activities represent the “outcome” of the three critical activities of a commercial organization. This study uses a moderated methodology derived from Gort and Klepper (1982) and Dickinson (2008) to categorize firms in different life cycle stages based on cash flow patterns of operating activities, investing activities, and financing activities. Ahmed et al. (2021) confirmed the use of panel data fixed effects and ordinary least squares techniques. Perenyi et al. (2011) studied the life cycle of SMEs and found that there are outlier firms as well. The shakeout category of Dickinson (2008) is clubbed together as the outlier category, which

includes all cash flow patterns that do not fall into other life cycle stages. Thus, three cash flow patterns and five life cycle stages are used in the research (Introduction, Growth, Maturity, Decline, and Outliers) as explained in Table 2.

Table 2 indicates the mechanism by which firms are categorized into various life cycle stages based on cash flow patterns (Dickinson, 2008). The firms which are not specified into any of the four life cycle stages are categorized as outlier firms. The sample companies were categorized into different life cycle stages using the data for the year 2018 (see Table 2) in five life cycle stages.

Table 2. Firm cash flow activities categorization into life cycle stages

Activities	Introduction	Growth	Maturity	Decline	Outliers			
Financing activities	+	+	-	-	-	+	+	-
Operating activities	-	+	+	-	-	+	-	+
Investing activities	-	-	-	+	-	+	+	+

Descriptive analysis and correlations are used as the basic analytical techniques, while pooled ordinary least squared (POLS) regression and fixed effect/random effect-based regression are used for more robust analysis. The R-squared values from the regressions have been used to analyze inter-variable dependency (Black, 1997). NPM, as a percentage, is used as the dependent variable, and the other variables are used as independent variables (see Table 1) in all the six panels. One crisis dummy variable has also been used to control for pre- and post-2008 sample time periods, where ‘0’ represents before the crisis period (2000-2007) and ‘1’ represents after the crisis period (2008-2018). The R-squared values have been used to analyze regression, as used in Black (1997).

The life cycle categorization of firms is done using the cash flow patterns (Gort & Klepper, 1982; Dickinson, 2008). Traditionally, the effect of a financial crisis has been studied in economics literature using a dummy variable (Ruzzante, 2018). Fixed effects and random effects are studied to analyze the effect of cross-section or time series in panel data (Ruzzante, 2018). Financial ratios are the standard tools for studying profitability and financial analysis in firms (La Rocca et al., 2011). The research combines the effect of various techniques and tools to develop a novel research

methodology, as applied. The panel regression used in the research is represented as Eq. (1).

$$Profitability = f(X_j, t, i) \tag{1}$$

where:

- *i* = the independent variables used;
- *j* = the number of companies represented in cross-sectional data;
- *t* = the yearly time period from 2000 to 2018.

The linear model representing profitability for each life cycle stage is used as Eq. (2):

$$NPM = \beta_0 + \beta_1 * ATO + \beta_2 * CR + \beta_3 * Debt\ ratio + \beta_4 * RoNW + \beta_5 * Dummy \tag{2}$$

4. DATA ANALYSIS AND DISCUSSIONS

The FLC categorization, as per Dickinson (2008), is modified to divide the companies into five life cycle stages: Introduction stage, Growth stage, Maturity stage, Decline stage, and Outliers stage. This is a standard methodology also used in Warusawitharana (2012) and Wang et al. (2020). Thus, six types of panels are used for analysis (one for each of the five life cycle stages and one for all companies combined). The 42 sample companies (Panel 1) were divided into sub-panels for each life cycle stage: Introduction stage (Panel 2, 33% companies), Growth

stage (Panel 3, 7% companies), Maturity stage (Panel 4, 33% companies), Decline stage (Panel 5, 7% companies) and Outliers/Shakeout stage (Panel 6, 19% companies). Initially, descriptive analysis (Tables 3 and 4) is conducted by panel least square and fixed effect/random effect regression analysis for the six panels. To analyze for fixed effects or random effects in panels, the Hausman test has been used. The null hypothesis (H_0) for the Hausman test is “random effect is appropriate”.

