"Analysis of the relationship between working capital policy and operating risk: an empirical study on Jordanian industrial companies"

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Abstract

The study analyzes the working capital management practices and their impact on profitability and risk of industrial Jordanian firms for the period of 2004 to 2007. The total sample of the study consists of 59 industrial firms listed on Amman Stock Exchange.

The working capital management practices examine the impact of aggressive/conservative working capital investment and financing policy and analyze through cross-sectional regression models the relationship between working capital policies and profitability as well as risk of the firms. Efficient management of working capital is a fundamental part of the overall corporate strategy aiming to create the shareholders' value. Firms try to keep an optimal level of working capital that maximizes their value.

The optimal level of working capital is determined to a large extent by the methods adopted for the management of current assets and liabilities. It requires continuous monitoring to maintain proper level in various components of working capital, i.e. cash receivables, inventory and payables, etc.

The result indicates a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policy. The firms yield negative returns if they follow an aggressive working capital policy. Moreover, the present study validates the findings of Carpenter and Johnson (1983) that there is no relationship between the level of current assets and liabilities and risk of the firms.

Keywords: degree of aggressiveness/conservativeness, working capital policies, Tobin's q, operating risk and financial risk.
JEL Classification: G11, G30, G31, G32.

Introduction

Net operating working capital relates to free cash flow and in turn market value of equity. A positive working capital requirement, or conservative working capital policy, indicates a need for additional capital which firms can finance internally, reducing free cash flow, or externally, generally via commercial papers or lines of credit. Thus, conservative working capital policy implies costs of either lost opportunities or explicit financing costs. A negative working capital gap means that the firm's net operating working capital provides financing for long-term assets, implying an aggressive strategy.

Working capital exists because of market imperfections occurring over firms' operating cycles. To maintain day-to-day operations while accommodating these imperfections, firms choose the pattern and weights of short-term asset and liability accounts according to their operating environments and financing abilities. Operating components of working capital are targeted as vehicles for improving cash flow and maximizing shareholder wealth.

Despite the attention paid to short-term assets and liabilities typified by these studies, an examination of the motives behind operating working capital strategy, while accounting for the net influence of receivables, inventory, and payables, is absent in the finance literature. There are aggregative studies of working capital components: Shin and Soenen (1998) and Deloof (2003) show that profitability and risk-adjusted returns are inversely related to the cash conversion cycle suggesting that aggressive working capital policy significantly improves firm performance.

The net investment that supports firm operations is the working capital requirement, or net operating working capital, defined as the sum of accounts receivable and inventories net of accounts payable. Operating assets and liabilities ultimately must be managed in concert rather than individually, a condition this paper attempts to reflect.

In general, from the perspective of Chief Financial Officer (CFO), working capital management is a simple and a straightforward concept of ensuring the ability of the organization to fund the difference between the short-term assets and short-term liabilities (Harris, 2005). However, a "Total" approach which covers should be followed all the company's activities relating to vendor, customer and product (Hall, 2002). In practice, working capital management has become one of the most important issues in the organizations where many financial executives are struggling to identify the basic working capital drivers and the appropriate level of working capital (Lamberson, 1995). Consequently, companies can minimize risk and improve the overall performance by understanding the role and drivers of working capital.

A firm may adopt an aggressive working capital management policy with a low level of current assets as percentage of total assets or it may also be used for the financing decisions of the firm in the form of high level of current liabilities as percentage of total liabilities. Excessive levels of current assets may have a negative effect on the firm's profitability whereas a low level of current assets may lead to lower level of liquidity and stock outs resulting in difficulties in maintaining smooth operations (Van Horne and Wachowicz, 2004).

1. Operational definitions

Degree of aggressiveness/conservativeness: the Aggressive Adaptive-Risk (AAR) approach is an efficient adaptive approach for parallel simulation which provides optimistic logical processes with the ability to adjust their degree of risk at run time, based on observed behavior. The AAR approach is implemented on a network of workstations. Performance results using large synthetic loads are reported and compared to those obtained for the Time Warp optimistic technique. This conservative stabilization concept is the result of imposing an additional condition to a set of necessary and sufficient conditions for output static stabilization.

