FINANCIAL CONSTRAINTS, CAPITAL STRUCTURE AND

DIVIDEND POLICY: EVIDENCE FROM JORDAN

A THESIS SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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ABSTRACT

The economic reforms in Jordan during the last two decades have highlighted and promoted the role that non-financial firms play within the Jordanian economy. The ability of firms to play this role is in major part determined by the structure of the financial system in which they operate, and in particular whether this financial system is able to make capital available efficiently to those firms that need it. Whether this is the case can be investigated by analysing the impact of firm characteristics on some of the most important financial decisions taken by these firms, and how these decisions are influenced by the presence of market imperfections.

The thesis examines the relation between the financing and investment decisions, where the effect of financial constraints on the firm's investment decision is investigated. In particular, this thesis focuses on how financial constraints affect different firms by investigating the extent to which the reliance on internal cash flow is affected by firm characteristics such as size, age, dividend payout ratio, and market listing. We find that Jordanian firms are financially constrained, but that these constraints do not appear to be related to firm characteristics. Further, results show that Jordanian firms use debt rather than equity to finance their investment.

The second empirical chapter focuses on the main determinants of firms' capital structure. Here the results show that Jordanian firms follow the pecking order theory, where profitability and liquidity have a negative impact on the level of debt. Size and market to book value have a positive impact, supporting the view that there are significant constraints on debt financing since indicators of the financial health of the firms affect their capital structure ratio. There is also evidence that ownership structure affects the firm's access to debt.

The final empirical chapter examines the impact of firm characteristics on dividend policy, and shows that profitability and market to book value have a positive impact on dividend policy, implying that firms with better access to capital or credit pay dividends. This implies that firms retain earnings in order to ensure that they have sufficient capital to invest, confirming the initial result that Jordanian firms are financially constrained. There is also evidence of the impact of ownership structure, consistent with the predictions of agency cost theory, while institutional investors appear to follow the prudent-man restrictions, being positively associated with firms that pay dividends.

This thesis confirms the presence of market imperfections that have a significant influence on the financial decisions taken by Jordanian firms. The consistent evidence of the importance of retained earnings shows that these firms face substantial constraints in terms of their access to external funds, despite the reforms to the Jordanian financial system over the last two decades.

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CHAPTER ONE

INTRODUCTION

Jordan has undergone substantial economic changes since it started its economic reforms at the beginning of the 1990s. The GDP growth rate of the Jordanian economy averaged 6.6 percent for the period from 1999 to 2008. One of the most important reform features were the privatisation of government enterprises and the promotion of exports and foreign direct investment. A major improvement in the Jordanian capital market began in 1997 when new legislation was introduced, and in 1999 Amman Stock Exchange (ASE) became the official stock market of Jordan. The banking system in Jordan is well-developed, efficient, and profitable. The reform of Jordan's economy indicates the importance of the non-financial sector as a key factor in the economy's development. However, this development is strongly influenced by firms' investment and financing decisions.

In their seminal paper, Modigliani and Miller (1958) introduce modern finance theory, where in a perfect world firms' investment and financing decisions are independent, and firm value is independent of its financing decision. The firm's investment rate is affected by the profitability of that investment, and external and internal sources of funds are perfect substitutes. However, in reality the market is not perfect and there are many factors that affect the firm's financing decision, such as; agency costs, transaction costs, taxes, and most importantly asymmetric information between investors and firms. Since the development of the theoretical aspects of corporate finance, a large number of studies have shown that imperfections in the market affect the financing decision of the firm, and that internal and external finance are not perfect substitutes.

As a result, alternative theories have been proposed to address this reality. For instance, Myers and Majluf (1984) show that asymmetric information between firms and external investors lead firms to use internal funds before external funds to finance their investment. Market imperfections have a significant impact on the financing decisions of firms, while the presence of asymmetric information makes the

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investment and financing decisions become dependent on each other. Subsequently, Fazzari, Hubbard, and Petersen (1988) show that internal funds are important determinants of the firm's capital expenditures, while other studies show that the development of the financial system has a significant impact on the asymmetric information and agency cost problems. Brown and Petersen (2009), for instance, conclude that the financial constraints decline over time as improvements in the financial system reduce the asymmetric information problem.

In Jordan, the banking system is well developed, although the financial market is still developing. Therefore, credit facilities from banks play a key role in financing Jordanian firms' investment. Consequently, it is important to identify the impact of market imperfections on the Jordanian firms' capital structure behaviour. Several theories attempt to explain corporate financing behaviour, including; trade off theory, agency cost theory, and pecking order theory. While each theory explains determinants of capital structure from a different perspective, they all rely on the theme that market imperfections play an important role in the debt financing decision. Research into capital structure policy has shown different results across different countries, and over time (e.g Rajan and Zingales, 1995; Baker and Wurgler, 2002). In addition, developing country shareholders may not have the ability to monitor management's decisions, and therefore, in the presence of a developed banking system the shareholders may use debt as a tool to reduce the agency cost problem.

The decision to retain earnings or pay dividends is also highly affected by market imperfections. In 1961 Miller and Modigliani introduce the irrelevance proposition of dividends, showing that under market perfection, the firm's dividend policy will not affect firm value. However, factors such as transaction costs, tax, and agency costs are likely to affect the firm's choice to retain or pay dividends. Furthermore, in the presence of a high cost of external funds and capital constraints, firms tend to retain their earnings.

1.1 MOTIVATION AND CONTRIBUTION

Since 1990 the Jordan economy has witnessed many major reforms. The Jordanian economy now is open, growing with a moderate inflation rate, and most government enterprises have been privatised. The financial system is classified as a bank-based system, the banking sector being well-developed and efficient. The banking system plays a key role in the Jordanian economy, firms using bank debts to finance their investment. The stock market is developing, and the ownership structure is highly concentrated. The bond market is very shallow and less developed. These factors may have implications on the firm's financing decisions, which this research will investigate in the subsequent chapters.

In the last two decades the Jordanian government has improved the efficiency of the economic and financial system. However, these efforts have not been investigated in depth, and current knowledge of the financing behaviour of Jordanian firms is quite limited. This study is motivated by the large changes to the Jordanian economy and its financial system, and intends to extend our knowledge of the financing behaviour of firms listed on the ASE, and to the extent to which corporate finance theory can explain this financing behaviour.

Jordanian firms depend mainly on the credit market to finance their investment, and the relative cost and availability of this financing depends on the development of the credit market and the relationship between firms and the fund providers. This relationship influences the cost of finance, which in turn is affected by the degree of asymmetric information between the firm and the creditors, where a high level of asymmetric information restricts the firm's ability to raise funds. The service and industrial sectors play a key role in the Jordanian economy, so if firms face financing restrictions, their ability to contribute to the economy will be adversely affected. This is the motivation for this study of Jordanian firms.

The major providers of funds in Jordan are banks, equity issuance being less frequently used, and the bond market is rarely used. However, the capital market is still developing, and asymmetric information between investors and firms may severely affect firms' capital structure. These factors motivate the study of their impact on capital structure policy.

Most Jordanian firms retain their dividends or pay a very low dividend, which supports the view that Jordanian firms do not use dividends as a means of signalling or reducing the asymmetric information problem. In bank-based markets, these problems are reduced since the main providers of funds are banks. A close relationship between firms and banks and high ownership concentration reduce these problems. These are characteristics of the Jordanian market, and therefore motivate us to explore dividend policy in Jordan.

The main aim of this research is to explore the financing choices of firms listed in the Amman Stock Exchange in Jordan, and the interrelationship between the financing and investing decisions. In addition, the research aims to explore the main determinants of the financing decision or the capital structure decision. The research investigates the main attributes encouraging firms to pay dividends, or the amount of dividends paid.

By evaluating the financing decisions of Jordanian firms, this thesis contributes to our understanding of the impact of market imperfections on developing market firms.

First, there is limited existing evidence on the presence of financial constraints in emerging markets. This thesis fills the gap between the theoretical and empirical work in this area by investigating the financial constraints on a sample of Jordanian firms. This is the first attempt to assess this issue in Jordan, and uses market listing as a classification criterion to distinguish between financially constrained and unconstrained firms.

 Second, this thesis models capital structure policy in Jordan, and tests whether the capital structure theories are applicable to the Jordanian capital market. Further it examines whether Jordanian firms have a target capital structure, and their speed of adjustment toward this target. Recent developments of new models in capital structure theory, especially pecking order theory (Shyam- Sunder and Myers, 1999; Frank and Goyal, 2003 among others), have been tested using data from developed countries, with few applications to data from developing countries. Thus, this thesis aims to fill this gap by applying and testing these models in Jordan.

Third, this thesis models dividend policy in Jordan. Recent years have seen the development of a new theory of dividend policy, the life cycle theory (DeAngelo *et*

*al.,*2006), but again the overwhelming majority of studies apply this theory to developed countries. This thesis applies this new theory to from an emerging market (Jordan).

1.2 THESIS STRUCTURE, MAIN FINDINGS, AND POLICY IMPLICATIONS

This thesis consists of four additional chapters. Chapter 2 comprises a discussion of the Jordanian economy, capital and money markets. There then follow three empirical chapters investigating the financial decision making of the corporate sector in Jordan. The first empirical chapter analyses the impact of financial constraints on corporate investment in Jordan, and specifically the relationship between the financing and investment decisions. The second empirical chapter analyses the main determinants of firms' capital structure policy in Jordan. This chapter assesses capital structure policy, in the context of the main theories of capital structure, including agency cost theory, trade off theory, and pecking order theory. The third empirical chapter investigates the determinants of Jordanian firms' dividend policy. The results from all empirical chapters are based on a balanced panel of 85 non-financial firms listed on the Amman Stock Exchange over the period from 1999-2008.

Chapter 2, Jordanian economy, capital and banking systems

This chapter presents the main indicators of the Jordanian economy, the main economic sectors and their relative contribution to gross domestic product. This chapter also outlines the main characteristics of the banking system in Jordan, and the credit facilities of the banks to the main economic sectors. In addition, this chapter presents the structure of the capital market in Jordan and the structure of the Amman Stock Exchange. Finally, this chapter highlights how the Jordanian economy and its banking and capital markets have provided the overall motivation for this study of the financial decisions of Jordanian firms.

Chapter 3, financial constraints and corporate investment

The first empirical chapter examines the impact of market imperfections on the financing decision of firms. This chapter aims to answer the following question "Are Jordanian firms financially constrained?" The chapter analyses the impact of asymmetric information on the ability of the firms to raise funds from external sources. In addition, it examines whether the characteristics of firms affect the extent of the asymmetric information between firms and fund providers. Studies of financial constraints on firm investment use the sensitivity of the firm's investment to internal funds, as a measure of these constraints. The major challenge facing the empirical literature is to find the firm characteristics that impound the unobservable financial constraints and affect the ability of firms to raise funds from external markets. Following a large body of empirical studies several segmenting variables have been used in this study, including market listing, firm size, firm age, and dividend payout ratio. To ensure a robust econometric analysis the general method of moments (GMM) is used for the estimation.

The results from this chapter show that Jordanian firms are financially constrained, as demonstrated by investment cash flow sensitivities that are positive and statistically significant. Firms' investment is affected by the availability of internally generated funds, indicating that Jordanian firms face financing restrictions on their investment. The sources of restriction come from; first, firms have to pay a relatively high cost of external funds; second, fund providers do not provide firms with the required amount of funds. The results also show that Jordanian firms use debt to finance their investment, however, there is no evidence to support that firms use equity to finance their investment.

The results also show that firm characteristics such as size, age, and dividend payout are not factors associated with investment cash flow sensitivity. In addition, the results do not support market listing as affecting investment cash flow sensitivities. Overall, the results suggest market listing and firm characteristics are not particularly useful criteria with which to capture the unobserved asymmetric information problem.

This chapter has several specific implications for policy in Jordan. Jordanian policy makers have devoted significant efforts to establishing a strong economy. However, to further enhance the growth of the economy and make full use of the economic reforms that have been implemented, the Jordanian government should pay

closer attention to the sources of finance of firms' investment. The empirical analysis in this thesis shows that firm investment is strongly reliant on their internal cash flow. Therefore, it is very important for Jordan to speed up both stock market development and credit market efficiency in order to meet the demand of Jordanian firms for financial resources. This study shows no evidence to support the either the firms' characteristics or market listing as having a significant impact on the degree of firms' financial constraints. Thus, the effort to reduce the restriction on sources of funds should not focus on particular firms, or types of firms. In addition, the results suggest that the Jordanian authorities should expand the choices of financing by improving the functioning of the bond market, and enhancing this avenue as an alternative source of financing.

Chapter 4, capital structure policy

The second empirical chapter focuses on the determinants of capital structure policy. This chapter aims to answer four main questions; first, what are the determinants of the financing behaviour in Jordan? Second, what is the explanatory power of the existing mainstream capital structure theories for the Jordanian capital market? Third, do Jordanian firms have a target capital structure ratio, and if so what is the speed of adjustment toward this target? Fourth, do the newly developed models of capital structure explain the financing decision in Jordan? This chapter uses OLS to investigate the determinants of capital structure, and then applies GMM to estimate target capital structure and the speed of adjustment toward this target.

The results show that firm size, growth opportunities, blockholders, and institutional investors positively impact the debt ratio, while liquidity, profitability, and the dividend payout ratio are negatively related. These results suggest the debt ratio of Jordanian firms is significantly affected by the probability of bankruptcy (indicators of healthy firms are large size and high market value), which supports trade off theory. The results show that Jordanian banks are conservative in their lending policy, preferring to provide loans to large firms, while small firms use the equity market or internal funds, as suggested by pecking order theory. The results also support banks preferring to lend to firms with high ownership concentration. It is not surprising that in a small economy with a high ownership concentration, the relationship between

banks and firm owners affects the ability of firms to access debt. The banks rely on these owners to effectively monitor the investment decisions in their firms.

The results are highly supportive of pecking order theory, where firms prefer to use their internal funds before external sources of funds, and profitability and liquidity have a negative impact on the debt ratio. The results show that Jordanian firms prefer to use their internal funds, either because the cost of debt is prohibitive or banks impose restrictive conditions on credit facilities. This supports the banking system as operating on a commercial basis, where firms should meet many criteria before receiving credit from banks. The banking sector offers loans to high quality firms, and the relation between banks and owners affects the banks' credit decisions.