Firms within a life cycle stage have demonstrated similar characteristics. Porter (1979) found significant “intra-industry” differences in a firm’s strategic choices, while Miller and Friesen (1984) found evidence of “intra-life cycle” commonalities in strategic and organizational design choices. This research analyzes life cycle trends through the coefficient of variation (CV) and found the highest variation in NPM is in the maturity stage of firms, and the lowest variation is observed for the growth stage. For the ATO variable, this volatility is highest for the decline stage and lowest for the growth stage. The debt ratio was an exception with a similar variation across different life cycle stages. The within-cycle variation for RoNW was highest for the decline stage and observed as lowest for the growth stage. For the current ratio, this variation is highest for the introduction stage and lowest for the growth stage.

Table 3. Descriptive statistics for the sample

Variables	Obs.	Mean	CV (%)	Min.	Max.
NPM	42	-0.12	-30.05	-2,641.49	290.38
ATO	42	2.62	66.00	0.00	2.13
CR	42	2.62	2.36	0.0042	0.5891
Debt ratio	42	0.34	74.00	0.0339	471.226
RoNW	42	0.05	3.71	48.61	352.13

Note: N = 42.

The data in Table 3, representing the average for 42 companies, may be considered as the industry benchmarks for a comparative analysis. The average return on net profits is negative (-12%), while the average return on net worth is satisfactory (5%). Average assets efficiency (62%) is on the lower side but indicates the lowest variation across the variables (CV = 0.66). Average liquidity is acceptable (2.62 times) for the sample.

Table 4 compares the descriptive statistics amongst different life cycle stages and finds net profit margin and return on net worth as less than the industry averages for firms in the introduction stage. Additionally, the average debt ratio for firms in the introduction stage is the highest across all stages, which is in sync with La Rocca et al. (2011). For firms in the growth stage, net profits become positive, RoNW increases, debt reduces marginally, and better liquidity management is found. For mature firms, a marginal fall in returns is observed. The average profitability for growth firms (NPM = 6%, RoNW = 16%) is higher than for mature firms (NPM = 5%, RoNW = 7%). This is in sync with the findings of Warusawitharana (2012). For declining firms, profits become negative, and RoNW is as the lowest across all stages. Also, in declining firms, asset efficiency is lowest across stages. For outlier firms, the lowest debt (23%) and highest net profit (8%) are observed, along with high (inefficient) liquidity management (CR = 3.34).

Table 4. Descriptive statistics for various FLC stages

	NPM	ATO	CR	Debt ratio	RoNW
<i>Introduction</i>					
Mean	-0.44	0.66	2.87	0.38	0.02
CV (%)	-10.69	53	356	68	8.85
<i>Growth</i>					
Mean	0.06	0.64	2.08	0.31	0.16
CV (%)	2.22	38	55	47	1.78
<i>Maturity</i>					
Mean	0.05	0.64	2.15	0.37	0.07
CV (%)	77.88	74	98	77	3.55
<i>Decline</i>					
Mean	-0.13	0.35	2.31	0.29	0.01
CV (%)	-5.87	103	103	63	18.72
<i>Outliers</i>					
Mean	0.08	0.63	3.34	0.23	0.07
CV (%)	3.28	70	80	70	2.18

Panel 1 (all companies): when panel OLS regression (Eq. (3)) was performed for all 42 companies taken together, the regression (R-squared = 4%) is significant at a 1% confidence level along with the independent variables, debt ratio, and RoNW.

$$NPM = 0.52 - 2.36 * Debt\ ratio + 0.48 * ATO - 0.09 * CR + 1.7 * RoNW - 0.02 * Dummy \quad (3)$$

Analyzing for fixed effects/random effects in this panel, the fixed effect is more appropriate for this panel (Eq. (4)) where RoNW, Debt ratio, and the equation are significant at a 1% confidence level (R-squared = 10%). The crisis dummy is positive, and RoNW improved, indicating that after the financial crisis, the profitability of firms improved in all life cycle stages.