Working capital policies: working capital also known as net working capital is a measurement of a business's current assets, after subtracting its short-term liabilities, typically short term. Sometimes referred to as operating capital, it is a valuation of the assets that a business or organization has available to manage and build the business. Generally speaking, companies with higher amounts of working capital are better positioned for success because they have the liquid assets that are essential to expand their business operations when required.

Tobin's q: economics theory of investment behavior where 'q' represents the ratio of the market value of a firm's existing shares (share capital) to the replacement cost of the firm's physical assets (thus, replacement cost of the share capital). It states that if q (representing equilibrium) is greater than one (q > 1), additional investment in the firm would make sense because the profits generated would exceed the cost of firm's assets. If (q < 1), the firm would be better off selling its assets instead of trying to put them to use. The ideal state is where q is approximately equal to one denoting that the firm is in equilibrium. Also called general equilibrium theory or 'q' theory, it was proposed by the US Nobel laureate economist James Tobin in 1918.

Operating risk: this concept relates to risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events. The definition includes legal risk, which is the risk of loss resulting from failure to comply with laws as well as prudent ethical standards and contractual obligations. It also includes the exposure to litigation from all aspects of an institution's activities. The definition does not include strategic or reputation risks.

Financial risk: probability of loss inherent in the methods used in financing a firm, that may impair its ability to provide adequate return

2. Problem definition

The corporate finance literature has traditionally focused on the study of long-term financial decisions, particularly investments, capital structure, dividends and company valuation decisions. However, short-term assets and liabilities are important components of total assets and need to be carefully analyzed. Management of these short-term assets and liabilities warrants a careful investigation since the working capital management plays an important role for the firm's profitability and risk as well as its value. The optimal level of working capital is determined to a large extent by the methods adopted for the management of current assets and liabilities. It requires continuous monitoring to maintain proper level in various components of working capital, i.e. cash receivables, inventory and payables, etc.

The present study investigates the relative relationship between the aggressive/conservative working capital policies and profitability as well as risk of firms for 59 industrial companies listed on Amman Stock Exchange for the period of 2004-2007

3. Hypotheses

This study has tested the following null hypotheses on relation between the defined variables and working capital policies of listed companies:

H0: There is no significant relationship between working capital policies and Return on Assets (ROA) of Jordanian industrial companies.

H0: There is no significant relationship between working capital policies and Return on Equity (ROE) of Jordanian industrial companies.

H0: There is no significant relationship between working capital policies and Tobin's (Q) of Jordanian industrial companies.

H0: There is no significant relationship between working capital policies and risk of Jordanian industrial companies.

4. Importance and contribution of this study

The main objective of working capital management is to maintain an optimal balance between each of the working capital component. Business success

heavily depends on the ability of financial executives to manage receivables, inventory, and payables in an effective way (Filbeck and Krueger, 2005).

Firms can reduce their financing costs and/or increase the funds available for expansion projects by minimizing the amount of investment tied up in current assets. Most of the financial managers' time and effort are allocated in bringing non-optimal levels of current assets and liabilities back toward optimal levels (Lamberson, 1995). An optimal level of working capital would be the one in which a balance is achieved between risk and efficiency. It requires continuous monitoring to maintain proper level in various components of working capital, i.e. cash receivables, inventory and payables, etc.

In general, current assets are considered as one of the important components of total assets of a firm. A firm may be able to reduce the investment in fixed assets by renting or leasing plant and machinery, whereas, the same policy cannot be followed for the components of working capital. The high level of current assets may reduce the risk of liquidity associated with the opportunity cost of funds that may have been invested in long-term assets.

The impact of working capital policies on profitability is highly important, however, a little empirical research has been carried out to examine this relationship. This paper investigates the potential relationship of aggressive/conservative policies with the accounting and market measures of profitability as well as the risk factor of industrial Jordanian firms. The present study is expected to contribute to better understanding of these policies and their impact on profitability especially in the emerging markets like Jordan.