Finally, the results in this chapter show that Jordanian firms have a target capital structure and move relatively quickly toward this target. In the presence of a weak bond market and an efficient banking system, the transaction cost related to bank loans is relatively moderate, which encourages firms to adjust their debt ratio. The results show that the Shyam-Sunder and Myers (1999), and Frank and Goyal (2003) models of pecking order theory are not applicable for Jordanian firms. we estimate the model for both large and small deficit firms, and take account of the impact of the firm's characteristics on its debt capacity.

Overall, the main capital structure theories can explain some of the major determinants of the Jordanian firms' capital structure, but we need to take into account the particular characteristics of the institutional framework of the Jordanian market when interpreting these findings.

The policy implications that emanate from this are; first, the Jordanian government should reduce the obstacles on credit facilities for small firms and encourage banks to provide finance to these firms. Since equity financing is very important for small firms, the Jordanian government should seek to improve the functioning of the equity market (as represented by the ASE), and ensure that it is a reliable and cost effective source of finance for Jordanian firms. Second, since Jordanian firms follow pecking order in their choice of finance, the Jordanian government should take further steps to reduce the gap between firms and banks. Jordanian banks need to become more involved in financing firms, and appreciate that their credit to firms is not just a tool

to make profit, but is also an important tool to support economic growth. Third, ownership structure has a significant impact on the debt ratio, where banks prefer to provide credit to firms with highly concentrated ownership. Thus, policy makers need to enhance the ability of shareholders in firms with high ownership dispersion to effectively monitor the firm's use of borrowed funds. The results show that Jordanian firms are able to move toward target capital fairly rapidly, however a reduction in the transaction cost of financing might allow firms to move toward target more quickly.

Chapter 5, determinants of dividend policy

The third and final empirical chapter investigates the determinants of firms' dividend policy. This chapter aims to answer the following questions; first, what are the main determinants of dividend policy behaviour in Jordan? Second, do Jordanian firms have a target dividend ratio? Third, are the main theories of dividend policy applicable to Jordanian firms? In this chapter the econometrics technique used are Logit, to estimate the probability that the firm pays dividends, and Tobit, to estimate the amount of dividend paid. We use GMM to estimate the firm's target dividend payout ratio.

The results show that the probability the firm will pay dividends is positively affected by profitability, market to book value, institutional investors, retained earnings/total equity ratio, while it is negatively affected by earnings volatility and blockholders. The positive impact of profitability and firms with growth opportunities supports the findings from the previous chapter that healthy firms enjoy better access to relatively low-cost credit. The results also support the life cycle theory, where retained earnings positively impact the payment of dividends, so mature firms are more likely to pay dividends.

The impact of ownership structure on dividend policy shows that blockholders prefer firms that do not pay dividends. This supports the agency cost theory, where closely monitored firms use internal cash flow rather than external funds. In addition, blockholders may consider their ownership as a long term investment, and reinvest dividends in new projects. In contrast, institutional investors prefer to receive dividends, which is consistent with the view that they regard dividends as indicators

of firms' financial strength. Institutional investors act as short term investors rather than owners of the company, and consequently are looking for current income rather than future earnings. Finally the results show that Jordanian firms do not have a target dividend ratio. The results also show that the same factors affect the amount of dividends that firms pay.

There are several policy implications of firms' dividend policy being affected by firms' characteristics; first, the Jordan authorities should improve the effectiveness of credit and capital markets, because firms with high profitability and high market to book value tend to pay dividends because they have better access to the capital market than firms with low profitability and low market to book value; secondly, the Jordanian authorities should give more attention to the agency cost problem, where the agency cost is the major determinant of dividend policy. They need to support shareholder rights, especially in firms with a low concentration of shareholders. Finally, Jordanian authorities need to work to improve the disclosure and transparency of firms, in order to reduce the role dividends play as a tool to control the firm's management.

Overall, the results from the three empirical chapters suggest that market imperfections in Jordanian capital and credit markets have a major impact on the financing decisions of non-financial firms. Thus the general policy implication is that the equity market should improve, and the credit market represented by banks should become more involved in financing firm investment. Finally, which is perhaps the most important, is that the bond market needs to develop into a reliable source of debt financing. As suggested by Herring and Chatusripitak (2000), development of the bond market plays a key role in the financial development of an emerging market.

Chapter, 6: Conclusion and summary

This chapter provides a summary of the empirical findings of the thesis, identifies limitations of the research, and presents avenues for future research.

CHAPTER TWO

JORDAN ECONOMY, CAPITAL AND BANKING SYSTEMS

2.1   JORDAN ECONOMY

In 1946 Jordan gained its independence from the United Kingdom, marking a transformation date for the Jordanian economy and policy. Stability of the economy and politics has been the predominant characteristic of Jordan. Jordan is heavily dependent on the banking sector, and to a lesser extent on the stock market sector, and despite being located close to the largest producers of oil (Saudi Arabia and Iraq), Jordan is not an oil producer. Figure 2.1 shows the growth rate of GDP for the period from 1980 to 2009. During the late 1980s the Jordanian economy faced a major financial crisis, which together with pressure from the Gulf War and the collapse of the third largest bank in 1989, contributed to a substantial decline in GDP. The large budget deficit in the late 1980s, combined with the Gulf War, forced the Jordanian government to reschedule its debt and devalue the Jordanian dinar. At the beginning of 1990, total external debt was more than 189% of GDP (total external debt amounted to $8.3 billion in 1990). These factors forced the Jordanian dinar to lose 10% of its real value at the beginning of 1990.

Figure 2. 1 Annual Growth Rate GDP
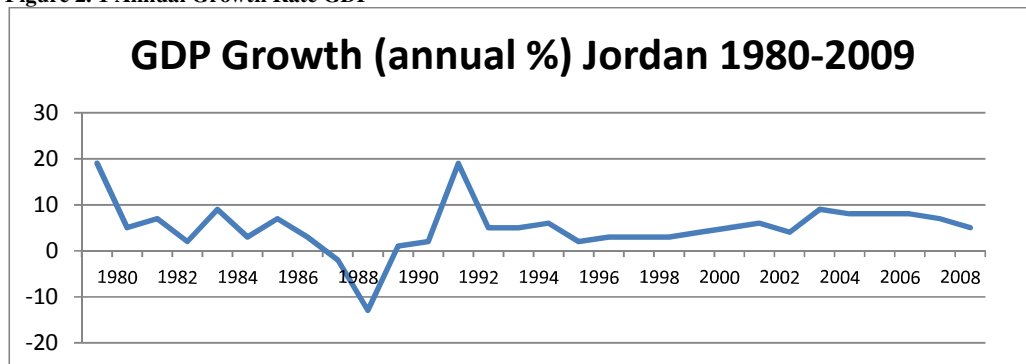
At the start of the 1990s, the Jordanian government undertook a number of major financial reforms, and succeeded in reducing its external deficit and the external

imbalance. The Jordanian economy started to recover, the GDP growth rate was 4% on average from 1994 to 2002, and 7% from 2002 to 2009.

Figure 2. 2 Percentage of External Debt to GDP

Percentage of External Debt to GDP
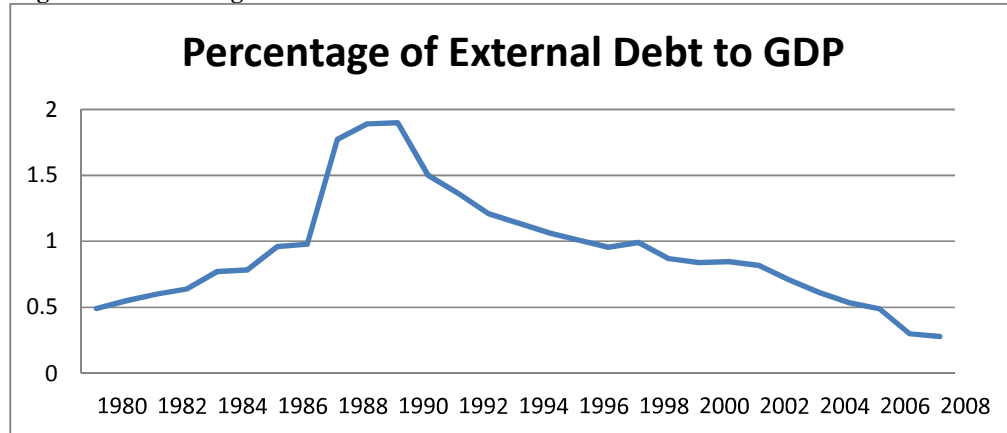
As we can see in Figure 2.2, the percentage of external debt to GDP decreased from 190% in 1990 to 27% in 2008, demonstrating that the Jordanian government successfully controlled its debt during the period. The reforms that were introduced included: A privatisation process, during which the main economic sectors were privatised, including utilities and natural resources (cement and phosphate): The financial and economic sectors were liberalized; Jordan joined the World Trade Organization (WTO) in 2000, and entered into several trade agreements with the European Union in 2001, in 2001 Jordan entered a Free Trade Area Agreement (FTA) with the US. In 1998 Jordan signed The Greater Arab Free Trade Agreement (GAFTA), and in 2004 signed the Jordan-Singapore Free Trade Area Agreement. In 2007 Canada and Jordan signed Trade and Investment Agreements, while Jordan entered The Jordan Euro-Mediterranean Association Agreement in 2002.

Since October 1995, the Jordanian dinar has been fixed at 1 dinar =1.41044 U.S dollars. However, a significant the main weakness of the Jordanian economy is that it depends on grants from other countries to fill the gap in the financial deficit, so that any fluctuation in the level of grants will affect the Jordanian economy. By the end of 2010 "'the total grants committed reached US$ 782.192M by the US, EU, Japan, China, Canada, UN, France, Korea, Arab Fund for Economic and Social

Development, the Islamic Development Bank, and others". (Jordan investment Board. [1]

Table 2.1 shows that the average growth rate of GDP has been 6% over the period 2000 to 2009, which shows that the Jordanian economy has been strong. In addition, the average GDP per capita increased from $1764 in 2000 to $4027 in 2009, which confirms that the economic reforms in the late 1990s and 2000 improved the income per capita in Jordan.

The inflation rate is moderate for the period from 2000 to 2007, however during 2008 the inflation rate rose to 14.9% due to increased world oil prices. As we can see, the growth rate of GDP decreased from 7.23% to 5.48% and the inflation rate is -0.68%, indicating that the Jordanian economy during 2009 slowed due to the global financial crisis, which affected the Jordanian economy and increased oil prices. The openness of the Jordanian economy increased foreign direct investment from 242 million in 2001 to 2,354 million in 2009. The increase in foreign direct investment reflects the confidence of foreign investors in the Jordanian economy. In addition, this reflects that the Jordanian economy provides a good investment opportunity. Jordanian exports are 53% of total GDP, which indicates the importance of exports to the Jordanian economy.

Figure 2. 3 Development of Total Exports, Imports and Trade Balance

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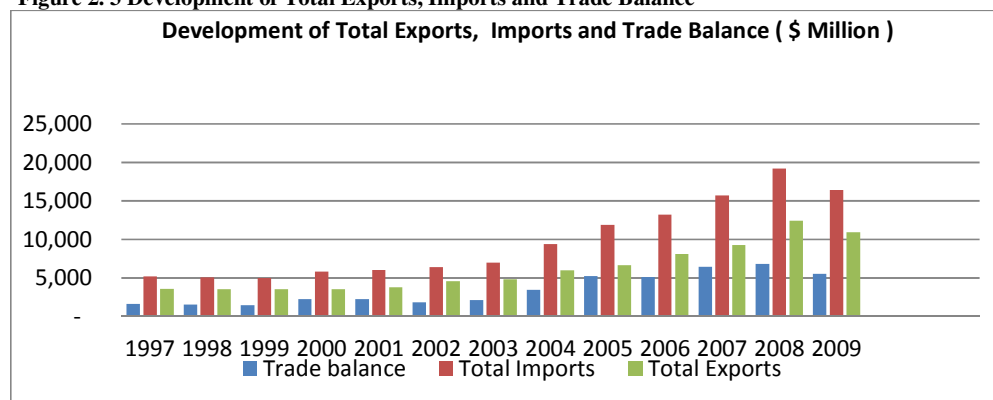
Table 2. 1 Main Economic Indicators of the Jordanian Economy

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
GDP (current US$) millions	7,248	7,914	8,151	8,464	8,980	9,584	1,020	11,411	12,588	15,057	17,110	21,971	23,820
GDP growth (annual %)	3.31	3.01	3.39	4.24	5.27	5.79	4.18	8.56	8.12	8.11	8.18	7.23	5.48
GDP per capita (current US$)	1,625	1,721	1,742	1,764	1,826	1,902	1,975	2,157	2,326	2,719	3,022	3,797	4,027
GDP per capita growth (annual %)	0.20	-0.09	1.56	1.70	2.70	3.26	1.64	5.97	5.69	5.66	5.79	4.92	3.20
Inflation, consumer prices (annual %)	3.04	3.09	0.61	0.67	1.77	1.83	1.63	3.36	3.49	6.25	5.39	14.93	-0.68
Foreign direct investment, net (current US$) millions	361	310	154	904	242	224	550	918	1,821	3,682	2,574	2,813	2,354
Foreign direct investment, net inflows (% of GDP)	4.98	3.92	1.94	10.79	3.05	2.49	5.36	8.21	15.76	23.54	15.32	12.87	10.19
Total reserves (includes gold, current US$) millions	2,435	1,988	2,770	3,441	3,174	4,116	5,365	5,446	5,461	6,982	7,924	8,918	12,135
Exports of goods and services (current US$)	3,568	3,544	3,529	3,538	3,781	4,544	4,829	5,955	6,634	8,111	9,279	12,415	10,929
Exports of goods and services (% of GDP)	49	45	43	42	42	47	47	52	53	54	54	57	46
Source: World bank data base													

Exports increased from \$3,535 million in 2000 to \$10,929 million in 2009, confirming the success of the Jordanian openness policy. However, the trade deficit is still a major problem for the Jordanian economy, which requires more investment in order to increase exports and reduce the deficit. The main exports are clothes, crude potash, pharmaceuticals, vegetables, and crude Phosphates[2].