$$NPM = 0.58 - 3.4 * Debt\ ratio + 0.4 * ATO + 0.003 * CR + 2.24 * RoNW + 0.11 * Dummy \quad (4)$$

Panel 2 (Introduction stage): Analyzing panel OLS regression (Eq. (5)) for the introduction stage companies, the regression is significant at a 1% confidence level (R-squared = 8.3%) along with the independent variables, debt ratio, and ATO. Analyzing for fixed effects/random effects in this panel, the fixed effect is more appropriate for this panel (Eq. (6)) where the Debt ratio and the equation are significant at a 1% confidence level (R-squared = 20%). The crisis dummy is as positive, and RoNW also improved, indicating that after the financial crisis, the profitability of firms improved in the introduction stage firms.

$$NPM = 0.23 - 4.06 * Debt\ ratio + 1.66 * ATO - 0.1 * CR + 1.76 * RoNW - 0.05 * Dummy \quad (5)$$

$$NPM = 0.95 - 7.5 * Debt\ ratio + 1.11 * ATO + 0.14 * CR + 3.2 * RoNW + 0.65 * Dummy \quad (6)$$

Panel 3 (Growth stage): Analyzing panel OLS regression (Eq. (7)), R-squared = 81% for the growth stage companies, the regression is significant at a 1% confidence level along with the independent variables, debt ratio, RoNW, and the crisis dummy variable. Analyzing for fixed effects/random effects in this panel, the fixed effect is more appropriate for this panel (Eq. (8)), R-squared = 83% where RoNW, Debt ratio, and the equation are significant at a 1%

confidence level. The crisis dummy variable and RoNW indicate a negative effect on profitability for growth-stage firms.

$$NPM = 0.12 - 0.31 * Debt\ ratio + 0.04 * ATO - 0.01 * CR + 0.42 * RoNW - 0.04 * Dummy \quad (7)$$

$$NPM = 0.04 - 0.17 * Debt\ ratio + 0.05 * ATO + 0.002 * CR + 0.39 * RoNW - 0.05 * Dummy \quad (8)$$

Panel 4 (Maturity stage): Analyzing panel OLS regression (Eq. (9)) for the maturity stage companies, the regression is insignificant with only RoNW being significant at a 5% confidence level (R-squared = 2%). Random effects reported a similar result. The financial crisis and RoNW indicated a positive effect on profitability for maturity-stage companies.

$$NPM = 0.4 - 0.49 * Debt\ ratio - 0.22 * ATO - 0.08 * CR + 2.36 * RoNW + 0.03 * Dummy \quad (9)$$

Panel 5 (Decline stage): Analyzing panel OLS regression (Eq. (10), R-squared = 36%) for the decline stage companies, the regression is significant at a 10% confidence level along with the independent variable, RoNW. However, the crisis dummy is significant at 1%. Analyzing for fixed effects/random effects in this panel, fixed effects are more appropriate for this panel (Eq. (11)) where RoNW, ATO, and the equation are significant (p-value < 0.01). The explained variance of profitability (R-squared = 58%) improved, and the effect of the financial crisis and RoNW is positive on profitability for decline-stage companies.

$$NPM = -0.9 + 1.13 * Debt\ ratio - 0.03 * ATO + 0.09 * CR + 2.92 * RoNW + 0.41 * Dummy \quad (10)$$

$$NPM = -0.84 + 0.82 * Debt\ ratio + 0.84 * ATO + 0.009 * CR + 3.95 * RoNW + 0.006 * Dummy \quad (11)$$

Panel 6 (Outlier companies): Analyzing panel OLS regression (Eq. (12)) for the outlier companies, the regression is significant at 1% confidence (R-squared = 56%) along with the independent variables ATO, debt ratio, and RoNW. Analyzing for fixed effects/random effects in this panel, the fixed effect is more appropriate for this panel (Eq. (13)) where RoNW, Debt ratio, and the equation are significant (p-value < 0.01) while ATO and the Dummy variable are significant at 10% level of confidence (R-squared = 71%). A negative effect of the financial crisis and a reduced effect of RoNW was observed on profitability for the outlier companies.

