

OWNERSHIP CONCENTRATION AND INVESTMENT SENSITIVITY TO MARKET VALUATION

Ghada Tayem*

Abstract

During the past decade, Jordan has undertaken substantial reforms aiming at restructuring its stock market in order to strengthen its role in promoting investment and allocating capital efficiently. This paper empirically investigates the impact of stock market development on capital investment at the firm level by assessing the investment- q sensitivity. In addition, this paper examines the impact of concentrated ownership, a salient institutional feature of listed Jordanian companies, on the investment- q sensitivity. The findings of this study indicate that investments by Jordanian firms respond significantly and positively to market signals. Furthermore, the results show that a company responds more efficiently to market signals as ownership concentration increases.

Keywords: Jordan, Investment Efficiency, Tobin Q, Concentrated Ownership, Largest Shareholder

Jel Classification: G31, G34

* Assistant Professor in Finance. The University of Jordan, School of Business, Amman 11942, Jordan

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1. Introduction

The allocation of capital to its most productive investment uses is a fundamental question in corporate finance (Stein, 2003). However, the role of the stock market in this allocation process has been long debated.^[1] According to Tobin's (1969) q theory of investment and its extension by Hayashi (1982), a firm's investment is directly related to stock market valuation of that firm. Firms with high market valuation to replacement cost, a proxy of marginal q , respond by increasing their investment. This link between investment and stock market valuation implies that insiders learn *new* information from the stock market about a firm's growth opportunities. Theoretical literature suggests that the stock market plays an important role in aggregating information not known to insiders from outside investors and hence managers can learn new information about their own firms from the stock price (Dow and Gorton, 1995, Subrahmanyam and Titman, 1999). For example, external investors are likely to have access to critical information not available to insiders about customer demand for firm's products and competition with other firms (Chen et al., 2007). Therefore, under this theoretical framework, stock prices can serve as a useful signal that aids insiders in mobilizing capital towards the most value adding investment

opportunities. Recent empirical evidence supports this notion, as for example, Chen et al. (2007) shows that investment- q sensitivity improves as stock price informativeness increases.

The above argument, nonetheless, assumes that ownership structure is irrelevant in the process of learning from the stock price. However, Jiang et al. (2011) argue that the pyramid ownership structure of East Asian companies can affect the investment- q sensitivity. According to the authors, control-ownership wedge allows for sizeable divergence between voting and cash flow rights and hence gives controlling shareholders incentives to extract private benefits at the expense of minority shareholders. Jiang et al. (2011) find that companies with larger control-ownership wedge are more likely to ignore signals from the stock price, which in turn weakens the investment- q sensitivity. In addition, Andres (2011) studies family ownership of listed German companies and report that the investment- q sensitivity is significant only for family firms. This study complements this literature by examining the influence of other aspects of ownership structure, namely the degree of concentrated ownership and the ownership of the largest shareholder, on strengthening/attenuating the link between market valuation and a firm's capital investments.

Jordanian companies listed in the Amman Stock Exchange (ASE) are mostly characterized by highly concentrated ownership structures. In this context, it is

¹ This point is discussed in more details in Section 2.

difficult to gauge the propensity of companies with highly concentrated ownership to listen to the market. On one hand, concentrated ownership allows shareholders with large ownership stake to exercise control over the firm. This is especially true for Jordanian firms where the largest shareholder typically assumes the responsibilities of the Chairman of the Board and/or the CEO (Abdel-Halim and Bino, 2013). Hence, in the case of Jordan the largest shareholder becomes effectively an insider. Therefore, large shareholders have incentives and discretionary power to extract private benefits in the form of sub-optimal investment which weakens their propensity to learn from the market and attenuates the investment- q sensitivity.^[2] Conversely, and similar to Jensen and Meckling (1976), as ownership stake of shareholders increases, private benefits of sub-optimal investment may not exceed benefits of efficient investment and hence the investment- q sensitivity is strengthened as ownership increases. In this study, therefore, we resort to empirical findings to resolve the differential nature of investment sensitivity to stock price that arises from concentrated ownership.