" *In 2010, a new income tax law has been issued by which nearly 85% of employees wages in the public and private sectors were exempted from income tax for those whose wages don't exceed 12,000 JD's/ year / person and 24,000 JD's for the main provider regardless of the number of family numbers.*

1. *The tax percentages is 7% on any amount exceeds the first 12,000 and 14% on anything above that.*
2. *As for the income corporate tax, the amount is as follows:*
3. *30% on banks and financial companies.*
4. *24% on communication companies, mediation and financial exchange.*
5. *14% on rest types of companies including industrial and commercial."* *(Jordan Investment Board, 2013)*

2.1.1 *Jordanian Economic Sectors*

This section shows the main economic sectors in Jordan and their relative contribution to Jordanian GDP. Table 2.2 shows that in Jordan there are two main sectors, the commodity producing sector and the services sector. On average, Jordan's commodity producing sector contributes nearly 31.5% of GDP, and the growth rate in 2008 was 8.1%. The main dominant sub-sector is the manufacturing sector, its relative contribution amounting to 18.9% with a growth rate in 2008 of 5.1%. This shows the importance of the industrial sector to the Jordanian economy. The reason for the high growth in this sector is due to Jordan's trade agreements with the largest markets in the world, which enables Jordanian firms to take advantage of this opportunity and export to these markets (the share of exports is as

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[2] Source : http://www.jordanexporters.org/market-intelligence/trade-statistics

follows: North America countries 16%, other Arab countries 24%, Asian non-Arab countries 33%).

The numbers of registered industrial businesses in 2008 were 1,335 (Source, Central Bank of Jordan (CBJ) 2011). The construction sector contributes 4.5% to GDP with a growth rate of 13.4% in 2008. The main investment in this sector is in new houses. During the last twenty years Jordan has faced two main immigration waves from neighbouring countries. In the first Gulf war (1990-1991) more than half a million Jordanian people returned from Kuwait and Iraq. The second major immigration wave occurred during the second Gulf war in 2003 when more than one million Iraqi citizens entered Jordan. The relative contribution of Mining and Quarrying to GDP is 2.6% and the growth rate for 2008 was 35.8%. This supports the Jordanian government's attitude to invest more in mining and exploring the natural resources in Jordan. It is notable that the mining and utility sectors in Jordan are owned by the private sector.

Table 2. 2 Jordanian Main Economic Sectors and their Relative Contribution to the GDP

Year	2006	2007	2008	Average
Commodity producing sector				
Agriculture, Hunting, Forestry and Fishing	2.7	2.6	2.5	2.6
Mining and Quarrying	2.6	2.9	5.5	3.7
Manufacturing	17.9	19.5	19.3	18.9
Electricity and Water	2.0	2.0	1.7	1.9
Construction	4.2	4.6	4.6	4.5
Total of Commodity producing sector	**29.4**	**31.6**	**33.5**	**31.5**
Services sector				
Trade, Restaurants, and Hotels	10.1	10.2	9.9	10.1
Transport, Storage and Communications	14.4	13.2	12.1	13.2
Finance, Insurance, Real Estate and Business Services	18.9	18.3	17.3	18.2
Social and Personal Services	4.5	4.5	3.8	4.3
Producers of Government Services	21.6	21.1	22.5	21.7
other services	1.1	1.0	0.9	1.0
Total of services sector	**70.6**	**68.4**	**66.5**	**68.5**
GDP at Constant Basic Prices	**100**	**100**	**100**	
Source: Central Bank of Jordan. Numbers are in percent of total GDP at constant prices				

From Table 2.2 we can classify the Jordanian economy as a service oriented economy. On average the contribution of the services sector to GDP is more than 68.5% and the growth rate was 5.9% in 2008. The financial sector represented by banks and insurance companies has the largest portion of GDP at 18.2%, and a growth rate of 13.2% in 2008. The financial sector in Jordan is well developed, at

the end of 2009 there were 21 banks, and 28 insurance companies licensed to practice insurance services. The tourist sectors represented by trade, restaurants, and hotels contribute 10% of GDP with a growth rate of 10.1%. Figure 2.4 shows the main economic sectors and their relative contribution to GDP.

Figure 2. 4 GDP Breakdown by Economic Activity
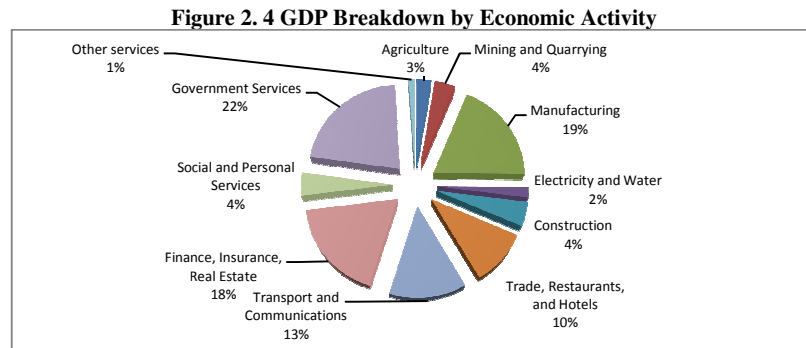
2.2 JORDAN BANKING SYSTEM

This section outlines the main characteristics of the banking system in Jordan, and the relation between the banking system and the different economic sectors. The banking sector in Jordan is dominated by the Central Bank of Jordan (CBJ). "*Banks operating in Jordan are regulated and supervised by the CBJ subject to the CBJ Law No. 23 of 1971, the Banking Law No.28 of 2000, and the circulations and instructions issued by the CBJ. Banks are licensed by the CBJ as public shareholding companies with a minimum capital of JD 40 million"(Kanadeh, 2008).* In 1930, the first Jordanian bank was established (the Arab Bank), and there are now 21 banks operating in Jordan, 15 local and 8 foreign banks[3] with 606 branches and with total assets equal to 30 JD billion at the end of 2009 (source, CBJ). In 1949 HSBC bank was the first foreign bank authorized to work in Jordan. All Jordanian banks are owned by the private sector. In addition, the banking sector in Jordan is very concentrated, 70% of total assets of Jordanian banks being held by three banks, and the degree of competition between the banks is very low (see, Demirgüç Kunt and Peira (2010))[4].

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[3] The foreign banks are: HSBC Bank Middle East LTD, Egyptian Arab Land Bank, Rafidain Bank, Citibank N.A., Standard Chartered Bank, National Bank of Kuwait, Banque Audi SAL/Saradar Audi Group, BLOM Bank.

[4] Demirgüç-Kunt, A. and Peira, M. (2010) "A Framework for Analysing Competition in the Banking Sector: Application to the Case of Jordan", *World Bank Policy Research Working Paper* No 5499.

In addition to the banking sector, there are other financial institutions that support and complement the banking system. These financial institutions provide non-banking financial services as follows: The Deposit Insurance Corporation, which encourages saving by providing confidence in the Jordanian banking system by insuring the deposits of banks located in Jordan; The Jordan Loan Guarantee Corporation, which provides loan guarantees for small and medium enterprises. The Jordan Mortgage Refinance Company, which improves the mortgage market by meeting the housing needs of low-income segments of the population through refinancing of their home loans. However, a major weakness of the financial system is the absence of financial adviser companies.

The main indicators of banking soundness in Table 2.3[5] show that the banking sector in Jordan has an average risk-weighted capital adequacy ratio in 2007 of 19%, which reflects a healthy state and complies with international capital adequacy requirements and prudential norms (Basel minimum requirement 8%). The ratio of non-performing loans (measuring the percentage of default or close to default), is 4.2 % which is a very good indicator. The other ratios show the sound profitability of the banking sector.

Table 2. 3 Indicators of Bank Soundness

	2000	2004	2005	2006	2007
Risk-weighted capital adequacy ratio	19.4	17.8	21.4	21.4	18.8
Non-performing loans (in percent of total loans)	14.6	10.3	6.6	4.3	4.2
Return on Assets	0.3	1.1	2.0	1.7	1.6
Return on Equity	4.4	13.1	20.9	15.0	12.2
Loans to GDP ratio (in percent of GDP)	75.8	76.5	86.6	97.6	100.6
Sources: World bank data base. All numbers in percent.					

Al-Fayoumi and Abuzayed (2009) compare the main indictors of the Jordanian Banking sector with the banking sectors in six Arab countries (Lebanon, Saudi Arabia, Bahrain, UAE, and Egypt). By the end of 2007, the capital adequacy ratio (the ratio of total capital over total assets) for Jordan was 18.08%, while the average for all other countries was 9.16%, showing strong evidence that the Jordanian banks have a good financial position. The management quality indicator, measured by the cost to income ratio, is in the middle of the distribution and shows the operating efficiency of the banks. The profitability ratio (Return on Assets ratio of 1.65%)

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[5]This table from IMF working paper link : http://www.imf.org/external/pubs/cat/longres.aspx?sk=22304.0, taken from Central Bank of Jordan .

shows that Jordan is performing better than Lebanon and Egypt. The major strength of the Jordanian banking sector is; providing a wide range of financial products and financial services; following international banking standards regarding capital adequacy requirements and prudential norms; showing a very healthy ratio of non-performing loans.

Figure 2. 5 Interest Rate in Banks

Interest Rate in Banks
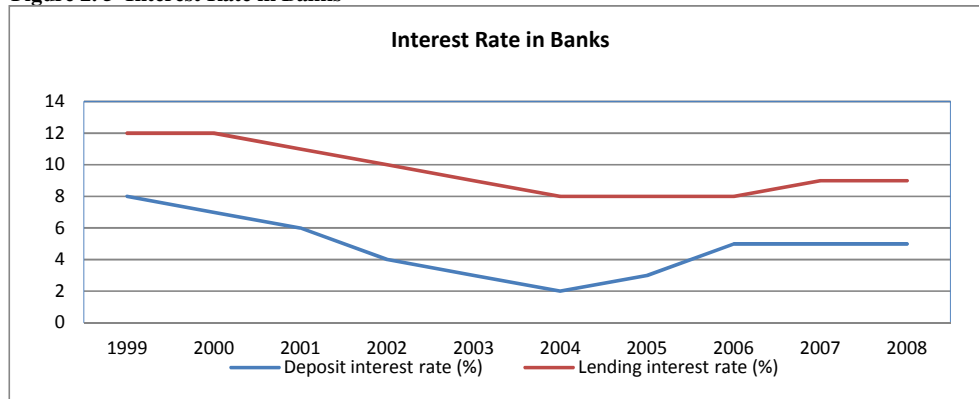
The banking sector is the first choice for firms to finance their investments. Average interest rates for credit facilities between 2000 and 2008 was equal to 8.5%.

Figure 2.5 shows the interest rate for deposits and lending, and illustrates that the spread between deposit and lending rates is relatively stable over time.

The banking system plays a key role in economic growth and development. In the last twenty years, total deposit and credit within the banking sector has increased at a rapid rate. Total deposits for working banks was equal to JD 18 Billion and total outstanding bank credit JD 13 billion at the end of 2008. Total Assets of the banking system was 200% of total GDP. A report from the Commission of the European Communities (2009) shows that Jordan's banking system achieved a high degree of compliance with international banking standards, with Basel Committee and its Basel Core Principal for effective banking system, with 70% of outstanding bank credit going to firms.

Figure 2. 6 Total Credit and Deposit of Jordanian Banks

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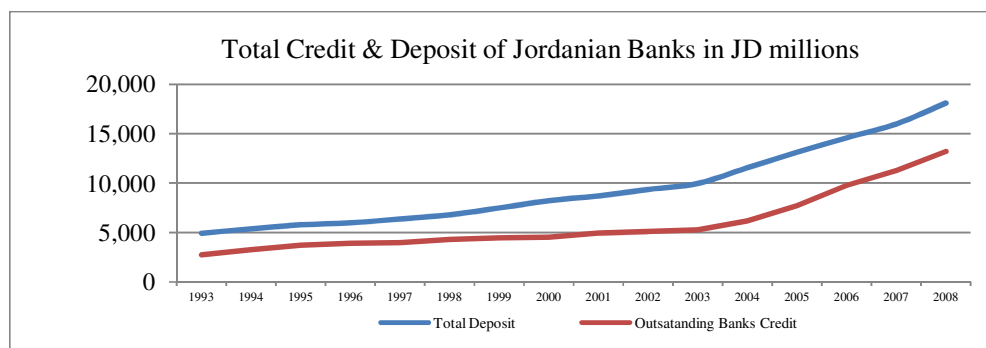
Source: Central Bank of Jordan

Jordanian banks play a key role in promoting economic growth through utilising national savings to finance deficit units and different economic sectors. Table 2.4 shows the credit facilities provided by Jordanian banks to the major economic sectors. The general trade sector uses the largest amount of credit facilities with a total of $4.5 billion in 2009 and growing at 10% in 2009. This sector includes trade, restaurants and hotels, and contributes 10% to GDP.

Table 2. 4 Credit Facilities Extended by Jordanian Banks by Economic Activity

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Agriculture	180	149	145	139	160	156	199	220	296	326
Mining and Quarrying	142	110	134	110	110	80	60	93	68	85
Manufacturing	964	1027	1114	1130	1262	1384	1541	1901	2253	2300
General trade , Restaurants, and Hotels	1787	1942	2008	2115	2295	2490	2977	3794	4602	5109
Construction	1050	1028	1079	1134	1344	1639	2201	2738	3233	3641
Transport and Communications	189	186	231	235	245	310	410	497	522	639
Trade, Restaurants, and Hotels	219	241	245	244	218	255	275	361	517	603
Public services and utilities	338	460	493	492	697	781	899	1035	1227	1282
Financial Services	215	213	197	188	137	248	341	550	617	612
Source, Central Bank of Jordan. Numbers are in US$ million										

However, Jordanian banks may follow a restrictive credit policy. The main reason for this is the geographical location of Jordan, being located in an unstable political

region. Jordan shares a border with Iraq, and this may encourage Jordanian banks to become more cautious when they consider providing loans.

2.3 JORDAN STOCK MARKET

"ASE has become one of the region's most transparent and efficient stock markets, which has increased its attractiveness for foreign and domestic investors" Martin and Saadi-Sedik (2006), which shows that the strong performance of the ASE has had a positive impact on the Jordanian economy.