$$NPM = 0.3 - 0.72 * Debt\ ratio - 0.15 * ATO + 0.002 * CR + 0.71 * RoNW - 0.01 * Dummy \quad (12)$$

$$NPM = 0.17 - 0.75 * Debt\ ratio + 0.12 * ATO + 0.001 * CR + 0.34 * RoNW - 0.04 * Dummy \quad (13)$$

The results show different outcomes for the net profit margins among Jordanian companies. During the decline stage, companies observe the assets turnover ratio as the highest, and it is also

the lowest in the growth stage. Return on net worth is positive for all panels. The crisis impacts the return on net worth negatively, which needs further investigation as it contradicts previous literature findings.

5. CONCLUSION

The objective of the research was to study the profitability of firms in the context of the 2008 financial crisis for the different life cycle stages of firms. Several imperative observations emerged from the analysis. Fixed effects are more appropriate across all panels, indicating a validation of cross-section level analysis for such a study. This also validates the categorization of companies based on life cycle stages and cash flow patterns. In terms of explained variance (Black, 1997), the growth stage firms are best explained (R-squared = 83%) followed by outlier firms (R-squared = 71%).

Analyzing inter-life cycle trends for the ratios, the highest variation is for NPM (78%) in the maturity stage and the lowest is for growth-stage firms (2.2%). The ATO is highest for decline-stage firms (103%) and the lowest for growth-stage firms (38%), for RoNW the highest variation is for decline-stage firms (18.72%) and lowest for growth-stage firms (1.78%). The current ratio is highest for the introduction stage and lowest for growth stage. The debt ratio is an exception with a similar variation across different life cycle stages.

Analyzing the effect of the financial crisis on profitability (intercept + dummy coefficient) amongst the different panel regressions, it was observed that the post-financial crisis effect on the profitability of Jordanian firms was most observed in firms in the Introduction stage (constant = 1.6, Eq. (6)), followed by all companies (constant = 0.69, Eq. (4)), and this effect was negative for declining firms (constant = -0.49, Eq. (10)). This implies that overall, the impact on profitability was positive and the new firms exploited this financial crisis as an opportunity better than firms in other life cycle stages. The firms in the declining stage were worst affected by this crisis. Return on net worth as an independent variable was significant in most panel regressions, indicating its importance as an explanatory variable for profitability, followed by ATO and debt ratio. Also, for ATO and RoNW, the regression coefficients are positive for most panels. The regression coefficients for the debt ratio are negative for all life cycle stages except the decline stage (positive), implying its inverse relationship with profitability. This indicates that declining firms rely more on debt to stay profitable and sustain.

The model for growth stage firms (Eq. (8)) can be used to forecast the profitability of firms during a financial crisis and hence it will help companies in financial planning. The declining stage had limited coverage in previous literature. One imperative finding about declining-stage firms is that such firms tend to rely more on debt financing to stay profitable and sustainable, hence they should be more cautious during a financial crisis in terms of debt management (Habib & Hasan, 2019). The firms in the declining stage also need to manage assets better to sustain longer. Analyzing basic statistics, one imperative finding about the outlier firms was

that they reported the lowest debt levels and highest net profit with poor liquidity management (high current ratio = 3.34) across all stages and industries. This is a category which is not well covered in the literature. Dickinson (2008) refers to it as shakeouts) and may be focused on in future research. The crisis dummy variable and RoNW indicated a negative effect on profitability for growth-stage firms, which is contrary to

the common economic rationale and thus needs to be further probed.

One of the limitations of the study is that the sample used is from a particular country. A multi-country sample may give more robust results. Another limitation is that the study uses the cash flow-based categorization of the firm life cycle and not all categorizations.

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