Examining the investment behavior in Jordan is interesting for several reasons. First: there are few studies that link the analysis of investment- q sensitivity to aspects of corporate governance.^[3] For example, Jaing et al. (2011) examine the case of six East Asian countries characterized by pyramid ownership structures that give rise to divergence between voting and cash flow rights and hence agency problems between insiders and minority shareholders. However, Jordanian companies are characterized by concentrated ownership with largest shareholders exerting control over the firm, a structure that can align the interests of large shareholders with those of the firm. Andres (2011) examines the case of family businesses in Germany, however, his study focuses mainly on the investment cash flow sensitivity and pays only little attention to the investment- q sensitivity. Second: there is little known about the behavior of investment in the context of small emerging economies, such as Jordan. Most studies focus on the US and other well-established markets. However, there is large disparity of capital expenditures among economies. For example, the mean (median) for the change in net fixed assets scaled by capital and book assets for Jordanian listed

industrial companies are 0.009 (-0.007) and 0.004 (-.024) respectively. Conversely, the mean (median) for the change in net fixed assets scaled by total assets reported in Jaing et al. (2011) for six East Asian markets is 0.038 (0.012) and the mean for the ratio of capital expenditures scaled by net fixed assets reported in Andres (2011) for Germany is 0.255.^[4] The disparity of capital expenditures calls for greater attention to the investment behavior of small emerging economies.

Third: the study of the investment behavior and the role played by the stock market in enhancing investment efficiency has far reaching implications for emerging markets. The last two decades have witnessed unprecedented growth in equity markets globally as many countries progressed to market-based economy, with Jordan being no exception. Jordan officially launched its economic reforms in 1989 in response to a severe economic crisis (Harrigan et al., 2006). However, it was not until the end of the 1990s that Jordan took serious steps to reform and liberalize its economy (Harrigan et al., 2006). The economic reform consists of plans aimed at strengthening the private sector and limiting the role of the public sector in economic activities with the Jordanian stock market being in the heart of these reforms. Securities Law of 1997 was enacted under which the stock market was restructured to include three distinct institutions: Amman Stock Exchange (ASE); Securities Depository Centre (SDC); and the supervisory body Jordan Securities Commission (JSC). In addition, electronic trading, settlement and clearing systems were introduced and the Securities Law of 1997 was supplemented with numerous by-laws and regulations adhering to corporate governance best practice (Zeitun, 2006, Kanaan and Kardoosh, 2005). Therefore, it is important to evaluate the success of equity markets of emerging economies in enhancing investment efficiency.

Using a q theory framework, this study documents a positive and significant impact of stock market valuation on a firm's investment decisions. The results show that capital expenditures of industrial companies listed in the ASE are positively related to stock market signals as captured in average Q . In addition, the results show that concentrated ownership strengthens the impact of investment- q sensitivity. Using alternatives measures of concentrated ownership, including the sum of the largest three shareholders and the percentage and existence of a large shareholder, I find that the interaction term between concentrated ownership and stock market valuation is positive and significant. This result indicates that greater ownership stakes increase the propensity of the firm to listen to the market. On a closer examination, the results show that there is a

² In Jensen (1986), managers with free cash flows have incentives and abilities to overinvest as it increases their personal utility.

³ It is important to note, though, that the link between investment-cash flow sensitivity and corporate governance has been extensively examined. For example, Wei and Zhang (2008) find that for listed companies in eight East Asian countries investment cash flow sensitivity increases as the degree of the divergence between control and cash-flow rights increases. Andres (2011) finds that family businesses in Germany are less sensitive to internal cash flows. Pawlina and Renneboog (2005) find that outside blockholders in UK companies reduce the cash flow sensitivity of investment via effective monitoring. Other contributions include Goergen and Renneboog (2001) for the UK, Gugler (2003) for Austria and Haid and Weigand (2001) for Germany.

⁴ The choice to report the fixed assets ratios from Jiang et al. (2011) and Andres (2011) is because these two studies are the closest to this paper. Similar conclusion can be drawn from other studies that examine the investment behavior.

positive and significant influence of ownership on a firm's investment- q sensitivity in the ownership range beyond 20% and insignificant influence below that bound. These results imply that, when largest shareholders own a small stake, and in the absence of other effective corporate governance and market discipline mechanisms, there is little incentive for the firm to follow market signals.⁵ However, when ownership stakes increase, largest shareholders are subject to a larger share of the costs of squandering corporate wealth (Jensen and Meckling, 1976) and therefore their propensity to listen to the market increases. This explanation is consistent with arguments from studies on the impact of insider ownership on investment behavior where they find that for some range of ownership there is an alignment effect between the interests of insiders and shareholders (Morck et al., 1988, Cho, 1998, Pawlina and Renneboog, 2005).

The remainder of this article is organized as follows. The next section contains a short review of related literature. Section 3 reviews the q theory of investment and the econometric specifications. Section 4 provides information on the construction of the dataset, variable definitions and descriptive statistics. Section 5 presents the regression analysis and section 6 concludes the paper.