The Jordan stock market was established in 1978. The main aim of the Jordan stock market is to establish a formal mechanism for firms to raise capital and for people to exchange and trade financial securities on Jordanian firms. In 1978 the total market capitalization of listed firms was equal to JD 286 million. In the last ten years the market capitalization of listed firms increased substantially. Table 2.5 shows the main figures of the ASE. The market capitalization for firms listed in the ASE increased from JD 3.5 billion in 2000 to JD 26 billion at the end of 2008, or 226.3% of the GDP, which indicates the growing importance of the Jordanian companies to the economy, and makes Jordan one of the largest emerging equity markets relative to GDP in the world. The major improvement in the Jordanian stock market was in1997, when the Jordanian government issued a new law called the Financial Securities Law, and Amman Stock Exchange (ASE) became the official Jordanian financial market.

Table 2. 5 Main indicators for ASE

Year	Number of Listed Companies	Market Capitalization (JD million)	Value Traded (JD million)	Market Capitalization / GDP (%)	Dividend Yield Ratio (%)
2000	163	3,509.60	334.70	58.40	3.61
2001	161	4,476.40	668.70	71.50	2.74
2002	158	5,029.00	950.30	80.40	3.23
2003	161	7,772.80	1,855.20	116.8	2.42
2004	192	13,033.80	3,793.20	184.7	1.72
2005	201	26,667.10	16,871.00	326.6	1.61
2006	227	21,078.20	14,209.90	233.9	2.33
2007	245	29,214.20	12,348.10	289	1.84
2008	262	25,406.30	20,318.00	226.3	2.51
Source: ASE market Information available on:http://www.ase.com.jo/en/node/536					

The financial sector is the biggest sector in Jordan, with a market capitalization amounting to JD 15.5 billion or 61% of the total market, followed by the industrial sector with JD 6.3 billion , or 25% of the total market, followed by the services sector with JD 3.7 billion or 14% of the total market. Figure 2 shows the market capitalization for the main sectors in ASE.

Figure 2. 7 Market Capitalization of Listed Firms on ASE (2008)
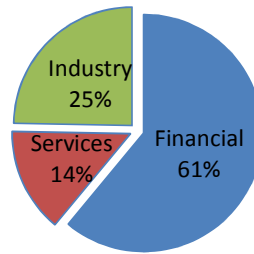
Amman Stock Exchange Indices:

The ASE uses three methodologies to calculate the market index. The aim of using different methodologies is to measure stock price movements more accurately. An Unweighted Price Index was the first index used in Amman Financial Market (AFM) in 1980. Data from 38 firms was used to construct the Unweighted Price Index.

1- Unweighted Price Index: All stocks included in the index have similar weights, and the market value of the firm does not affect the weight given for stock price.

2- Market Capitalization Weighted Price Index: this index comprises the most liquid 100 firms, and gives an indication of the change in total market value, since the most liquid 100 firms equal 90% of market value.

3- Free Float Weighted Price Index: this index uses the market value of stock available for trading instead of the total number of stock outstanding. This method is not biased by large firms with shares that are not available for trading.

The ASE uses a price index weighted by the market capitalization of free float as a calculation method to measure the performance of stock market, limiting the effect of large market capitalization companies.

The ASE stock Index increased from 1090 point in 2002 to 4260 point in 2005, reflecting the importance of the ASE as a stock market. In addition, market capitalization increased over the same period from JD 5,029 million in 2002 to 26,667 million in 2005. However, during 2006 the ASE stock index dropped by 29.3%. The main reason for the sharp drop in the ASE stock index in 2006 was the establishment of 26 new companies and the increase in capital of listed companies. During 2006 the capital of firms in ASE increased from JD 3.0 billion to JD 4.6 billion. The drop in the ASE stock index in 2006 reflects that the ASE may suffer from a liquidity problem and increasing the number of new firms and new capital for existing firms may lead to a decline in market liquidity, as a consequence stock prices dropped, leading the ASE index to fall.

In 2007 the ASE stock index started to recover and achieved a 36% increase comparing with 2006. The paid in capital of companies listed in the ASE increased from JD 4.6 billion to JD 5.4 billion. In addition, 18 new firms listed on ASE. In 2008 the total value of traded stock and bonds in ASE amounted to JD 20.3 billion, compared with JD13.1 billion in 2007. The Jordan stock market is performing well and the global crisis in 2007-2008 has had a limited effect on ASE compared with other regional countries. During 2008 the ASE index dropped by 25%, the Egypt stock index dropped of 56%, and the Dubai Stock market index dropped by 70%.

Figure 2. 8 ASE General Free Float Weighted Price Index
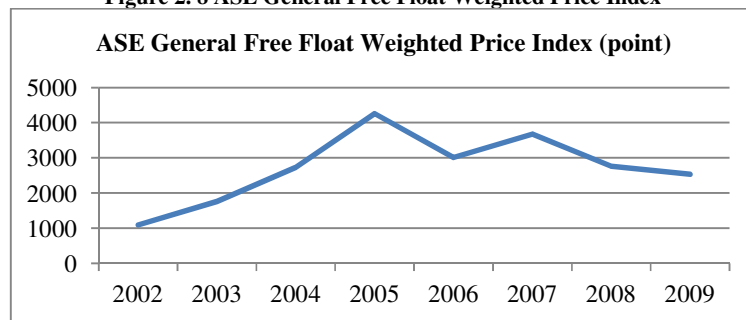
Table 2.6 shows the percentage of foreign investors in listed companies in the ASE between the period 2000 to 2008 in all listed firms, services, and industrial sectors. There has been a 14.1% increase in the number of foreign investors since the establishment of the ASE in 2008. In addition, the percentage of foreign investors increased by 142% for the services sector and 75% for the industry sectors. The

highest ratio of foreign investor ownership and the growth rate of their ownership reflects their confidence in the ASE and the Jordanian economy, and also shows that the Jordanian capital market is open to foreign investors, and supports that there are no restrictions on foreign investment in listed companies.

Table 2. 6 Percentage of Foreign Shareholders in Listed Companies

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Percentage of foreign shareholders in service	14	21.3	19.6	26.8	24.3	25.5	26.1	36.5	36.1	33.8
Percentage of foreign shareholders in industry sector	30.5	30.2	27.8	26	30	36.8	38.1	43.7	51.8	53.3
Percentage of foreign shareholders in all firms	43.1	41.7	38.5	37.4	38.8	41.2	45	45.5	48.9	49.2
[1]Source: ASE market Information available on :http://www.ase.com.jo/en/node/536. Numbers as a percentage of market capitalisation.										

It is important to shed light on the ownership structure of Jordanian firms, Table 2.7 shows the percentage of institutional investors and Blockholders. One of the major investors in the ASE are institutional investors, their total trade was 35% percent of the total securities bought in 2006, and 32.4% of the total securities sold. The privatisation process increased the number of institutional investors in the ASE. The average percentage of institutional investors in Jordanian firms is almost 50%. On average 49 percent of firms have more than 50% of shares owned by institutional investors. In some cases the institutional investors represent more than 70% of total shares outstanding. According to Report on the Observance of Standards and Codes (ROSC, 2004) the average control position for the top 48 listed companies is about 30 percent of shares. In addition, the majority of Jordanian firms are supermajority owned where the firm's decisions can be taken without the approval of the minority shareholders (ROSC, 2004). Thus, we expect the ownership concentration and structure to have a large impact on the firms' financing decisions.

Table 2. 7 Aaverage Percentage of Ownership Structure in Listed Companies

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Average percentage of institutional investors as total of shareholders	0.52	0.51	0.50	0.49	0.48	0.46	0.49	0.49	0.46
Average percentage of blockholders investors as total of shareholders	0.56	0.57	0.52	0.57	0.53	0.49	0.56	0.55	0.44
Source: ASE market Information available on :http://www.ase.com.jo									

In the Jordanian context, Shanikat and Abbadi (2011) show that the basic shareholders were horned in decision-making, except for the major decisions. Consequently, we can find that the there is no separation between ownership and control of the firms, therefore a high ownership concentration will affect the relationship between firms and fund providers, especially banks. As indicated by

Centre for International Private Enterprise (2003) most of the investors in emerging markets, including Jordan, are short term investors rather than owners of the firms. Thus, we expect banks to take this point into account when they provide credit for firms, where they prefer to lend to firms with a high ownership concentration.

2.3.1   *Legal Structure of Amman Stock Market*

Jordan Government issued Article 72 of the No. 76 of 2002. This law defined the structure of ASE, trading rules, and type of securities traded on ASE. The ASE is divided into a primary and secondary market.

1- Primary Market: This is the market that deals with new issuance of securities for existing and new firms. Securities issued in the primary market in ASE are: stocks, corporate bonds, treasury bills, and treasury bonds.

2- Secondary market: This is the market where issued securities are bought and sold in accordance to Securities laws. The secondary market is divided into the First Market and the Second Market. According to Jordan Securities law definitions of first and second market are:

1.   Second Market: That part of the Secondary Market through which trading takes place in securities that are governed by special listing requirements, in accordance with the ASE Securities law. Companies listed in second market are:

•   All new companies that want to trade their shares on Amman Stock Exchange.

•   Companies that transferred to second market from the first market because of any of the following cases occurred, according to Article 8 in Securities law :

A- If the Net Shareholders' Equity decreased to less than 75% of the paid-in capital.

B- If the Company accounts show losses in the last three fiscal years.

C- If the Company's Free Float ratio shares drop to less than the end of its fiscal year by:

1.   5% if its paid-in capital is 50 million Jordanian Dinars or more.

2.   10% if its paid-in capital is less than 50 million Jordanian Dinars.

D- If the number of company shareholders drops to less than 75 by the end of its fiscal year.

E- If the days of trading on company shares over the last twelve months drop to less than the minimum set. The minimum days of trading in the Company shares must not be less than 20% of overall trading days over the last twelve months.

F- If the percentage of traded free float drops during the last twelve months to less than 10% at the end of its fiscal year.

2.   First Market: That part of the Secondary Market through which trading takes place in securities that are governed by special listing requirements, in accordance with Securities law. The requirements to transfer from the second market and listing on first market in accordance to Securities law No.76 article 7 are:

A- The company must be listed for a full year at least on the Second Market.

B- The company's Net Shareholders' Equity must not be less than 100% of the paid-in capital.

C- The company must make net pre-tax profits for at least two fiscal years out of the last three years preceding the transfer of listing.

D- The company's (Free Float) to the subscribed shares ratio by the end of its fiscal year must not be less than:

1. 5% if its paid-in capital is 50 million Jordanian Dinars or more.

2. 10% if its paid-in capital is less than 50 million Jordanian Dinars.

E- The number of Company shareholders must not be less than 100 by the end of its fiscal year.

F- The minimum days of trading in the Company shares must not be less than 20% of overall trading days over the last twelve months, and at least 10% of the Free Float shares must have been traded during the same period.

Accordance to article 9 in Amman Securities law: *the listing of a Company's shares shall be transferred from the Second Market to the First Market, and form the First Market to the Second Market, once during the year, upon the provision of the financial statements to the ASE.*

2.4 JORDAN CORPORATE BOND MARKET

The total market value of bonds in the ASE is very low. The value traded in 2008 was JD 0.6 million with 427 bonds, which indicates the limited impact of the bond market on the growth of firms and Jordan's economy. At the end of year 2008 only 7 firms have issued bonds with a total market value amounting to JD 82 million.

2.5 SUMMARY

This chapter highlights the main characteristics of the Jordanian economy and its banking and capital market, and shows their relationship with the various economic sectors. Since 1999 the Jordan economy has witnessed many major reforms. The Jordanian economy now is open to other economies, growing, has a normal inflation rate, and most of the government enterprises have been privatised. However, the trade deficit is very high due to high energy costs. The financial system is classified as a bank-based system where the banking sector is well-developed, efficient and

working on a commercial basis. The banking system plays a key role in the Jordanian economy, where firms using bank debts for their investment. The stock market is still in a developing process, and the major development started after 1999, while ownership of firms remains concentrated. The bond market is very shallow and needs more development. As aforementioned, the services and industrial sectors are very important to Jordanian economic growth. These factors are likely to have significant implications for firms' financing decisions, which this research will investigate in the subsequent chapters.

CHAPTER THREE

FINANCIAL CONSTRAINTS ON CORPORATE INVESTMENT

3.1 INTRODUCTION

One of the most important decisions taken by firms is the investment decision. Analysing the investment decision has been at the core of much research in finance. This research has focused on the factors that affect the investment decision, and in particular whether firms are prevented from making otherwise worthwhile investments by the availability of finance. Based on the standard investment model, in the presence of perfect capital markets, the firm's investment decision should depend only on the desired or required rate of return, which means that the firm's investment decision should not be affected by the financing decision. Notably, the availability of internal finance, whether it is cash flow or current profit, must not be seen to affect the firm's investment decision. The investment model should capture the investment opportunity of a firm, whilst the inclusion of internal finance variables should not yield any significant relation with the amount invested at any particular point in time. If any internal finance variables are significant when included in the investment equation, then this can be taken to show the presence of financial constraints on firm investment (see Kadapakkam *et al*., 1998).

In the presence of market imperfections, internal and external finance will no longer be perfect substitutes for each other. The firm will be unable to separate the investment decision from the financing decision because the method of financing will influence the cost of financing, and thereby influence the investment that the firm can make. The firm is therefore regarded as being financially constrained when the firm's spending on investment is affected by the availability of internal finance. Alternatively, we can define a financially constrained firm as one where the cost of external finance (new shares or debt) is greater than the cost of internal

finance, thus leading the firm to face a financing hierarchy in its source of funds. It is likely that imperfections in the financial market in ASE will create financial restrictions on a Jordanian firm's investment, and thereby create a disparity between the cost of external finance and the cost of internal finance (see Kadapakkam *et al.*, 1998).

There has been an extensive debate in the literature as to why the cost of external finance might be different from the cost of internal finance. Many articles have justified the difference in terms of the presence of transaction costs, taxation costs and bankruptcy costs. Others have justified this difference by the presence of asymmetric information between the insiders and outsiders of the firm, emphasising the issues of adverse selection and moral hazard, which lead to an increase in external costs and the discouragement of financing firm investment from outside sources. The result is that firms will prefer internal sources of funds because they are less costly, and in extreme cases internal funds might be the only source of funds available to the firm.