The study analyzes the working capital management polices and impact on profitability and risk of industrial Jordanian firms listed in Amman Stock Exchange for the period of 2004 to 2007.

5. Theoretical framework

5.1. Operational risk conceptual approach. Recently, the changes that took place on the financial market, because of the development of new activities and implementation of new products, have generated new types of risks that are more complex and bigger. A recent category is represented by the relative operational risk, for which the Basel Committee elaborated standards and regulations. In this way, the impact of this risk on the activity of a credit institution was recognized.

The past experiences indicated that in the case in which a financial institution has not an adequate risk management, it is exposed to jeopardy which can transform into important losses. These losses can generate even the cessation of the institution's activity. The Basel Committee considers the operational risk as a distinct category of the credit risk or the market risk. It defines the operational risks as "the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events". It also takes into consideration the legal risk, but excludes categorical the strategic and reputation risks. According to Merrill Lynch, the previous definition does not explain clearly how the nature and the measure of the indirect losses should be interpreted. This determines the financial institutions to have their own definitions, but this will create insubstantiality. Because the Basel Committee wanted to underline only the minimum standards for all the financial institutions, and because of the lack a concrete definition for this risk, in practice the list of risk categories was adopted and each of them was analyzed.

The separation was made in order to cover all the possible operational risks and to concentrate on the most significant causes of the severity of loss met day by day. The specialized literature presents the opinions of more authors regarding the operational risk area. Therefore, in 2001, The PNC Financial Services Group recommended a more concise definition for the operational risk, a definition that should be based on more direct losses and which excluded categorical the business risk, the strategic risk and the reputation risk: the operational risk is the risk of the income direct loss, which results from internal events connected to inadequate personal, important errors or illegal behavior because of the errors or the systems and processes inadequate, or from external events where the risks are not covered by the credit, market or interest rate risk. Thus, the operational risk can be interpreted as a vulnerability of the financial institution that can be reduced or eliminated through an increased control.

The important increase in the operational risk is due to organizational, infrastructure, business environment or improvement changes. These changes were materialized in: the development of the technology, the increase in the attention to the transparency, the increase in the electronic commerce, the increase in the operations for the natural person and small economic agents, deregulation, the incompatibility of the systems, the increased use of the automatic technologies, globalization, the increased use of the external sources and the complicated technologies to reduce the credit and market risks. All of this determined a healthy management of the operational risk and the inclusion in the internal process of a bank.

Thus, the financial institutions consider that this risk appears in the departments called "Operations" and is concretized into potential losses generated by

errors and controls, systems and processes omissions. That is why, it is not necessary to have a special department for the operational risk. Also, the risk management is made by a global risk committee. But there are some institutions that consider the operational risk as the risk which is not harmonized with the credit or market risks and which incorporates all the risks, except the credit risk and the market risk, in order to take into account all the potential influences over the profit and losses account. This thing brought some problems and, thus, the financial institutions decided to limit themselves to things that can be measured easily.

For a banking-financial institution we can mention a series of main operational risk factors, such as: internal fraud, external fraud, employment practices, the job safety, clients, products and business practices, bank's products and operation practices, the technical infrastructure deficiency, activity disturbances and system defections. For a good management of the operational risk there are six steps that have to be followed: identification of the risk type, identification of the risk factors, the exposure to the risk rank evaluation, the risks estimation, the loss and profile estimation and source explanation, the comparison of the risk with the profitability of each risk type, being compulsory to know the potential loss or the causes that generated this type of risk.

5.2. Ability to finance operating working capital. Positive net investments in operating working capital require financing. Firms with limited financial resources, more expensive costs of external financing, weaker access to capital markets, reduced bargaining power, and exhibiting financial distress will find financing more problematic.

5.2.1. Operating cash flow. Positive operating cash flow enables firms to finance a positive working capital requirement, allowing a more conservative operating working capital strategy, thereby facilitating future sales growth. However, firms with negative operating cash flows must finance a positive working capital requirement through other sources. Love, Preve, and Sarria-Allende (2007) estimate a direct relation between net trade credit and cash flow for a sample of firms in emerging market countries.