2. Stock Markets, Investment, and Ownership

The stock market is important to an economy in insuring investors against idiosyncratic risk, disseminating more information about investment projects, exerting corporate governance, and hence raising the rate of return to economy wide investment (Holmstrom and Tirole, 1993, Atje and Jovanovic, 1993, Levine and Zervos, 1996). Indeed, empirical studies find a positive impact of stock market development on economic growth using pooled cross-country analysis (Levine and Zervos, 1996, Levine and Zervos, 1998, Arestis et al., 2001, Beck and Levine, 2004, Ndikumana, 2005). One important area of this literature is concerned with investigating the role of the stock market in allocating investment efficiently. The seminal work by Barro (1990) examines the relation between market valuation using index returns on private domestic investment in the US over the period 1891-1987 and documents a significant impact of market returns on investment. Similarly, Henry (2000) finds that the growth rate of private domestic investment for eleven developing countries that liberalized their stock market has increased significantly following stock market liberalization.

⁵ It is well documented that emerging markets in general have weak legal protection rights (La Porta et al., 1999, La Porta et al., 2000) and higher levels of insider trading, price and market manipulation and false disclosure (Cumming et al., 2011) which makes it reasonable to conclude that effective corporate governance and market discipline mechanisms in Jordan are weak.

However, as Samuel (1998) points out investigating investment at the firm level is more appropriate given that investment decisions are made at the firm level. Moreover, Morck et al. (1990) note that the stock market is likely to play a role in allocating investments across sectors and firms more than over time, which renders the study of investment at a firm level more relevant. At the heart of the link between market valuation and investment at the firm level is the question on whether insiders learn new information from external investors through signals contained in the stock price. This question has been long-debated as external investors have smaller information sets about firm's investment opportunities than managers and therefore managers can safely ignore stock market movements (Morck et al., 1990). However, theoretical models in Dow and Gorton (1995) and Subrahmanyam and Titman (1999) show that the stock price contains new information that is aggregated from external investors and hence managers can improve their investment decisions by observing stock-price movements.

The empirical evidence documented in Morck et al. (1990) shows that for US non-financial firms there is a weak influence of stock return on firm level investment which suggests that the stock market is not central for firm-level investments. This finding is reinforced in Samuel (1998) where he finds that a q model performs relatively poor to other investment models in explaining US capital expenditures. However, Chen, Goldstein, and Jiang (2006) examine the connection between the sensitivity of investment to Tobin's q and find that the investment- q sensitivity increases when measures of external information embedded in the stock price improve. This result, according to the authors, indicates that managers learn new information from stock prices when they make investment decisions. Luo (2005) arrives at a similar conclusion by looking at merger deal completion where the author finds that returns on merger announcements successfully predict deal completion. The evidence from Arab countries on investment- q sensitivity is rare. In Bolbol and Omran (2005) the authors examine firms from five Arab countries and find no evidence that stock return is related to investment. Their evidence, however, is based on a small number of firms (83 firms from five countries). Therefore, this study aims to complement the international evidence by thoroughly examining the investment- q sensitivity in the context of Jordan, a small emerging market.

3. Methodology: Economic Model and Estimation Specifications

To answer the questions of this study I utilize Tobin's q theory of investment (Tobin, 1969). The advantage of this theory is that it incorporates future expected profits and hence links market valuation of the firm to its investment decision. The q theory is derived from a

profit maximization function that includes real rental price of capital (that is the price of output relative to the price of investment goods) and costs of adjustment (such as costs of installation and training). The first order condition of this function yields the following equation:

$$(I_t/K_t) = f(q_t) \quad (1)$$

where I is firm's investment in period t ; K is the capital stock; and q is the marginal q defined as the increase in market value due to having an additional unit of capital. According to the definition of marginal q , it is optimal for a firm to invest when q exceeds 1. One main problem with estimating Equation 1 is that q is not observed since it is a marginal amount. However, in his seminal work, Hayashi (1982) shows that under certain assumptions, average Q can be used as a proxy of marginal q , where Q is the current market value of the firm divided by the replacement cost of the firm's capital. Hence, Equation 1 is modified as a linear function of average Q :

$$(I_t/K_t) = a + bQ_t + e_t \quad (2)$$

This study defines Q as the ratio between the sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. However, many empirical studies document that Q alone fails to fully explain the behavior of a firm's investment due to the existence of capital market frictions that cause firms in the real world to deviate from the optimal investment behavior (see Stein, 2003 for a comprehensive review). Early studies have focused on the impact of liquidity constraints and financing frictions on a firm's investment behavior (Fazzari et al., 1988, Hubbard, 1997, Kaplan and Zingales, 1997). Financial constraints relates to the differential cost between internal and external financing, with a premium required on external financing. This has the effect of a constraining a firm's ability to utilize all of its investment opportunities. In addition, recent empirical studies document evidence that a firm's financial leverage determines in part its investment (Aivazian et al., 2005). The number of employees is included as a proxy for a firm's size and is expected to be negatively correlated with the firm's investment (Shanmugam and Bhaduri, 2002). Finally, I include the current ratio to capture a firm's liquidity position (Xiao, 2009). Therefore, equation 2 is modified to include a vector of control variables as follows:

$$\left(\frac{I_{it}}{K_{it}}\right) = \lambda Q_{it-1} + \sum_j^1 \delta_j X_{jit-1} + v_i + \tau_t + u_{it} \quad (3)$$

where X_{jit} is a vector of control variables defined as follows. *CashFlow* is the ratio between EBIT to its capital. *Employees* are the logarithm of the number of total employees. Firms included in the analysis are the ones with 10 employees or more. *DebtRatio* is the

ratio between total liabilities to total assets. *Liquidity* is the ratio between current assets to total assets. Also, the specification in equation 3 includes firm effects to control for unobserved firm heterogeneity (Bond and Meghir, 1994) and time fixed effects in order to account for macroeconomic conditions (Xiao, 2009). Finally, the specification uses one period lag for all control variables since an investment decision at time t is likely to be influenced by information available at the beginning of the period (Xiao, 2009). Using lagged explanatory variable has the added benefit of alleviating endogeneity.

This study main question relates to the impact of ownership structure on a firm's investment decision. Following Claessens et al. (2000) I include *Large3* which is the total ownership of the largest three shareholders owning 5% or more of a company (I vary the 5% cut-off in the robustness checks). In addition, I examine the impact of the largest shareholder *Largest*, defined as the percentage ownership of the largest shareholder, on a firm's investment decision. I also consider a third ownership measure, *LargestDum*, which is an indicator variable that takes the value of one if a firm has a largest shareholder with an ownership of 20% or more and zero otherwise. Furthermore, the variables *Large3*, *Largest*, and *LargestDum* are interacted, respectively, with the variable Q in order to examine the impact of a firm's ownership structure on investment efficiency (if any). To accounts for the influence of ownership structure on a firm's decision to invest, I modify Equation 3 to include a vector of the previously discussed variables:

$$\left(\frac{I_{it}}{K_{it}}\right) = \lambda Q_{it-1} + \sum_j^1 \delta_j X_{jit-1} + \sum_k^1 \gamma_k OWN_{kit-1} + v_i + \tau_t + u_{it} \quad (4)$$

Lastly, I make a final adjustment to equation 4. I include a lagged term of I/K in Equation 4 to account for a firm's dynamic adjustment towards an optimal capital level, that is a firm's adjustment of investment spending until it reaches an optimal level of capital (Devereux and Schiantarelli, 1990, Bond and Meghir, 1994). Therefore equation 4 is adjusted to include a lagged dependent variable:

$$\left(\frac{I_{it}}{K_{it}}\right) = \beta \left(\frac{I_{it-1}}{K_{it-1}}\right) + \lambda Q_{it-1} + \sum_j^1 \delta_j X_{jit-1} + \sum_k^1 \gamma_k OWN_{kit-1} + v_i + \tau_t + u_{it} \quad (5)$$

However, when a lagged dependent variable is included as a control variable, the lagged dependent variable becomes correlated with the error term, u_{it} . Therefore, estimating equations 5 in static form using standard panel data techniques leads to biased and inconsistent estimators. In order to overcome this

problem, equation 5 is first differenced to eliminate the fixed effects. Then, an instrumental variable approach is used to estimate the dynamic panel in equation 5 (Anderson and Hsiao, 1981, Arellano and Bond, 1991).

4. Data and Summary Statistics

This study utilizes firm-level data on companies listed in the ASE during the period 2002-2011. Financial firms are excluded from the sample because their financial data and nature of investment is very different from nonfinancial firms. Furthermore, service companies are excluded because they rely heavily on labour and they have small incremental changes in their fixed assets base. For each year during the study period I collected data on listed companies for that year. Major databases provide data only on a small number of large listed Jordanian companies, therefore, the financial data used in this study is hand-collected from the annual Corporate Guide published by the ASE. The ownership data is collected from the annual Corporate Guides for the period 2002-2007 and from the companies' financial statements for the period 2008-2011. Jordanian

Securities Commission requires listed companies to disclose equity holdings of 5% and more. Data is disregarded for reasons of consistency in case a company reports shareholdings less than 5%.

Table 1 shows summary statistics for the sample used in the study. The number of observations for all variables is 610 representing 84 companies. However, the number of observations on ownership data is 517 representing 78 companies. The loss of ownership data is due to the unavailability of recorded data in the Corporate Guides or the unavailability of a company's annual report(s). The primary variables of interest in this study are Q and the ownership variables: *Largest*, *Largest3* and *Largest5*. On average Q is above 1 with a value of 1.28 and its median is also above 1 with a value of 1.123. The mean (median) of equity holdings of the largest shareholder is 28% (22%), while the sum of equity holdings of the largest three and the largest five shareholders are 48% (46%) and 54% (57%) respectively. These figures indicate that the average equity holding stakes of Jordanian investors are large enough to induce an interest in the investment activities of the company.