In general terms, the investment and financing decisions are no longer independent if the cost of financing is dependent on the source of that financing. More specifically, it means that not only is the investment decision dependent on the financing decision, but that the investment decision taken by the firm can be a way of investigating the presence of financing constraints. A large amount of research has investigated this relationship between the financing and investment decisions by analysing the relationship between firm investment or capital expenditure and firm cash flows. The presence, and extent, of a relationship between investment and cash flow is a measure of the financial constraints on a firm's investment, and is referred to as the investment-cash flow sensitivity. If a firm's investment is sensitive to its cash flow, then this suggests that the firm is constrained from investing by raising capital from external sources.

3.2 THE INVESTMENT CASH FLOW RELATIONSHIP

An early analysis of the potential impact of asymmetric information between the firm and its external supplier of funds was presented by Myers and Majluf (1984).

They developed the notion that as a result of this asymmetric information, firms would choose to rely on internal funds to finance new investment, and once these internal funds had been utilised, they would then revert to external sources of funds, with debt being preferred to equity. This was developed further by Greenwald *et al.,* (1984), who argue that it is the availability of debt, and not the cost of debt, that limits firms from investing in new positive net present value projects. Moreover, the information problem between investors and the firm would decrease if the investors know the methods the business will utilise to invest their money.

The importance of the availability of internal funds has lead many papers to examine the relationship between a firm's investment and the availability of internal funds. An early example of this was conducted by Fazzari *et al*., (1988), who subsequently found that there is a positive relationship between firm investment and cash flow. The major contribution of this particular paper can be seen from two different perspectives: The first one is the addition of a cash flow variable to the investment model in order to measure directly the financial constraints on firm investment. The second contribution is the grouping of firms into two depending on whether they can be classified as constrained or unconstrained. The classification criteria include factors such as the payout ratio, firm size or firm age. Following classification, the model is tested on each group separately with the cash flow coefficient being compared between the two groups. They find that investment in firms with a high dividend retention ratio, or equivalently a low payout ratio, is more sensitive to the availability of internal cash flow. They interpret this result as demonstrating that these firms are more financially constrained as a result of their payout policy.

The next section summarises the main literature that has evaluated the factors that affect the firm's investment cash-flow sensitivity.

3.2.1 *Review of firm's Characteristics and Investment-Cash Flow Relationship*

A number of studies have examined the impact of the firm's characteristics on the relationship between investment and cash flow. The main idea is that the firm's

unique characteristics may influence the extent of the asymmetric information problem between the firm's management and investors, which in turn affects the wedge between the cost of external funds and the cost of internal funds. An alternative perspective has been developed by agency cost theory, which predicts a positive relation between a firm's investment and its cash flow, Jensen and Meckling (1976). Here, the agency problem is one where the firm's managers have an incentive to overinvest in order to increase the personal benefits they can acquire from empire building. Agency costs refer to any costs that the firm's owners have to pay in order to ensure that the firm's managers make optimal decisions on behalf of the firm's owners. Therefore, the main challenge for most researchers is to identify the firm characteristics that can be used as classification criteria to reflect the degree of asymmetric information and/or agency cost (i.e. the characteristics that help to explain the reasons for the wedge between the cost of external and internal funds). Fazzari *et al*., (1988) confirmed that firm characteristics do appear to affect the sensitivity of investment to cash flow.

A number of studies have since been conducted to examine this relationship, using different firm characteristics or using different data sets. For example, Gilchrist and Himmelberg (1995) use different classification criteria to identify firms facing financial constraints, including commercial paper issuance, bond ratings and firm size. The impact of firm size on the investment – cash flow sensitivity has also been examined explicitly by Kadapakkam *et al*., (1998). They argue that large firms should be less affected by the availability of internal cash flow because they are well-known to investors and lenders, and have less asymmetric information. However, their results show that corporate investment is affected by the availability of cash flow. In contrast to their expectations, they find that large firms' investments are more sensitive to the availability of internal cash flow, and they interpret this result by concluding that internal cash flow is less costly than funds from external sources. Large firms' investment will be affected by cash flow because they have the flexibility and ability to reschedule their investment until the availability of this cash flow. However, Rauh (2006) finds that small and medium firms are more financially constrained.

This analysis is extended by Cleary (1999), who investigates the relationship between firm investment and cash flow, taking into consideration the financial status of the firm and its effect on the firm's ability to borrow. Cleary measures firm financial status using several financial ratios (liquidity, leverage, profitability, and growth), and expects that firms with strong creditworthiness will pay a lower premium on money borrowed from banks, and should be classified as being less constrained. However, Cleary finds that firms with high creditworthiness depend to a greater extent on internal cash flow when financing their investments, whilst investment-cash flow sensitivity is lower in those businesses with low creditworthiness rating. Cleary interprets this finding from the perspective of free cash flow theory, whereby the firm's managers increase firm spending on investment in response to the availability of free cash flow.

Alternatively, characteristics of the firm's ownership might be important factors in influencing investment-cash flow sensitivity. Goergen and Renneboog (2001) consider the impact of ownership concentration, and suggest that the presence of a large block shareholder will decrease the liquidity constraints on firm investment by reducing the problem of asymmetric information, while at the same time reduce the overinvestment problem by monitoring and controlling managers' use of free cash flow. Their results confirm that the presence of block shareholders lowers the investment - cash flow sensitivity. A similar finding with respect to institutional shareholders has been found by Attig *et al*., (2012). They show that the degree to which firms rely on internally generated cash flow to fund their investments is reduced as the investment horizon of institutional investors increases. Finally, Firth *et al*., (2008) investigate the impact of bank ownership, and find that state-owned banks impose fewer lending restrictions on firms with a high level of state ownership in their capital. This shows that the relationship between banks and firms decreases the restriction on external finance.

The focus on firm characteristics has been extended by Bhagat *et al*., (2005), who examine the relationship between investment and cash flow for distressed firms, where distressed firms are those that cannot meet their obligations using internal cash flow. Their results show that investment-cash flow sensitivity in distressed firms depends on the type of distressed firm. Distressed firms with profits yield a

positive relationship between investment and cash flow, whereas those with operating losses yield a negative relationship. Bhagat *et al*., argue that the negative relationship is due to the impact of external financing. Specifically, firms with an operating loss finance their investment from external finance, and in particular from external equity. The hypothesis is that external equity investors are willing to finance firm investment in distressed firms in the expectation of better future conditions, and because of limited liability they are prepared to invest in these riskier firms.

A different approach has been taken by Beck *et al*., (2006), who examine the determinants of financial obstacles on firm investment through a survey of over 10,000 firms in 80 countries. Their results show that the age and size of the firm, and the type of ownership, affect the financial obstacles to firm investment. Smaller firms face more financial constraints than larger firms, thus indicating that large firms suffer less from asymmetric information and have a greater access to external sources of funds. In addition, they find that financial system development decreases the financial obstacles on firm investment.

The type of asset held by the firm may also be important. Almeida and Campello (2007) find that investment in firms with a high tangibility of assets is not affected by changes in internal funds. Asset tangibility affects the sensitivity of investment to cash flow in financially constrained firms, but does not affect it in financially unconstrained firms. The theoretical basis behind this proposed relationship relates back to what is referred to as the credit multiplier, which means that the firm can extend its credit ability by holding more tangible assets. The results support the hypothesis that investments in firms with high asset tangibility are unaffected by changes in internal funds.

Lyandres (2007) obtains similar results for the impact of firm age on the investment - cash flow sensitivity. Mature firms have a lower sensitivity between investment and cash flow because they suffer less from asymmetric information. As a result the cost of external finance is lower, and they have greater access to the external market.

3.2.2 *The Financial System and Investment Cash Flow Relationship*

In contrast to the research focusing on firm characteristics, an alternative approach has been to examine how the financial system might affect the extent of asymmetric information and agency costs. Here research has considered how differences in the structure or development of financial systems will affect the wedge between the cost of internal and external finance. A potentially important aspect of financial systems is whether they are bank-based systems or market-based systems. Firms in bank-based systems should be less financially constrained because their close relationship with banks can reduce the moral hazard and asymmetric information problems. Banks can effectively monitor the firm's uses of funds (Petersen and Rajan, 1997). On the other hand, the asymmetric information problem increases in a market-oriented financial system, leading to an additional cost premium from utilising external funds to finance firm investment.

Consistent with this, there is evidence of a closer relationship between firms and creditors represented by banks in the German financial system, which subsequently leads to less asymmetric information between firms and suppliers of funds (Audretsch and Elston, 2002). This reduces liquidity constraints on firm investment, particularly among small firms when compared to the financial constraints on small firms in Anglo-Saxon countries with market-based financial systems. As a result, firms depend more on debt financing from banking to finance their new investment. Similar results were obtained by Bond *et al.,* (2003), who use firm datasets for Belgium, France, Germany, and the United Kingdom. The results highlight a positive and significant impact of cash flow upon firm investment within the UK, but notably a less important role in France, Germany, and Belgium. The results also indicate that the market-oriented financial system within the UK does not work as effectively in terms of providing firms with the required amount of funds.

These findings were confirmed by Mizen and Vermeulen (2006), who find that investment-cash flow sensitivities amongst UK firms are greater than German firms owing to the greater asymmetric information in a market-financed system. They extend previous studies by examining the impact of creditworthiness, and find that investment-cash flow sensitivities are lower in firms with high

creditworthiness (measured by sales growth and net profit margin). These results are consistent with the theory that firms with a healthy and good financial position have better access to external finance. However, Aggarwal and Zong (2006) find that investment in unconstrained firms in market-based countries is less affected by the availability of internal cash flow compared with constrained firms. On the other hand, investment in unconstrained firms amongst bank-based countries is more affected by the availability of internal cash flow compared with constrained firms. This analysis is extended by Becker and Sivadasan (2010) using data from 21 European countries. They find that investment-cash flow sensitivity is lower in more developed countries, such as Switzerland, compared with less developed countries, such as Italy and Hungary, as a result of the reduction in market imperfections in a well developed financial system. Baum *et al*., (2011) also find that the firm's financial constraints can be reduced by the structure and the development of the financial system. They show that firms in bank-based markets are less financially constrained than firms in market-based countries, confirming that bank-based systems ease the obstacles to external sources of fund because the relationship between firms and banks reduces the asymmetric information problem due to the banks' monitoring of the firm's activities.

Other research has examined the impact of the development of the financial system over time on the financial constraints on firm investment. Financial system development should improve firm access to external finance as it leads to fewer imperfections in the market, measured by transaction costs, agency problems and asymmetric information. Love (2003) confirms that financial development reduces financial constraints on firm investment, firms in developing countries having greater financial constraints. Laeven (2003) argues that financial liberalisation decreases financial constraints more for small firms than for large firms. Similar results are also obtained by Bhaduri (2005) and Ghosh (2006), who find evidence that improving the financial system will decrease the firm's investment sensitivity to cash flow, as a result of improved access to external finance. Bhaduri argues that small and young firms face more financial constraints before and after financial liberalisation, and that the financial constraints are greater after liberalisation because of the withdrawal of government support. Similarly, Baum *et al*., (2011)

find that financial development reduces financial constraints, because the strengthening of financial institutions enables firms to access funds at a lower cost.

Brown and Petersen (2009) extend this by examining the impact of the equity and debt finance channels on the investment cash flow sensitivities. They find that the improvement of the equity market in the US during the last two decades has decreased the financial constraints on US firms. The major improvements being; the establishment of NASDAQ in 1971 and the creation of the National Marking System; the rise of mutual funds playing a key intermediary between firms and households; and the inclusion of a wider range of investments in fund portfolios.

There is a general consensus that improvements in financial markets lead to a decrease in financial constraints on firm investment, because improvements in capital markets lead to fewer market imperfections and the increased use of external equity finance. Brown and Petersen include new equity and new debt issuance to control for the availability of external finance in investment cash flow sensitivities. Using data for US non-financial firms between 1970 and 2006, they find that the investment cash flow relationship is also affected by the changing composition of firms' investment between physical and R&D, and the increasing importance associated with the equity market. The relationship between firm investment and physical expenditure disappears over time, which is consistent with their finding that firms' spending on physical expenditures declines over time in favour of R&D expenditures. On the other hand, the result shows the increasing impact of internal cash flow on R&D expenditure, which is in line with firms' spending on R&D increasing over time as a portion of total investment.

3.2.3   *Business Group and Investment Cash Flow Relationship*

Some research has suggested that the financial constraints on firm investment may be reduced if the firm belongs to a business group. They provide evidence that the business group provides firms within the group with funds, reduces their need for external funds and decreases the investment cash flow sensitivity. Hoshi *et al.*, (1991) explore this in the context of the relationship between firm investment and internal funds, taking into account firm membership in a group of firms, in this case a Keiretsu. The results support the view that the relationship between firms

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and banks has an impact on firm investment, firms belonging to a Keiretsu group being less financially constrained. This confirms that the Keiretsu provides a strong link for member firms to raise debt from financial institutions. Similar results of a reduction in investment-cash flow sensitivities for firms belonging to a corporate group were found by Deloof (1998) for firms belonging to corporate groups in Belgium. Finally Gorodnichenko et al. (2009) study the investment-cash flow sensitivity of firms from German Konzerns, where a Konzern is *"a group of affiliated companies consolidated under unified leadership of a ruling company"*. They show that small firms in Konzerns have a lower sensitivity of investment to cash flow than firms that do not belong to a business group. Thus, different types of business group play an important role in allowing firms to reduce the sensitivity of investment to cash flow, and therefore reduce the financial constraints on corporate investment.

In the context of developed banking systems and the underdevelopment of capital markets, Fohlin and Iturriaga (2010) investigate the impact of the bank-firm relationship on financial constraints for firm investment in Spain. They suggest that a close relationship between firms and banks will decrease investment cash flow sensitivities because banks provide firms with the required amount of liquidity. They present two indicators of the bank-firm relationship; the amount of bank equity ownership in firm capital, implying that the bank will be a creditor and an investor in the firm at the same time; and the amount of bank debt to total debt, where firms with a high ratio of bank debt to total debt will be closer to the bank. In contrast to expectations, the bank-firm relationship has little impact on investment-cash flow sensitivities, whereas it is lower in firms with large block shareholders. This implies that the bank's relationship with the firm is not a perfect substitute for supervision by large stakeholders, and that firms face an agency cost problem. Firm managers increase the firm's size by investing in new projects, even though such projects are not profitable, and banks cannot effectively monitor these investment decisions.