Thus, we expect a positive correlation between working capital requirements and cash flow. To relieve endogenously concerns, cash flow is measured as lagged operating income before depreciation minus income taxes scaled by net assets.

5.2.2. Asymmetric information and costs of external financing. Myers and Majluf (1984) show that capital markets extract a premium for the external financing of firms with greater informational asym-

metries because such firms' projects and cash flows are more difficult to value, which leads firms to follow a financing pecking order, exhausting the lowest cost sources of capital first. A positive working capital requirement must be financed.

They expect less transparent firms to have a reduced working capital requirement since firms with greater informational asymmetries typically pay greater rates to borrow. The lagged market-to-book ratio is used as a proxy for the degree of asymmetric information, where market-to-book is defined as the sum of market value of equity and total liabilities minus payables scaled by net assets. We expect an inverse relation between the working capital requirement and the market-to-book ratio.

5.2.3. Capital market access. Creditworthy firms with superior capital market access are more capable of financing the working capital gap externally. Brennan and Hughes (1991) argue that larger firms are covered more intensely by analysts, whose increased monitoring reduces informational asymmetries, implying that larger firms enjoy ready access to capital relative to smaller firms. Since this study examines the determinants of net operating working capital, we emphasize commercial paper issues and bank debt.

While larger firms find it easier to finance relaxed credit and inventory policies, smaller firms are less able to issue commercial papers or negotiate lines of credit. Having fewer ways to finance receivables, smaller firms rely on factoring more than large firms. Whited (1992) finds that larger firms face fewer borrowing constraints than smaller firms because the former have better capital market access. Petersen and Rajan (1997) show that receivables are directly related to size, and they report a weak positive relation between payables and size, but Deloof and Jegers (1999) report that payables are insignificantly related to size.

5.2.4. Market power. The length of trade credit terms is directly related to market power as more valuable customers can negotiate more generous credit terms with suppliers. In addition, firms with greater market share can stretch the credit terms offered by suppliers with little repercussion as contracts with industry leaders are critical to the viability of smaller suppliers. Similarly, strong relationships with vendors allow firms with greater market power to hold fewer inventories. Suppliers with more market power relative to customers can negotiate shorter terms with customers for at least two reasons.

First, the level of competition from rival firms is reduced for firms with large market share, which decreases the likelihood of losing customers over a

reduction in credit terms. Second, suppliers with large market share are more likely to have forged longer relationships with clients, implying high costs of switching suppliers. These switching costs include learning and transactions costs as documented by Kemmerer (1987) and Chevalier and Scharfstein (1996). Molina and Preve (2008) show that, compared to firms in competitive industries, firms in concentrated industries tighten credit policy to a greater extent when facing financial distress.

5.2.5. Financial distress. Distressed firms have limited financial slack and cash generating ability, and the strain of financial distress may cause firms to reduce investment in operating working capital by collecting on receivables, tightening credit terms, liquidating existing inventory, and by stretching credit terms granted by suppliers. Molina and Preve (2008), show that financially distressed firms have significantly reduced levels of trade credit relative to their non-distressed counterparts. We expect the working capital requirement to correlate inversely with financial distress.

Following Molina and Preve (2008), a firm must satisfy two criteria to be classified as financially distressed: the firm must have difficulty covering interest payments and be over-leveraged. The first component is having a coverage ratio, calculated as operating income before depreciation divided by interest expense, less than one for two consecutive years, or less than 0.80 in any given year. Second, a firm is considered over-leveraged if its leverage ratio is in the top two deciles of its industry's leverage ratio in a given year.

6. Previous empirical evidence

Finally, Afza and Nazir (2007) investigated the relationship between the aggressive/conservative working capital policies for seventeen industrial groups and a large sample of 263 public limited companies listed on Karachi Stock Exchange for the period of 1998-2003. Using ANOVA and LSD test, the study found significant differences among their working capital investment and financing policies across different industries. Moreover, rank order correlation confirmed that these significant differences were remarkably stable over the six-year study period. Finally, ordinary least regression analysis found a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies.