Table 1. Summary Statistics

Table 1 reports descriptive statistics for a sample of industrial Jordanian firms listed in the ASE over the period 2002-2011. Industries are based on the ASE classification. Q is the sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. *Concentrated Ownership* is the total ownership percentage of shareholders owning 5% and more. *Large5* is the total ownership percentage of the largest five shareholders owning 5% and more. *Large3* is the total ownership percentage of the largest three shareholders owning 5% and more. *Largest* is the total ownership percentage of the largest shareholder owning 5% and more. *CashFlow* is the ratio between EBIT to its capital. *Employees* is the logarithm of the number of total employees. Firms included in the analysis are the ones with 10 employees or more. *DebtRatio* is the ratio between total liabilities to total assets. *Liquidity* is the ratio between current assets to total assets.

	Mean	Median	SD	Min	Max	Skewness	Kurtosis
Fixed Assets (Million JDs)	14.800	4.538	-	0.113	252.000	4.029	21.376
(ln) Fixed Assets	15.401	15.328	1.431	11.632	19.345	0.226	3.300
Change in Fixed Assets to Total Assets	0.009	-0.007	0.089	-0.442	0.631	2.364	18.779
Change in Fixed Assets to Capital	0.044	-0.024	0.254	-0.536	1.651	2.835	14.963
Market to Book Ratio (Q)	1.281	1.128	0.581	0.300	3.904	1.618	6.109
Concentrated Ownership	54.396	57.850	22.400	0	98.5	-0.322	2.372
Total Ownership of Largest 5 (<i>Large5</i>)	53.679	57.140	22.132	0	98.5	-0.279	2.393
Total Ownership of Largest 3 (<i>Large3</i>)	47.891	46.220	21.188	0	98.5	0.148	2.419
Largest Owner (<i>Largest</i>)	28.308	22.600	18.500	0	98.5	1.543	5.725
Cash Flow (<i>CashFlow</i>)	0.309	0.135	1.083	-1.342	10.647	6.979	58.619
Book Assets (Million JDs)	48.100	12.700	-	0.626	873.000	3.877	19.821
(ln) Book Assets	16.544	16.355	1.353	13.347	20.588	0.715	3.499
Number of Employees	380.2443	150	745.430	10	4786	3.733	17.217
(ln) Number of Employees (<i>Employees</i>)	5.067	5.011	1.237	2.302	8.473	0.240	3.976
Debt Ratio (<i>DebtRatio</i>)	0.345	0.315	0.218	0.009	0.945	0.657	2.789
Current Ratio (<i>Liquidity</i>)	2.834	1.941	2.538	0.120	18.05	2.342	9.921

Table 2 reports the correlation matrix between the key variables used in the study. As predicted, Q is positively and significantly correlated with the investment measure at the 5% significance level. The

ownership variables (*Large3* and *Largest*) are not significantly correlated with the investment measure. This study does not make predictions on the relation between a firm's investment spending and its

ownership structure, since investment spending does not reflect spending efficiency. The variable *CashFlow* is positively and significantly related to the investment measure, a result that is also confirmed in the regression analysis. Other notable observation is the positive and significant correlation between

ownership variables (*Large3* and *Largest*) and *Q*. This indicates that firms with larger ownership concentration have larger investment opportunities.

Table 2. Correlation Matrix

Table 2 presents the correlation between the variables used in the study. The sample consists of industrial Jordanian firms listed in the ASE over the period 2002-2011. Industries are based on the ASE classification. *Q* is the ratio between sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. *Large3* is the total ownership percentage of the largest three shareholders owning 5% and more. *Largest* is the total ownership percentage of the largest shareholder owning 5% and more. *LargestDum* is an indicator variable that takes the value of one if the firm's largest shareholder owns 20% and more and zero otherwise. *CashFlow* is the ratio between EBIT to its capital. *Employees* is the logarithm of the number of total employees. *DebtRatio* is the ratio between total liabilities to total assets. *Liquidity* is the ratio between current assets to total assets. *p*-values are in parentheses.