3.2.4 *Financial crisis and Investment Cash Flow Relationship*

Recently some empirical papers have investigated the impact of the financial crisis on the financial constraints on firms' investment. During the financial crisis, the ability and willingness of financial institutions to lend to firms declined, which lead to an increase in interest rates and a reduced readiness to take risks by providing firms with funds. Duchin *et al.*, (2010) find that during the financial crisis firm investment declined significantly, with financially constrained firms being affected more than financially unconstrained firms. These results support the finding by Campello *et al.*, (2010) who use survey analysis to show that during the financial crisis cuts to capital expenditure by financially constrained firms are more severe than for unconstrained firms. Financially constrained firms were heavily reliant on internal cash flow during the financial crisis because they have limited access to the capital markets.

3.3 MODELLING INVESTMENT

Four main testable models have been used to describe firm investment and the impact of financial constraints. The four models are the neoclassical model, the sales accelerator model, Tobin's Q model, and the Euler model (see Goergen and Renneboog, 2001)

- Neoclassical Model

The neoclassical model was pioneered by Jorgenson (1963), and assumes that firm investment is determined by the cost of capital. The main argument in this model implies that firms invest in capital stock if the return on the investment exceeds the cost of the investment; therefore, the investment equation is as follows:

Firm investment level = function of (cost of capital, cash flow, other variables).

$$\left(\frac{I}{K}\right)_{i,t} = ao + \beta_1 \left(\frac{CK}{K}\right)_{i,t} + \beta_2 \left(\frac{CK}{K}\right)_{i,t-1} + \beta_3 \left(\frac{CF}{K}\right)_{i,t} + e_{i,t} \qquad eq. \ 3.1$$

Where *I* represents firm investment, *CK* represents the cost of capital. In this model the main aim of the firm is to reach the optimal capital stock in the current period, thus we can consider desired investment as a change towards the optimal

stock of capital. Jorgenson assumes that the firm will move towards the optimal stock of capital with a delay. Delivery lags mean that some investment goods ordered in the current period are delivered in the next period. Considering investment as a continuous process, we can consider that investment at time *t* is the sum of the proportion of the current and the past desired investment which is delivered at time t, indicating that the cost of capital in the current period and past period determine the actual investment in time *t*.

CF represents internal cash flow, which is the variable used to measure the financial constraint on firm investment, and K is the capital stock. This model suffers from the difficulty of establishing the firm's cost of capital.

- Sales Accelerator Model

A widely used model is the sales accelerator model proposed by Abel and Blanchard (1986), which states that increasing firm sales leads to increasing firm investment. They introduce an autoregressive model to measure the relationship between firm investment and sales. In this model, long-run firm investment is a function of expected future profitability measured by the sales accelerator. Financial constraints on firm investment exist when a relationship is established between cash flow and firm investment.

Firm investment level = function of (Sales, cash flow, other variables).

$$\left(\frac{I}{K}\right)_{i,t} = ao + \beta_1 \left(\frac{S}{K}\right)_{i,t} + \beta_2 \left(\frac{S}{K}\right)_{i,t-1} + \beta_3 \left(\frac{CF}{K}\right)_{i,t} + e_{i,t} \qquad eq.\ 3.2$$

where *I* represents firm investment, *S* represents firm sales or output as a measure of future profitability and growth opportunities. *CF* represents net income plus depreciation, and is used to measure the financial constraints on firm investment. *K* is the lagged net fixed assets.

Laeven (2000) use the sales accelerator model to explore the impact of liberalisation (deregulation of government controls on interest rates, the removal of barriers to banking sector entry) on the financial constraints on firm investment. The sales variable is used as a proxy for investment, and cash flow as a measurement of financial constraints. The results point to firm investment being

sensitive to the availability of internal cash flow. In addition, firm sensitivities to cash flow decrease with financial reform and liberalisation. Bhaduri (2005) applied the model to firm investment in India. The results support the sales accelerator model, internal cash flow having a positive and significant impact on firm investment. He found that small and young firms face more financial constraints than larger and older firms.

- Tobin's Q Model

The Q Model was presented by Tobin (1969) and extended by Hayashi (1982). This model implies that future firm investment and profitability can be captured by the Q value, where Q is equal to the market value of equity and debt divided by the replacement cost of firm's capital stock. The model was used by Fazzari, Hubbard and Petersen (1988), who included the ratio of cash flow to the investment equation in order to measure financial constraints on firm investment and capture market imperfections. This model assumes that, in the presence of perfect markets, firm investment depends only on Q; in other words, cash flow should not affect firm investment, otherwise market imperfections exist and the firm faces liquidity constraints.

Firm investment level = function of (Q value, cash flow, other variables).

$$\left(\frac{I}{K}\right)_{i,t} = ao + \beta_1 \, Q_{i,t} + \beta_2 \left(\frac{CF}{K}\right)_{i,t} + e_{i,t} \quad eq. \ 3.3$$

where *I* represents firm investment in fixed assets at the end of period, the *Q* value is used as a proxy of investment opportunities. *CF* represents net income before extraordinary items plus depreciation, and measures the financial constraints on firm investment. *K* is the beginning of period replacement cost of firm capital stock. In addition, in the presence of adjustment costs to investment, the lagged value of investment is included to control for the persistence of the investment-capital ratio that is assumed to be in the data (see, Carpenter and Guariglia, 2008, Rousseau and Kim, 2008; Brown and Petersen, 2009). As noted by Eberly *et al.,* (2012) '*the best predictor of the current investment at the firm level is lagged investment'*, so including lagged investment will improve the ability of the Q model to capture investment behaviour.

- Euler Model

An alternative to the Q model for estimating firm investment is the Euler Equation model presented by Abel (1980) and applied by Bond and Meghir (1994a, 1994b). An Euler model is derived from the forward-looking dynamic program of a first-order maximisation conditions, however, when panel data is used and we have short time series the model is estimated with backward terms and future expectations. where the firm maximises its value which is a function of the capital stock from the previous period. The current rate of investment depends on last period's investment and the marginal product of capital. If we assume a 2-period model, then the firm makes its investment decision by comparing the marginal benefits generated from a unit of capital at time t with the discounted value of the marginal costs of the investment at time t+1. The advantage of the Euler model is that it controls for expectational influences on the investment decision (see Bond *et al., 2003*), with the previous rate of investment and cash flow playing a crucial role on current investment. The model assumes the absence of financial constraints:

Current investment level = function of (lagged investment level, cash flow, sales, other variables).

$$\left(\frac{I}{K}\right)_{i,t} = ao + \beta_1 \left(\frac{I}{K}\right)_{i,t-1} + \beta_2 \left(\frac{I}{K}\right)^2_{i,t-1} + \beta_3 \left(\frac{Y}{K}\right)_{i,t} + \beta_4 \left(\frac{CF}{K}\right)_{i,t} + \beta_5 \left(\frac{D}{K}\right)_{i,t} + e_{i,t}$$

eq. 3.4

Bond and Meghir (1994b) show that, in the absence of financial constraints, the variable coefficients must be as follows ($\beta_1 > 1, \beta_2 < -1, \beta_3 \geq 0,$ and $\beta_4 < 0.$). In order for investment to follow its optimal path, all the above restrictions must be met. $I_{i,t-1}$ represents the lagged rate of investment, which should have a positive relationship with the dependent variable because the firm cannot cancel a capital expenditure commitment. $I^2_{i,t-1}$ represents the squared lagged rate of investment, and measures the deviation of the current optimal rate of investment from current actual capital stock. Y represents firm output, and accounts for the impact of imperfect competition. CF measures the sensitivity of the firm's investment to internal cash flow. In the absence of financial constraints, this coefficient must be negative, which means that a higher level of cash flow implies lower net marginal

costs, which in turn leads to lower expected investment. *D* represents firm debt, and captures bankruptcy costs and the tax advantages of debt. All variables are scaled by the beginning of period replacement cost of firm capital stock *K*.

3.3.1 Comments on Investment Models

Each of the four investment models has some limitations and shortcomings that affect their reliability to estimate investment. The neoclassical model lacks the ability to include any forward-looking variables (Goergen and Renneboog, 2001), which means that the model does not have the ability to forecast the firm's future investment opportunities. It simply shows the main determinants of firm investment. The sales accelerator model suffers from the same problem, where the firm's sales have no expectation regarding the firm's future growth opportunities. This model assumes that firm sales grow alongside firm investment, and may not have any expectational power in relation to future growth opportunities (Goergen and Renneboog, 2001). Whilst the Euler model includes lagged investment, it is a fairly restrictive model that again does not incorporate a proxy for the firm's future growth opportunities. The use of the Euler model is more appropriate for unquoted firms where we cannot use the market value as a proxy for investment opportunities. The model may also be more applicable when estimated over a relatively long period of time, as it is able to pick up changes in individual firms' financial positions alongside fluctuations in the economic environment (Schiantarelli, 1996). The Euler model is therefore not regarded as being well suited to estimating models of firm investment (Oliner *et al.,* 1995). As a result, the overwhelming majority of the literature has applied variations of the Q model to estimate firm investment.

3.4 THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

The impact of the availability of internal finance and external finance on firm investment is a central issue in the context of corporate finance. Modigliani and Miller (1958) show that, in a perfect world, the firm's investment decisions are independent of the financing decisions, and that the firm must invest only if the

return on the investment is greater than the cost of capital. Recent literature finds that investment decisions are related to financing decisions because most firms operate in imperfect markets owing to transaction costs, asymmetric information, tax costs and agency costs. Myers and Majluf (1984) argue that, in the presence of perfect markets, external investors have all the information regarding the firm's investments, whilst external finance would be a perfect substitute for internal finance. Firm investment will not be affected by the availability of internal finance, while in the presence of asymmetric information and transaction costs firms will face a pecking order, leading to a financing hierarchy. Accordingly, a firm will use its internal finance before external finance and will prefer debt to equity. The firm cannot separate the investment decision from the financing decision, owing to the external source of funds not being a perfect substitute for internal source of funds.

A firm can be defined as financially constrained when investment spending is affected by the availability of internal funds or the change in internal cash flow. Alternatively, a firm can be defined as financially constrained when it faces a financing hierarchy, or follows a financing pattern consistent with the pecking order hypothesis, where firms utilise internal funds first, and prefer debt to equity financing. The model in Eq. 3.5 below will therefore be estimated, to test whether there is any relationship between firm investment and internal cash flow, and therefore whether firms face constraints on their investment.

H1: All else equal, firms listed in ASE are not financially constrained and therefore the cash flow coefficient is not significantly different from zero.

3.4.1   *Financial Constraints and Market Listing*

ASE provides us with a unique opportunity to measure the financial constraints on firm investment. The ASE secondary market is divided into two markets; the first market and the second market. Firms listed in the first market are in general firms in a good financial position, are well known, have a normal free float volume, and are assumed to be less financially constrained. On the other hand, firms listed in the second market have suffered from losses, have low free float volume, and are assumed to be financially constrained and restricted from the credit market. This listing classification provides us with the opportunity to test whether there are any

differences in financial constraints between those firms listed in the first market and those listed in the second.

Further, if we can establish any differences in financial constraints between the firms in the two markets, we can then conclude that the suppliers of funds take into consideration the financial position of the firm; therefore, they will increase or decrease financial restrictions on the supply of funds for firms, depending on the firm's financial position. In addition, if the firms listed in the second market are more financially constrained than the first-market firms, one can conclude that the Amman Stock Exchange successfully discriminates between healthy and less healthy firms.

H2: All else equal, firms listed in the second market are more financially constrained than firms listed in the first market, so investment-cash flow sensitivities will be higher in the second market.

3.4.2 *Financial Constraints and Firm Size*

One of the most important factors that might affect asymmetric information and agency costs is firm size. Smaller firms face greater asymmetric information problems and are assumed to be financially constrained for several reasons: First, small firms are less able to increase their capital from new issues because of transaction costs - flotation and underwriting costs decrease proportionately with the value of the issue (Devereux and Schiantarelli, 1990). Second, large firms may have a low probability of bankruptcy because they are more diversified and provide better collateral (Bhaduri, 2005; Kadapakkam *et al*., 1998), and so large firms may have better access to debt than small firms: Third, small firms have more asymmetric information between insiders and outsiders because they are followed by fewer analysts (Kadapakkam *et al*., 1998). All of these factors increase the cost of external sources of finance for small firms, and therefore small firms will face financial constraints and depend more heavily on their internal sources of finance.

There is evidence that small firms are more financially constrained than large firms, as shown by Arslan *et al*., (2006) and Duchin *et al*., (2010), although other researchers find that the investment cash flow sensitivity is greater in large firms,

Kadapakkam *et al*., (1998), Cleary (2006) and Chang *et al*., (2007). To examine the effect of firm size, two definitions of size will be used: total assets and the value of sales. Firms below the sample median will belong to small firms, and firms above will be classified as large firms; this classification criterion is similar to that of Kadapakkam *et al*., (1998), and Duchin *et al*., (2010).

H3: All else equal, small firms are more financially constrained than large firms, so investment-cash flow sensitivities will be higher for small firms.

3.4.3   *Financial Constraints and Firm Age*

It is often argued that young firms are more likely to face a high asymmetric information problem since outsiders have insufficient data and a short interaction record with the young firms to evaluate their performance (Guariglia, 2008). Mature firms are more likely to have lower degrees of asymmetric information since outsiders know more about the firm. In addition, more mature firms have a repeated relationship with creditors, which reduces the asymmetric information between firm and creditors, Schaller (1993). Mature firms have better access to external financing with lower costs of external financing (Bhaduri, 2005 and Lyandres, 2007). Brown and Petersen (2009) argue that the age of the firm is negatively correlated with asymmetric information, and costs of external financing decrease with firm age, where age is calculated as the point at which the firm is established. With this in mind, firms were selected into mature and young firms by splitting the sample at the median of the firm age. The model is estimated for the entire sample by including the interaction term (cash flow with group dummy) comprising a dummy variable set to 1 for mature firms and a value of 0 for young firms.