In the Pakistani context, Rehman (2006) investigated the impact of working capital management on the profitability of 94 Pakistani firms listed on Islamabad Stock Exchange (ISE) for the period of 1999-2004. He studied the impact of the different variables of working capital management including Average Collection Period, Inventory Turnover in Days, Average Payment Period and Cash Conversion Cycle on the Net Operating Profitability of firms. He concluded that there is a strong negative relationship between above working capital ratios and profitability of firms. Furthermore, managers can create a positive value for the shareholders by reducing the cash conversion cycle up to an optimal level.

Filbeck and Krueger (2005) highlighted the importance of efficient working capital management by analyzing the working capital management policies of 32 non-financial industries in USA. According to their findings, significant differences exist between industries in working capital practices over time. Moreover, these working capital practices, themselves, change significantly within industries over time.

Sathyamoorthi (2002) focused on good corporate governance and in turn effective management of business assets. He observed that more emphasis is given to investment in fixed assets both in management area and research. However, effective management working capital has been receiving little attention and yielding more significant results. He analyzed selected Co-operatives in Botswana for the period of 1993-1997 and concluded that these firms followed an aggressive approach during the whole four-year study period.

Pandey and Parera (1997) provided an empirical evidence of working capital management policies and practices in the private sector manufacturing companies in Sri Lanka. The information and data for the study were gathered through questionnaires and interviews with chief financial officers of a sample of manufacturing companies listed on the Colombo Stock Exchange. They found that most companies in Sri Lanka have informal working capital policy and company size has an influence on the overall working capital policy (formal or informal) and approach (conservative, moderate or aggressive). Moreover, company profitability has an effect on the methods of working capital planning and control.

However, Weinraub and Visscher (1998) have discussed the issue of aggressive and conservative working capital management policies by using quarterly data of US firms for the period of 1984-1993. Their study looked at ten diverse industry groups to examine the relative relationship between their aggressive/conservative working capital policies. The authors have concluded that the industries had distinctive and significantly different working capital management policies. Moreover, the relative nature

of the working capital management policies exhibited remarkable stability over the ten-year study period. The study also showed a high and significant negative correlation between industry asset and liability policies and found that when relatively aggressive working capital asset policies are followed they are balanced by relatively conservative working capital financial policies.

7. Population and sample selection

This study examines empirically the working capital management practices of sampled industrial firms. All firms that have been listed on the Amman Stock Exchange (ASE) during the four-year period, 2004-2007, were sampled. Fifty nine firms qualified to be included in the study sample. The data for the empirical analysis were derived from the financial statements of these firms.

8. Research design and hypotheses

8.1. Specification of the model. The study used aggressive financing policy and aggressive investment policy as measuring variables of working capital management. **Aggressive Investment Policy (AIP)** results in minimal level of investment in current assets versus fixed assets. In contrast, a conservative investment policy places a greater proportion of capital in liquid assets with the opportunity cost of lesser profitability. In order to measure the degree of aggressiveness, following ratio will be used

AIP = Total Current Assets (TCA)/ Total Assets (TA),

where a lower ratio means a relatively aggressive policy.

Aggressive Financing Policy (AFP) utilizes higher levels of current liabilities and less long-term debt. In contrast, a conservative financing policy uses more long-term debt and capital. The degree of aggressiveness of a financing policy adopted by a firm will be measured by:

AFP = Total Current Liabilities (TCL)/ Total Assets (TA),

where a higher ratio means a relatively aggressive policy.