	I/K	Large3	Largest	Largest -Dum	Q	CashFlow	Employees	DebtRatio	Liquidity
I/K	1								
Large3	0.058 (0.189)	1							
Largest	0.005 (0.912)	0.865 (0.000)	1						
LargestDum	0.048 (0.271)	0.761 (0.000)	0.659 (0.000)	1					
Q	0.101 (0.012)	0.239 (0.000)	0.172 (0.000)	0.166 (0.000)	1				
CashFlow	0.115 (0.004)	-0.035 (0.422)	-0.051 (0.246)	0.030 (0.497)	0.016 (0.691)	1			
Employees	0.064 (0.112)	0.090 (0.040)	0.096 (0.029)	0.015 (0.735)	0.127 (0.002)	0.002 (0.960)	1		
DebtRatio	0.085 (0.036)	0.019 (0.658)	-0.008 (0.862)	0.070 (0.113)	-0.089 (0.026)	-0.160 (0.000)	0.315 (0.000)	1	
Liquidity	-0.042 (0.298)	-0.039 (0.370)	-0.087 (0.046)	-0.100 (0.022)	0.035 (0.384)	0.199 (0.000)	-0.192 (0.000)	-0.579 (0.000)	1

Table 3. Investment Efficiency – Base Model

Table 3 reports estimation results for testing equations 4 and 5. Panel I reports the estimation results of regressing Q on investment to capital ratio, while Panel II reports the estimation results that include Q and other control variables. The sample consists of industrial Jordanian firms listed in the ASE over the period 2002-2011. Industries are based on the ASE classification. Q is the ratio between sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. $CashFlow$ is the ratio between EBIT to its capital. $Employees$ is the logarithm of the number of total employees. $DebtRatio$ is the ratio between total liabilities to total assets. $Liquidity$ is the ratio between current assets to total assets. t -statistics (alternatively z -statistics) are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% respectively.

	Column 1 OLS	Column 2 Fixed Effects	Column 3 Arellano-Bond
Panel I			
I/K_{t-1}	-	-	-0.015 (-0.23)
Q	0.049 (1.65) *	0.091 (2.45)**	0.187(1.72)*
Time Effects	Yes	Yes	Yes
Observations	610	610	358
Sargan Test (Chi^2)	-	-	68.784
Arellano-Bond test (z)	-	-	-0.914
Panel II			
I/K_{t-1}	-	-	-0.067 (-1.02)
Q	0.051 (1.78) *	0.081 (2.36) *	0.186 (1.76)*
CashFlow	0.020 (3.11) ***	0.047 (6.81) ***	0.043 (3.43)***
Employees	0.006 (0.63)	-0.005 (-0.17)	-0.067 (-1.14)
DebtRatio	0.016 (0.83)	0.019 (0.50)	0.053 (0.91)
Liquidity	-0.021 (-0.88)	0.028 (0.86)	0.052 (1.10)
Time Effects	Yes	Yes	Yes
Observations	610	610	355
Sargan Test (Chi^2)	-	-	68.673
Arellano-Bond test (z)	-	-	-0.398

5. Data Analysis and Results

The analysis starts by estimating equations 4 and 5 without including ownership variables. The results are reported in Table 3. Panel I reports the estimation results of regressing Q on investment to capital ratio in order to capture the stand alone impact of Q on investment, while Panel II reports the estimation results that include Q and other control variables. Columns 1, 2 and 3 report the estimation results using pooled OLS, firm fixed effects, and Arellano-Bond first differenced dynamic panel respectively. All estimations use robust standard errors and include time fixed effects. The results show that the impact of Q on a firm's capital expenditures is positive and statistically significant in all estimations. This result indicates that investment spending of listed Jordanian companies responds positively and significantly to stock market valuation. In terms of the magnitude of the coefficient, and based on the static fixed effects estimator, an increase in Q by one standard deviation is associated with 4.7% increase in investment to capital ratio. Other variables do not have a statistically significant impact on the investment to capital ratio except for cash flow. The sign on the coefficient of cash flow is positive and is statistically significant in all estimations, indicating that industrial firms listed in the ASE can be financially constrained. However, the coefficients on *Employees*, *DebtRatio* and *Liquidity* are not significant.

In order to account for any possible adjustment effect, the model includes the lagged dependent variable as a predictor. To estimate the dynamic panel, this study applies the Arellano-Bond first difference model. The results are presented in column 3. The sign on the coefficient of the lagged dependent variable has the negative predicted sign but is statistically insignificant. This result indicates that there is no adjustment effect on investment among industrial firms listed on the ASE. In addition, the signs and significance of the base-model variables are stable. For example, the coefficients on Q and cash flow have their expected positive sign and are statistically significant, while the coefficients on *Employees*, *DebtRatio* and *Liquidity* are not significant. Because the results of the Arellano-Bond first difference model suggests that there is no significant adjustment effect, further estimations will not include the lagged I/K as a predictor. Therefore, further analysis will report the estimation results using the fixed effects model.^[6]