H4: All else equal, young firms are more financially constrained than mature firms, so investment-cash flow sensitivities will be higher for young firms.

3.4.4   *Financial Constraints and Dividend Payout Ratio*

Fazzari *et al.,* (1988) argue that firms with a low payout ratio are more financially constrained because they expect to face a high cost of external financing. Fazzari *et al.,* (1988) find that investment cash flow sensitivities are higher for low payout

firms. In contrast, Cleary (2006), Arslan *et al.,* (2006) and Chang *et al.,* (2007) find that the investment cash flow sensitivity is less for low payout firms. Following D'Espallier *et al.,* (2008) and Campello *et al.,* (2010), we classify firms into dividend-paying and non-dividend-paying firms. Accordingly, dividend-paying firms were split from non-dividend-paying firms on an annual basis. The model is estimated for the entire sample by including the interaction term (cash flow with group dummy) comprising a dummy variable set to 1 for dividend-paying firms and a value of 0 for non-dividend-paying firms.

H4: All else equal, non-paying dividends firms are more financially constrained than dividend-paying firms, so investment-cash flow sensitivities will be higher among non dividend paying firms.

3.5   MODEL DESIGN

In the presence of perfect markets, a firm's current investment must be affected by the firm's expected future profitability (Fazzari *et al.,* 1988; Kadapakkam *et al.,* 1998; Cleary, 1999; Bhagat *et al.,* 2005; and Brown and Petersen, 2009). Therefore, in the investment equation the equity market-to-book value is used as a proxy to control for expected future profitability (i.e. investment growth opportunities) (see, Cleary, 2006 and Allayannis and Mozumdar, 2004). The cash flow variable is included in the investment equation to measure the financial constraints on firm investment. A large and positive coefficient for cash flow means that firms respond to the availability of cash flow by increasing investment (Fazzari *et al.,* 1988, Bond *et al.,* 2003; Laeven, 2003; Bhagat *et al.,* 2005; Cleary, 2006; Duchin *et al.,* 2010). In the presence of an adjustment cost of investment, the lagged value of investment is included to the Q model to control for the persistence of the investment-capital ratio that is assumed to be in the data (see, Carpenter and Guariglia, 2008, Rousseau and Kim, 2008; Brown and Petersen, 2009). Including the lagged value of investment will improve the ability of the Q model to model investment behaviour.

Following Brown and Petersen (2009), Rousseau and Kim (2008), and Ismail *et al.*, (2010), we use the dynamic model of investment; the lagged investment to net

fixed assets implies that it may be easier for the firm to continue investment at some fraction of the previous period's ratio, due to the presence of adjustment costs of investment (Brown and Petersen, 2009). Finally, we control for external sources of finance by adding new debt and new equity issuance to the model. Therefore, the model is estimated as follows:

$$\left(\tfrac{I}{K}\right)_{i,t} = ao + \beta_1 \left(\tfrac{I}{K}\right)_{i,t-1} + \beta_2 \left(\tfrac{M}{B}\right)_{i,t} + \beta_3 \left(\tfrac{CF}{B}\right)_{i,t} + \beta_4 \left(\tfrac{ND}{K}\right)_{i,t} + \beta_5 \left(\tfrac{NE}{K}\right)_{i,t} +$$

$$\lambda_t + a_i + \varepsilon_{i,t} \qquad\qquad\qquad eq.\ 3.5$$

Where I is the firm's investment, represented by the change in the level of net fixed assets, and defined as {(Net Fixed Asset in year $_t$)–(Net Fixed Asset in year $_{t-1}$)+(Depreciation for year $_t$)} see, Miguel and Pindado (2001); K is net fixed assets; M is the market value of outstanding common equity; B is the book value of common equity (see, Cleary, 1999); CF represents net income after tax plus depreciation, which is used to measure financial constraints on firm investment. ND measures cash flow from new debt, equal to net increase in total debt, and this is equal to the net increase from year $_{t-1}$ to year t in {(Total liabilities in year $_t$) – (Accounts Payable in year $_t$) – (Other Liabilities in year $_t$)}; NE measures new cash flow as a result of raising capital, and is equal to {(Increase in Paid in Capital from year $_{t-1}$ to year1) + (Issuance Premium in year $_t$)}; λ_t is year dummies which control for year fixed effects, a_i is a firm specific effects, and $e_{i,t}$ is the random error term.

3.5.1   *Firm's Characteristics and Investment-Cash Flow Sensitivities*

In order to examine whether the investment-cash flow sensitivities are different between the firms that are assumed to be financially constrained or unconstrained, we interact the dummy variable with cash flow[6], where the dummy variable is set to 1 if the firm is assumed to be unconstrained, and 0 otherwise.

To determine whether the investment-cash flow sensitivity is affected by the firm's characteristics, we estimate an augmented version of equation (3.6), where β_6 distinguishes the impact of firm characteristics on investment-cash flow sensitivities.

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[6] A similar methodology is used by Duchin *et al*., (2010).

$$\left(\frac{I}{K}\right)_{i,t} = ao + \beta_1 \left(\frac{I}{K}\right)_{i,t-1} + \beta_2 \left(\frac{M}{B}\right)_{i,t} + \beta_3 \left(\frac{CF}{K}\right)_{i,t} + \beta_4 \left(\frac{ND}{K}\right)_{i,t} + \beta_5 \left(\frac{NE}{K}\right)_{i,t}$$

$$+ \beta_6 D * \left(\frac{CF}{K}\right)_{i,t} + \lambda_t + a_i + \varepsilon_{i,t} \quad eq\ 3.6$$

D is a dummy variable that captures one of our interested criterion to be tested. To recap, the criteria are as follows: i) Market listing ii) Firm size iii) Firm age iv) Firm dividend policy.

3.5.2 *Method of Estimation*

This study uses panel data estimation to examine the research problem. As in many studies, for example, (Laeven, 2003; Love, 2003; Ghosh, 2006; Rousseau and Kim, 2008; and Brown and Petersen, 2009) this study uses the Generalised Methods of Moments method. This method helps us to overcome the endogeneity problem, which might arise because cash flow, new debt, new capital, the market to book value, and investment may be simultaneously determined (see, Brown and Petersen 2009). Because the OLS estimator would yield inappropriate results if there is endogeneity of the model variables, we use the GMM estimator. One approach is the first-difference Generalised Methods of Moments (GMM) estimator developed by Arellano and Bond (1991). The differenced-GMM enables us to remove the time invariant firm characteristic (unobserved individual effect) by taking the first difference of the variables. In addition, the differenced-GMM controls for possible endogeneity problems where the differences are instrumented by lagged levels of the regressors, where valid instruments are not correlated with the error term in the equation. (Blundell and Bond, 1998) documented that, even if the instruments are not correlated with the error term, differenced-GMM may perform poorly when the time dimension of the panel data is relatively small, and the series are persistent, especially if the instruments are only weakly correlated with the endogenous explanatory variables. The second approach is the System-GMM. Arellano and Bover (1995) and Blundell and Bond (1998) extend the differenced-GMM estimator and introduced another estimator, "*derived from estimation of a system of two simultaneous equations, one in levels (with lagged first differences of the right-hand side variables as instruments) and the other in first differences (with lagged*

levels of the right-hand side variables as instruments)" Alessandrini *et al.(2006)* The System-GMM estimator treats this system as a single-equation estimation problem.

The estimator is called System-GMM because it combines the moment conditions for the differenced model with those for the levels model. Blundell and Bond (1998) show that System-GMM is less biased and has more precision, especially when we have small samples. In the presence of heteroskedasticity and serial correlation, the two-step System-GMM is more efficient than one-step System-GMM. *"The estimated asymptotic standard errors of the efficient two-step robust System-GMM estimator are severely downward biased in small samples, and thus we correct for this bias using the method proposed by Windmeijer (2005)"* (see, Fiordelisi *et al. (2011)*. Blundell and Bond (1998) use all right-hand side variables in the model lagged twice or more as instruments. However, in this study the number of cross sections is small, so to avoid the problem of too many instruments relative to the sample size[7], we will use certain lags instead of all available lags for the instruments. Therefore, we use the second lag of the right-hand side variables in Eq. 3.5 as valid instruments.[8] In addition, System-GMM solves the endogeneity problem because of the lagged value of the dependent variable (see the following chapter for more explanation of this issue).

For consistent estimation and in order to avoid misspecification, the System-GMM estimator requires that the error $\varepsilon_{i,t}$ to be serially uncorrelated. Specifically, the $\varepsilon_{i,t}$ are serially uncorrelated when the $\Delta\varepsilon_{it}$ are correlated with $\Delta\varepsilon_{i,t-1}$, but not correlated with $\Delta\varepsilon_{i,t-k}$ for k $\geq$2. Therefore, the System-GMM estimator is consistent if there is no second order serial correlation. To check for serial correlation, we will test first order serial correlation (*AR 1*) and second order serial correlation (*AR 2*), under the null hypotheses there is no serial correlation. The instruments used in the System-GMM estimator will be valid only if there is no correlation between instruments and error term. To check the validity of the instruments we use the Hansen-J statistic, which tests the over-identifying restrictions, under the null hypothesis that the instruments are uncorrelated with the error term (i.e. instruments are valid).

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[7] In all regressions the number of instruments is lower than the number of cross sections.
[8] I use STATA 11 for all of the estimates.

I use Wald test to test for the joint significance of the reported coefficients and time fixed effect as well, asymptotically distributed as x^2 under the null of no relationship.

3.6 DATA AND SAMPLE DESCRIPTION

The source of the data is the publicly available Amman Stock Exchange (ASE) database. Appendix A.1 shows the data collection process. The database contains data relating to all listed and public traded Jordanian firms. The ASE database contains financial information for all 262 listed Jordanian firms, including information relating to detailed financial statements, stock prices, and statistical information concerning trading activities.

The following steps are carried out when selecting the sample: In the first step, financial firms are excluded owing to the fact that this study estimates capital expenditure sensitivities (Allayannis and Mozumdar, 2004). This classification retains 130 firms. In the second step, firms which were established after the year 1999 were also excluded, as well as those firms delisted from ASE or firms that ceased trading (Himmelberg and Petersen, 1994).

Table 3. 1 Summary Descriptive Statistics for Sample

	$\left(\dfrac{I}{K}\right)_{i,t}$	$\left(\dfrac{M}{B}\right)_{i,t}$	$\left(\dfrac{CF}{K}\right)_{i,t}$	$\left(\dfrac{ND}{K}\right)_{i,t}$	$\left(\dfrac{NE}{K}\right)_{i,t}$
Mean	0.33	1.52	0.46	0.28	0.31
Median	0.08	1.23	0.18	0.009	0
Standard deviation	1.18	1.08	1.29	1.11	1.51
No. of firms	85	85	85	85	85

Please see table 3.3 for variables definition.

3.7 SUMMARY STATISTICS

Table 3.2 shows the correlation matrix amongst the variables. The correlation between firm investment and firm internal cash flow is positive, which may support the notion that firms are financially constrained. The correlation between firm

investment and market-to-book value is positive, thus indicating the ability of the market to predict firm future growth opportunities. The new debt variable has the largest correlation coefficient with investment, which indicates the importance of the Jordanian banking system in terms of providing firms with required funds. The positive value between investment and equity indicates the importance of the equity market in providing firms with funds. In addition, the correlation matrix shows no evidence of high correlation between the independent variables.

Table 3. 2 Correlation Matrix among Variables

	$\left(\dfrac{I}{K}\right)_{i,t}$	$\left(\dfrac{M}{B}\right)_{i,t}$	$\left(\dfrac{CF}{K}\right)_{i,t}$	$\left(\dfrac{ND}{K}\right)_{i,t}$
$\left(\dfrac{M}{B}\right)_{i,t}$	0.10*			
$\left(\dfrac{CF}{K}\right)_{i,t}$	0.27*	0.0083		
$\left(\dfrac{ND}{K}\right)_{i,t}$	0.61*	0.09*	0.24*	
$\left(\dfrac{NE}{K}\right)_{i,t}$	0.32*	0.16*	0.27*	0.38*
Please see table 3.3 for variables definition.				
*Significant level at the 1 percent level.				

3.8 RESULTS OF INVESTMENT-CASH FLOW SENSITIVITIES

3.8.1 *Results of Investment-Cash Flow Sensitivity*

Table 3.3 reports the regression results from Equation 3.5 in all firms. All the specifications pass the Hansen-J statistics test for Over-Identifying Restrictions, confirming that the instruments can be considered valid. The results show that the J-statistics are statistically insignificant at least at ten percent level. The Arellano-Bond tests for serial correlation - if the model is well specified we expect to reject the null of no first order serial correlation (*AR 1*), and fail to reject the hypothesis of no second order serial correlation (*AR 2*).

The market-to-book value is used to control for expected future profitability and unobservable investment opportunity. The market-to-book value is found to be positive but not statistically significant. The lagged value of investment is positive and statistically significant, which indicates a positive and significant degree of

persistence and therefore the presence of adjustment costs, which shows the relationship between current investment and lagged investment.