The impact of working capital policies on the profitability will be analyzed through frequently used profitability measures, i.e. Return on Assets (ROA) and Return on Equity (ROE) as well as market measure and Tobin's q by running cross-sectional regressions. The regression models to be estimated are:

$$RO_{it} = \alpha + \beta_1 (TCA/TA_{it}) + \beta_2 (TCL/TA_{it}) + \varepsilon, \quad (1)$$

$$ROE_{it} = \alpha + \beta_1 (TCA/TA_{it}) + \beta_2 (TCL/TA_{it}) + \varepsilon, \quad (2)$$

Tobin's $q_{it} = \alpha + \beta_1 (TCA/TA_{it}) + \beta_2 (TCL/TA_{it}) + \varepsilon, \quad (3)$

where ROA_{it} = Return on Assets of Firm i for time period t; ROE_{it} = Return on Equity of Firm i for time period t; Tobin's q_i = value of q of firm i for time period t; TCA/TA_{it} = Total Current Assets to Total Assets ratio of firm i for time period t;

TCL/TA_{it} = Total Current Liabilities to Total Assets ratio of firm i for time period t; α = intercept; ε = error term of the model.

The impact of the working capital assets management and financing polices on the relative risk will be measured by applying regression models for the risk of the company and its working capital management policies over the period of 2004-2007. The regression equations are:

$$SD_{Sales'} = \alpha + \beta_1 (TCA/TA_i) + \beta_2 (TCL/TA_i) + \varepsilon, \quad (4)$$

$$SD_{ROAi} = \alpha + \beta_1 (TCA/TA_i) + \beta_2 (TCL/TA_i) + \varepsilon, \quad (5)$$

$$SD_{ROEi} = \alpha + \beta_1 (TCA/TA_i) + \beta_2 (TCL/TA_i) + \varepsilon, \quad (6)$$

$$SD_{qi} = \alpha + \beta_1 (TCA/TA_i) + \beta_2 (TCL/TA_i) + \varepsilon, \quad (7)$$

where SD_i = Standard Deviation representing risk of firm i.

9. Data and main empirical results

Equation (1) has been estimated for 59 industrial firms for the period 2004-2007 and results are reported in Table 1. For each year, TCA/TA and TCL/TA ratios have been regressed against ROA values and the five regression models indicating the impact of working capital policies on the profitability of Jordanian firms. The model of t-test and F-values and the SPSS statistics indicate overall best fit of the model. The t-statistics of both TCA/TA and TCL/TA are statistically significant at 1%, 5%, and 10% levels for ROA for all the years except for 2006 and 2007.

The positive coefficient of TCA/TA shows a negative relationship between the degree of investment policy aggressiveness and return on assets. As TCA/TA increases, degree of aggressiveness decreases, and return on assets goes up. Therefore, there is a negative relationship between the relative degree of aggressiveness of working capital investment policies and return on assets. The negative value of β coefficient for TCL/TA also points at the same negative relationship between the aggressiveness of working capital financing policy and return on assets. The higher the TCL/TA ratio, the more aggressive is the financing policy that yields negative return on assets.

Table 1. Regression analysis of working capital policies and return on assets (ROA)

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	.307	2.433(.018**)	-.267	-2.093(.041**)	14.155	.000***
2005	.239	1.860(.068*)	-.052	-.392(.967)	2.019	.142
2006	.198	1.525(133)	.116	.885(.380)	1.406	.254
2007	.195	1.498(.140)	.039	.295(.769)	1.154	.323
2004-2007	.277	3.564(.000***)	-.052	-.798(.426)	8.971	.000***

Note: *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

The results of regression model (2) have been reported in Table 2, where the dependent variable is return on equity having the same independent variable of working capital investment policy and working capital financing policy. As the degree of aggressiveness of working capital policy tends to increase, the returns are likely to decrease. Though, the results are statistically highly impressive which is apparent from the high level of significance of β coefficients and t-values, however, they predict a negative relationship between the degree of aggressiveness of working capital policy and accounting measures of returns.

Table 2. Regression analysis of working capital policies and return on equity (ROE)

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	.269	2.109(.039**)	-.332	-2.656(.010**)	16.357	.000***
2005	.324	2.590(.012**)	-.090	-.681(.499)	4.371	.017**
2006	.265	2.078(.042**)	.062	.472(.639)	2.151	.126
2007	.280	2.199(.032**)	.077	.580(.564)	2.420	.098
2004-2007	.269	4.281(.000***)	-.080	-1.229(.220)	14.071	.000***

Note: *** Significant at 1%, ** Significant at 5%. * Significant at 10%.