The main purpose of this study is to explore the effect of concentrated ownership on the propensity of a firm to respond positively to market valuation, Tobin's q . This study applies two operational definitions of ownership concentration. The first definition focuses on the sum of ownership of the largest three investors owning above 5% of equity

capital and the second measures ownership of the largest shareholder (Demsetz and Lehn, 1985, Demsetz and Villalonga, 2001).^[7] In order to test the impact of ownership concentration on a firm's propensity to listen to the market, the estimation includes the interaction between ownership measures with Q . A negative sign on the interaction term supports an expropriation effect. Largest shareholders extract private benefits in the form of sub-optimal investment which weakens their propensity to learn from the market and attenuates the investment- q sensitivity. A positive sign, however, supports an alignment effect. As ownership stake of shareholders increases, private benefits of sub-optimal investment may not exceed benefits of efficient investment and hence the investment- q sensitivity is strengthened as ownership increases.

Table 4 reports the results of estimating equation 3 including *Large3* and *Largest* as regressors and their respective interactions with Q , *Large3*Q* and *Largest*Q*. The signs and significance of the base-model variables are stable compared to the estimation results reported in Table 3. The coefficient on *CashFlow* has its expected positive sign and is statistically significant, while the coefficients on *Employees*, *DebtRatio* and *Liquidity* are not significant. The coefficients on Q and the interaction terms *Large3*Q* and *Largest*Q* are positive and significant. The results show that the impact of Q on investment to capital ratio is given by $.077 + .0026*Large3$ in case of using the ownership of the largest three shareholders and by $.061 + .005*Large3$ in case of using the ownership of the largest shareholder. Taking the case of the ownership of the largest shareholder, a company with a second quartile largest shareholder ownership has a total Q effect over investment of .143 ($.061 + .005*16.47$), while a company with a median largest shareholder ownership has a total Q effect of .183 ($.061 + .005*24.47$). This result indicates that the propensity of an industrial company listed in the ASE to listen to the market increases with the percentage of ownership of the largest shareholder.

⁶ The results of estimations using the lagged I/K as a predictor are qualitatively similar to the ones reported in Tables 4 and 5.

⁷ The results are robust when the sum of the largest five shareholders owning 5% and more is used. It is also robust to the use of the 10% cut-off point instead of the 5%.

Table 4. Ownership Concentration and Investment Efficiency

Table 4 reports estimation results for testing the differential impacts of ownership concentration on investment efficiency using two alternative definitions of ownership concentration: *Large3* and *Largest*. The sample consists of industrial firms listed in the ASE over the period 2002-2011. Industries are based on the ASE classification. *Q* is the ratio between sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. *Large3* is the total ownership percentage of the largest three shareholders owning 5% and more. *Largest* is the total ownership percentage of the largest shareholder owning 5% and more. *CashFlow* is the ratio between EBIT to its capital. *Employees* are the logarithm of the number of total employees. *DebtRatio* is the ratio between total liabilities to total assets. *Liquidity* is the ratio between current assets to total assets. *T-statistics* are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% respectively.

	Model 1	Model 2
Q	0.077 (1.98)*	0.061 (1.79)*
Large3	0.002 (1.44)	-
Q*Large3	0.003 (1.74)*	-
Largest	-	0.000 (-0.25)
Q*Largest	-	0.005 (1.76)*
CashFlow	0.044 (6.92)***	0.046 (7.22) ***
Employees	-0.005 (-0.15)	-0.001 (-0.04)
DebtRatio	-0.002 (-0.05)	0.001 (0.03)
Liquidity	0.038 (1.17)	0.038 (1.12)
Time Effects	Yes	Yes
Observations	517	517

The positive sign on the interaction terms *Large3*Q* and *Largest*Q* lend support to the alignment effect. Largest shareholder with high ownership stakes are subject to a larger share of the costs of sub-optimal investment and hence are more likely to invest efficiently. To further analyze the impact of large shareholding on investment-*q* sensitivity, I split the sample into two subsamples based on two cut-offs 10% and 20% ownership. These two cut-offs are well-accepted in the literature as representing control interest in the company (see for

example La Porta et al., 1999). I report results based on the ownership of the largest shareholder in Table 5. The results show that for firms with a large shareholder owning 10% (alternatively 20%) or less *Q* do not have a significant impact on ownership, while firms with a large shareholder owning above 10% (alternatively 20%) *Q* have positive and significant impact on investment. These results indicate that the positive incremental impact of ownership on investment-*q* sensitivity is present only in firms with large ownership.

Table 5. Ownership Concentration and Investment Efficiency by Ownership Percentage

Table 5 reports estimation results for estimating equation 4 sub-samples divided based on ownership percentages. The sample consists of industrial Jordanian firms listed in the ASE over the period 2002-2011. Industries are based on the ASE classification. Q is the ratio between sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. $CashFlow$ is the ratio between EBIT to its capital. $Employees$ is the logarithm of the number of total employees. $DebtRatio$ is the ratio between total liabilities to total assets. $Liquidity$ is the ratio between current assets to total assets. T -statistics are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% respectively.

	10% Ownership		20% Ownership	
	Below 10%	Above 10%	Below 20%	Above 20%
Q	-0.109 (-0.92)	0.124 (2.77)***	-0.044 (-0.72)	0.206 (2.94)***
CashFlow	0.024 (0.39)	0.045 (6.97)***	-0.027 (-0.49)	0.032 (3.06)***
Employees	0.011 (0.74)	-0.024 (-0.51)	0.021 (0.84)	-0.130 (-3.27)***
DebtRatio	0.139 (1.95) *	-0.023 (-0.51)	0.020 (0.25)	0.091 (1.38)
Liquidity	0.114 (1.33)	0.039 (1.24)	0.090 (1.27)	0.048 (1.34)
Time Effects	Yes	Yes	Yes	Yes
Observations	77	440	208	309

To test the significance of the differential impact of ownership level on Q , this study creates an indicator variable, $LargestDum$, that takes the value of zero if the firm's largest shareholder owns less than 20% and one otherwise. This variable is interacted with Q to create the interaction term $LargestDum*Q$. The results are reported in Table 6. Column 1 reports the estimation results of the main variable of interest and shows that the impact of Q in firms with an ownership

stake less than 20% for the large owner is positive but statistically insignificant. However, the impact of Q in firms with an ownership stake more than 20% for the large owner is positive and statistically significant. Columns 2 and 3 reports the estimation results with the set of control variables and using fixed effects and Arellano-Bond model respectively. The results are consistent with the ones reported in Column 1.

Table 6. Ownership Concentration and Investment Efficiency – Extended Model

Table 6 reports estimation results for testing the differential impacts of ownership concentration on investment efficiency using two alternative estimation methods: Fixed Effects and Arellano-Bond dynamic panel. The sample consists of industrial firms listed in the ASE over the period 2002-2011. Industries are based on the ASE classification. Q is the ratio between sum of the market value of a firm's equity and the book value of its liabilities divided by the book value of a firm's assets. $LargestDum$ is an indicator variable that takes the value of one if the firm's largest shareholder owns 20% and more and zero otherwise. $CashFlow$ is the ratio between EBIT to its capital. $Employees$ are the logarithm of the number of total employees. $DebtRatio$ is the ratio between total liabilities to total assets. $Liquidity$ is the ratio between current assets to total assets. T -statistics (alternatively z -statistics) are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% respectively.

	Model 1 Fixed Effects	Model 2 Arellano-Bond
I/K_{t-1}	-	-0.094 (-1.48)
Q	0.008 (0.20)	-0.087 (-0.84)
$LargestDum$	0.044 (1.46)	-0.131 (-1.82)*
$Q*LargestDum$	0.138 (2.42)**	0.298 (2.47)**
$CashFlow$	0.044 (6.63)***	0.047 (3.94)***
$Employees$	-0.009 (-0.31)	-0.031 (-0.65)
$DebtRatio$	-0.002 (-0.05)	0.083 (1.57)
$Liquidity$	0.040 (1.23)	0.081 (1.83)*
Time Effects	Yes	Yes
Observations	517	335
Sargan Test (Chi^2)	-	136.131
Arellano-Bond test (z)	-	-0.066

Conclusion

This article investigates the investment behavior of Jordanian companies listed in the ASE with a focus on the impact of ownership concentration on attenuating/strengthening the investment- q sensitivity. Concentrated ownership along with the possibility of assuming management responsibilities allow large shareholders to exercise control over the firm. Therefore, large shareholders have incentives and abilities to extract private benefits in the form of sub-optimal investment which weakens their propensity to listen to the market and hence attenuates the investment- q sensitivity. In contrast, the costs relative to the benefits of maximizing private benefits and wasting cash flows on sub-optimal investment are increasing in percentage of equity holding. Therefore, the investment- q sensitivity is strengthened as ownership increases

In this study, I address these competing predictions by using a q theory framework applied on

a sample of listed Jordanian companies for the period from 2002 until 2011. Base model results indicate that listed firms respond to signals from the market regarding their investment opportunities. The propensity to listen to the market increases with ownership concentration. In addition, using subsamples the results show that there is a positive and significant influence of ownership on a firm's investment- q sensitivity in the ownership range beyond 20% and insignificant influence below that bound. These results imply that, when largest shareholders own a small stake, and in the absence of other effective corporate governance and market discipline mechanisms, there is little incentive for the largest shareholder to follow market signals. However, when ownership stakes increase, largest shareholders are subject to a larger share of the costs of squandering corporate wealth and therefore their propensity to listen to the market increases.

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