To further validate the above-mentioned results, the impact of working capital investment and working capital financing policy on the market returns has also been examined. Tobin's q has been used as a measure of market returns, for each year from 2004 to 2007. q-value greater than 1 indicates the greater perceived value given by investor to the firm. The results of equation (3) have been presented in Table 3: the results reported in the first panel of Table 3 are in accordance with those of Table 1 and Table 2 highlighting that the market returns on Tobin's q are decreasing as the firms are following the aggressive investment policy by keeping low level of current assets. This similarity in the market and accounting returns confirms the notion that investors do not believe in the aggressive approach of working capital management, hence, they don't give any additional value to the firms listed on Amman Stock Exchange.

However, some dissimilarities are found in the relationship between financing policy and Tobin's q. In the years 2005, 2006 and 2007, the relationship between working capital financing policy and Tobin's q is positive, indicating that the higher the degree of aggressiveness of working capital financing policy, the greater the investor's value given to the firm.

Table 3. Regression analysis of working capital policies and Tobin's q

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	.069	2. 520(.050*)	-.024	-.184(.854)	.268	.766
2005	.095	.723(.473)	.166	1.271(.209)	.891	.416
2006	-.074	-.564(.575)	.164	1.152(.216)	3.040	.036**
2007	-.114	-.866(.390)	-.052	-.393(.696)	.370	.692
2004-2007	-.020	-2.306(.080*)	.045	.682(.496)	4.403	*.062

Note: *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Finally, to empirically test the theory of Van-Horne and Wachowicz (2004), impact of working capital policies on risk of the firms has been investigated by regressing the ordinary least square regressions for equations (4)-(7). The risk is measured by the standard deviation of sales and different return measures as operating and financial risk, respectively.

The standard deviation has been estimated over the four years, from 2004 to 2007, and then five regressions have been run for working capital investment and working capital financing policy and results are reported in Tables 4 to 7.

The positive β coefficients of SD_{Sales}, SD_{ROA}, SD_{ROE}, and $SD_{Tobin's q}$ indicate negative relationship between the risk measurements and the working capital investment policy. On the other hand, similar relationship has been found for the working capital financing policy. The increased variation in sales and profitability is attributed to increasing the level of current assets and decreasing the level of current liabilities in the firm. However, these results are not statistically significant except the SD_{ROA}, SD_{ROE} in years 2004, 2005 and in all years from 2004 to 2007 .

In general, there is no statistically significant relationship between the level of current assets and current liabilities and operating and financial risk of Amman industrial firms.

Table 4. Regression analysis of working capital policies and risk
(standard deviation of sales (SD_{Sales}))

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	-.043	-.325(.746)	-.081	-.614(.542)	.185	.831
2005	.017	.125(.901)	-.120	-.910(.367)	.469	.628
2006	-.019	-.140(.889)	.025	.187(.852)	.031	.970
2007	-.007	-.051(.959)	-.138	-1.050(.298)	.620	.542
2004-2007	-.018	-.276(.783)	-.075	-1.144(.254)	.661	.517

Note: *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Table 5. Regression analysis of working capital policies and risk
(standard deviation of return on assets (SD_{ROA}))

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	-.117	-.890(.377)	.509	4.462(.000***)	3.031	.056*
2005	-.147	-1.120(.267)	-.029	-.219(.827)	3.129	.052*
2006	-.120	-.913(.365)	.006	.048(.962)	.422	.658
2007	-.047	-.354(.724)	.045	.341(.734)	.197	.821
2004-2007	-.103	-1.580(.115)	.054	.826(.410)	2.361	.097*

Note: *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Table 6. Regression analysis of working capital policies and risk
(standard deviation of return on equity (SD_{ROE}))

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	-.154	-1.176(.245)	.433	3.625(.001***)	16.881	.000***
2005	-.090	-.679(.500)	.274	2.150(.036**)	.618	.543
2006	-.165	-1.266(.211)	.160	1.222(.227)	1.795	.175
2007	-.150	-1.146(.257)	.058	.439(.662)	1.132	.330
2004-2007	-.138	-2.131(.034**)	.218	3.417(.001***)	12.399	***.000

Note: *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Table 7. Regression analysis of working capital policies and risk
(standard deviation of Tobin's q (SD_q))

Year	Investment policy		Financing policy		Investment policy + financing policy	
	β-coefficient	t-value (sig)	β-coefficient	t-value (sig)	F-value	sig
2004	-.058	-.436(.664)	-.007	-.054(.957)	.112	.894
2005	-.044	-.330(.743)	.055	.416(679)	.182	.834
2006	.119	.905(.369)	-.215	-1.166(.101)	2.039	.140
2007	.072	.547(.587)	.034	.258(.798)	.148	.863
2004-2007	-.009	-.133(.894)	.043	.653(.514)	.288	.755

Note: *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

The results above are in conflict with those of Gardner et al. (1986), and Weinraub & Visscher (1998), but they are in accordance with the findings of Afza and Nazir (2007) and produced negative relationship between the aggressiveness of working capital policies and accounting measures of profitability.

Although the results of all return variables are significant, model (1) produces more broader and consistent results as compared to models (2) and (3) where F-value and β coefficients are highly significant. Market returns (Tobin's q) are slightly less significant in our study which is attributed to the more volatile stock market of Jordan. The Amman Stock Market is said to be heavily overvalued stock market, and hence, the results based on market share price data are more inconsistent. Moreover, results of Tables 4-7 confirm the results of Carpenter and Johnson (1983) in that there is no statistically significant relationship between the working capital levels and the operating and financial risk of the firms.

Conclusion and recommendations

Short-term assets and liabilities are important components of total assets and needs to be carefully analyzed. Management of these short-term assets and liabilities warrants a careful investigation since the working capital management plays an important role in a firm's profitability and risk as well as its value. Efficient management of working capital is a fundamental part of the overall corporate strategy to create the shareholders' value. Firms try to keep an optimal level of working capital that maximizes their value.

In practice, working capital management has become one of the most important issues in the organizations where many financial executives are struggling to identify the basic working capital drivers and the appropriate level of working capital. Consequently, companies can minimize risk and improve the overall performance by understanding the role and drivers of working capital

The study investigated the relative relationship between the aggressive/conservative working capital policies for 59 industrial companies listed on Amman Stock Exchange for the period of 2004-2007.

The impact of aggressive/conservative working capital investment and financing policies has been examined through cross-sectional regression models between working capital policies and profitability as well as risk of the firms. The result indicates a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies. The firms yield negative returns if they follow an aggressive working capital policy.

These results are further validated by examining the impact of aggressive working capital policies on market measures of profitability which was not tested before. The results of Tobin's q were in line with the accounting measures of profitability and produced almost the same results. Moreover, the findings of Carpenter and Johnson (1983) are also confirmed that there is no significant relationship between the aggressiveness/conservativeness of working capital policies of firms and their operating and financial risk.

Using a new measure of profitability, i.e. Tobin's q to estimate the relationship of working capital management and firm returns in Amman, the current study is expected to be a significant contribution to finance literature.

Moreover, theoretical discussion on risk and working capital management has also been tested on the empirical basis in an emerging market of Jordan. Although the results of current study are in contrast to some earlier studies on the issue, yet, this phenomenon may be attributed to the inconsistent and volatile economic conditions of Jordan. The reasons for this contradiction may further be explored in upcoming researches and this topic is left for future.

Finally, the study recommends to address vagaries of generally accepted accounting practices related to unexpected and uncontrollable events or changes in the situation. The success of the event will depend on whether the careful analysis of accounting data of financial statements will be done to gain access to the financial status of firms to try to make a proper assessment and improve the overall performance and risk of the firms.

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