Table 3. 3 Results for Investment to Cash Flow Sensitivities

Dependent variable : $\left(\frac{I}{K}\right)_{i,t}$

Independent variables	Model 1
$\left(\dfrac{I}{K}\right)_{i,t-1}$	0.118** (2.36)
$\left(\dfrac{M}{B}\right)_{i,t}$	0.033 (1.18)
$\left(\dfrac{CF}{K}\right)_{i,t}$	0.101* (1.87)
$\left(\dfrac{ND}{K}\right)_{i,t}$	0.231** (2.20)
$\left(\dfrac{NE}{K}\right)_{i,t}$	0.132 (1.24)
Arellano-Bond AR(1) test-*p.value*	0.00
Arellano-Bond AR(2) test-*p.value*	0.38
OIR J-test *p-value*	0.32
Wald test (df)	4.44 (6)
Wald test 1 (df)	42.32 (5)
F statistics (df)	5.08 (10)

Where I is the firm's investment, represented by the change in the level of net fixed assets, and defined as {(Net Fixed Asset in year $_t$)–(Net Fixed Asset in year $_{t-1}$)+(Depreciation for year $_t$)}; K is net fixed assets; M is the market value of outstanding common equity; B is the book value of common equity ; *CF* represents net income after tax plus depreciation; *ND* measures cash flow from new debt, equal to net increase in total debt, and this is equal to the net increase from year $_{t-1}$ to year t in {(Total liabilities in year $_t$) – (Accounts Payable in year $_t$) – (Other Liabilities in year $_t$)}; *NE* measures new cash flow as a result of raising capital, and is equal to {(Increase in Paid in Capital from year $_{t-1}$ to year1) + (Issuance Premium in year $_t$)}. The two-step GMM estimator is employed in the analysis with robust standard errors that are adjusted using the finite sample correction of Windmeijer (2005). The Hansen J-test of over-identifying restrictions (OIR) for the GMM estimators: the null hypothesis is that instruments used are not correlated with residual and so the over-identifying restrictions are valid. *AR (1)* is Arellano-Bond test for first-order serial correlation in the first-differenced residual, asymptotically distributed as N (0, 1) under the null of no serial correlation. *AR (2)* is Arellano-Bond test for second-order serial correlation in the first-differenced residual, asymptotically distributed as N (0, 1) under the null of no serial correlation. Wald is Wald test of the joint significance of the time dummies; Wald 1 is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as x^2 under the null of no relationship. t-statistics in parentheses. Applying a two-tailed test, the asterisk ***, **, and * denotes that the coefficients are statistical significance at 1%, 5%, and 10% level, respectively.

The cash flow coefficient is positive and statistically significant (at 10%) but in all other estimations the cash flow coefficient is statistically significant at 5%, which indicates the importance of internal cash flow on firm investment. The results suggest that Jordanian firms are financially constrained, and are consistent with the findings of (Fazzari *et al.,* 1988; Arslan *et al.,* 2006; Ratti *et al.*, 2008; and Brown and Petersen, 2009). The results support the view that the asymmetric information problem increases the wedge between the cost of external and internal funds.

Table 3.3 also shows that the new debt coefficient is positive and statistically significant (at 5%), highlighting the importance of debt financing on firm investment for Jordanian firms. The result is consistent with the findings of Brown and Peterson (2009). Furthermore, the positive impact of the new debt coefficient emphasises the importance of debt in reducing firms' dependency on internal funds to finance their investment. However, Table 3.3 also shows that the new equity issuance coefficient is positive but not statistically significant.

3.8.2 *Results of Financial Constraints and Market Listing*

Table 3. 4   Results of Investment-Cash Flow Sensitivities and Market Listing

Dependent variable : $\left(\frac{I}{K}\right)_{i,t}$	
Independent Variables	**Model 2**
$\left(\dfrac{I}{K}\right)_{i,t-1}$	0.112** (2.44)
$\left(\dfrac{M}{B}\right)_{i,t}$	0.031 (1.16)
$\left(\dfrac{CF}{K}\right)_{i,t}$	0.133** (2.04)
$\left(\dfrac{ND}{K}\right)_{i,t}$	0.239*** (2.21)
$\left(\dfrac{NE}{K}\right)_{i,t}$	0.155* (1.65)
$FM * \left(\dfrac{CF}{K}\right)_{i,t}$	-0.014 (-0.71)
Arellano-Bond AR(1) test-*p.value*	0.000
Arellano-Bond AR(2) test-*p.value*	0.371
OIR J-test *p-value*	0.300
Wald test (df)	4.50 (7)
Wald test 1 (df)	68.70 (6)
F statistics (df)	6.08 (11)

See Table 3.3 for tests and variables definitions. The two-step GMM estimator is employed in the analysis with robust standard errors that are adjusted using the finite sample correction of Windmeijer (2005).

In Table 3.4, we investigate the investment-cash flow sensitivity further, by testing whether this sensitivity is different between the two markets. we interact market listing (FM) with cash flow, setting the dummy variable to 1 if the firm is listed in the first market, and 0 if the firm is listed in the second market. To determine whether investment-cash flow sensitivity is affected by market listing, we use Eq. (3.6) for the estimations.

In Table 3.4, Model 2 shows the results of the interaction between cash flow and market listing $(FM \times \left(\frac{CF}{K}\right)_{i,t})$. The negative coefficient of the interaction term suggests that financial constraints for firms listed in the first market are less than for those listed in the second market. However, the results show that the coefficient of the interaction term is not statistically significant. Hence, the null hypothesis of the investment-cash flow sensitivity being different between the two markets is rejected. Overall, the results do not confirm that market listing affects the financial constraints on a firm's investment, which suggests that market listing may not be used as a useful criterion to differentiate between financially constrained and financially unconstrained firms.

3.8.3   *Results of Financial Constraints and Firm Size*

Table 3.5 presents the results of investment-cash flow sensitivity for different sized firms. Firms were selected according to their size based on sales (Model 3), and total assets (Model 4). Using sales as a classification criterion, Model 3 includes a term that interacts cash flow with "large firms" $(Large * \left(\frac{CF}{K}\right)_{i,t})$. Large is a dummy set to 1 if the firm is larger than the sample median, and 0 otherwise. We use Eq. (3.6) for the estimations. In Model 3 the coefficient of $(Large * \left(\frac{CF}{K}\right)_{i,t})$ is not statistically significant at any conventional level. Thus, we find no evidence to support firm size as a useful criterion to differentiate between financially constrained and financially unconstrained firms. Model 4 shows the results when firm assets are used as a classification criterion. Again, the results show that the coefficient of the interaction term is not statistically significant. Hence, the null hypothesis that investment-cash flow sensitivities are different between large and

small firms is soundly rejected. We cannot conclude that large firms are less financially constrained than small firms.

These results are consistent with the findings of Gilchrist and Himmelberg (1995) and Duchin *et al.,* (2010). However, the results are not consistent with the findings of Arslan *et al.,* (2006) and Cleary (2006), who find that firm size is an important factor in explaining financial constraints on firms.

Table 3. 5   Results for Investment-Cash Flow Sensitivities and Firm Size.

Dependent variable : $\left(\frac{I}{K}\right)_{i,t}$		
Independent Variables	Model 3	Model 4
$\left(\frac{I}{K}\right)_{i,t-1}$	0.121*** (2.61)	0.121*** (2.65)
$\left(\frac{M}{B}\right)_{i,t}$	0.04 (1.59)	0.032 (1.11)
$\left(\frac{CF}{K}\right)_{i,t}$	0.112** (2.11)	0.139** (2.49)
$\left(\frac{ND}{K}\right)_{i,t}$	0.232** (2.29)	0.241** (2.23)
$\left(\frac{NE}{K}\right)_{i,t}$	0.124 (1.26)	0.154 (1.46)
$Large * \left(\frac{CF}{K}\right)_{i,t}$	-0.033 (-0.53)	-0.066 (-1.17)
Arellano-Bond AR(1) test-p.value	0.000	0.000
Arellano-Bond AR(2) test-p.value	0.348	0.37
OIR J-test *p-value*	0.343	0.319
Wald test (df)	5.12(6)	4.40(6)
Wald 1 test (df)	88.16(6)	61.23(6)
F statistics (df)	8.73 (11)	6.83(11)

See Table 3.3 for tests and variables definitions. Model 3 uses firm's total sales as a measure of size and model 4 uses firm's total assets as measure of size. The two-step GMM estimator is employed in the analysis with robust standard errors that are adjusted using the finite sample correction of Windmeijer (2005).

3.8.4 *Results of Financial Constraints and Firm Age*

Table 3. 6 Results for Investment Cash Flow Sensitivities and Firm Age

Dependent variable : $\left(\frac{I}{K}\right)_{i,t}$	
Independent variables	Model 5
$\left(\frac{I}{K}\right)_{i,t-1}$	0.110** (2.32)
$\left(\frac{M}{B}\right)_{i,t}$	0.038 (1.25)
$\left(\frac{CF}{K}\right)_{i,t}$	0.080** (2.21)
$\left(\frac{ND}{K}\right)_{i,t}$	0.200** (2.02)
$\left(\frac{NE}{K}\right)_{i,t}$	0.120 (1.16)
$Mature * \left(\frac{CF}{K}\right)_{i,t}$	0.064 (1.07)
Arellano-Bond AR(1) test-p.value	0.000
Arellano-Bond AR(2) test-p.value	0.354
OIR J-test *p-value*	0.295
Wald test (df)	4.39 (6)
Wald 1 test (df)	15.16 (6)
F statistics (df)	10.42 (11)

See Table 3.3 for tests and variables definitions. The two-step GMM estimator is employed in the analysis with robust standard errors that are adjusted using the finite sample correction of Windmeijer (2005).

Table 3.6 presents the estimation results for investment cash flow sensitivities for groups formed based on firm age. Model 5 includes a term that interacts cash flow with 'Mature firms' $\left(Mature * \left(\frac{CF}{K}\right)_{i,t}\right)$, where Mature is a dummy variable set to 1 if the firm age is higher than the sample median and 0 otherwise. We use eq. (3.6) for the estimations.

The coefficient of $Mature * \left(\frac{CF}{K}\right)_{i,t}$ is not significant. Thus there is no evidence to confirm that firm age affects the investment-cash flow sensitivity, and by extension the asymmetric information problem. Hence, the null hypothesis of the investment-cash flow sensitivity being different for mature and young firms is rejected.

3.8.5   *Results of Financial Constraints and the Dividend Payout Ratio*

Table 3. 7 Results for Investment Cash Flow Sensitivities and Dividend Policy

Dependent variable : $\left(\frac{I}{K}\right)_{i,t}$

Independent variables	Model 6
$\left(\frac{I}{K}\right)_{i,t-1}$	0.122*** (2.65)
$\left(\frac{M}{B}\right)_{i,t}$	0.032 (1.11)
$\left(\frac{CF}{K}\right)_{i,t}$	0.131** (2.49)
$\left(\frac{ND}{K}\right)_{i,t}$	0.241** (2.23)
$\left(\frac{NE}{K}\right)_{i,t}$	0.151 (1.46)
$DIV * \left(\frac{CF}{K}\right)_{i,t}$	-0.066 (-1.17)
Arellano-Bond AR(1) test-p.value	0.000
Arellano-Bond AR(2) test-p.value	0.370
OIR J-test *p-value*	0.319
Wald test (df)	5.12 (6)
Wald 1 test (df)	88.40 (6)
F statistics (df)	8.73 (11)

See Table 3.3 for tests and variables definitions. The two-step GMM estimator is employed in the analysis with robust standard errors that are adjusted using the finite sample correction of Windmeijer (2005).

Model 6 shows the results for dividend-paying and non-dividend-paying firms. Model 6 includes the interaction term cash flow interacted with a dividend-paying dummy, DIV. The dummy variable is set to 1 if firm *i* is dividend paying in year *t*, and 0 if the firm is non-dividend-paying in year *t*. we use Eq. (3.6) for the estimations.

The negative coefficient of the interaction term suggests that financial constraints are less severe in dividend-paying firms, however, the interaction term is not statistically significant. There is therefore no evidence that non-dividend-paying firms are more financially constrained than dividend-paying firms, and there is no support for the hypothesis that firms that maintain their dividend can expect to face restrictions on external sources of finance, contrary to the findings of Fazzari *et al.* (1988).

3.9 CONCLUSION

The principal aim of this chapter has been to examine whether Jordanian firms are financially constrained, using data from listed non-financial firms for the period 2000 to 2008. In addition, this chapter tests if aspects of the firm's characteristics affect the degree of these financial constraints, as measured by the sensitivity of the firm's investment to internal cash flow. The results show that Jordanian firms are financially constrained, the cash flow coefficient being both positive and statistically significant for the complete sample of firms. For all firms in the sample, the results suggest that cash flow has a positive impact on firm investment, which supports the existence of financial restrictions on firm investment.

The results also show that external sources of funds have a major impact on firm investment. Specifically, debt affects firm investment, although there is no evidence that Jordanian firms use equity issuance to finance their investment. This indicates that Jordanian firms depend primarily on external sources of funding to finance their investments. However, external providers of funds do not provide firms with all the funds they need to finance their investments, and external sources of funds are more costly than internal ones. As a result, firms in Jordan can be classified as being financially constrained.

According to Jordanian Securities law, listed firms must be classified into one of two markets. The first market is where firms with a strong financial position are traded, and the second market is where firms with a weak financial position are traded. This suggests that market listing might be a useful criterion to discriminate between constrained and unconstrained firms. Thus, firms listed in the first market are likely to be less financially constrained than those listed in the second market. The results in this chapter suggest that market listing is not a useful criterion to discriminate between constrained and unconstrained firms, since the results do not support that firms listed in the second market are more financially constrained than firms listed in the first market. This finding is not consistent with our a priori hypothesis.

In addition, to test the impact of the firm's characteristics on the asymmetric information environment that the firm may face, and which will affect the

investment-cash flow sensitivity, several classification criteria have been used in this study. These criteria are the firm's size, age and dividend-payout ratio. The results do not provide evidence to support the expectation that firm size affects the investment-cash flow sensitivity. Further, the results do not support the view that the age of the firm can be a useful criterion to differentiate between financially constrained and financially unconstrained firms. Finally, we do not support the dividend-payout ratio being a useful criterion to discriminate between financially constrained and financially unconstrained firms, the results showing that investment-cash flow sensitivities are not different between dividend paying and non dividend paying firms.

Overall, the results suggest that the firm's market listing and other specific financial characteristics are not useful criteria to capture the unobserved asymmetric information problem. A possible reason for the findings of an absence of significant effects of firm characteristics is that these characteristics are more important for the providers of equity capital rather than debt. Given the result for the new equity variable, it is possible that the financial market in Jordan is at a stage of development where firm characteristics do not yet influence lending decisions, and therefore do not impact on the firms' financial constraints. Instead, the results appear to be indicating that in Jordan, the banking system is relatively well-developed but the financial market is less well-developed.

CHAPTER FOUR

CAPITAL STRUCTURE POLICY

4.1 INTRODUCTION

This chapter investigates the determinants of the firm's capital structure choice in a developing country. The main aim of this study is to determine which of the main capital structure hypotheses (the trade off, agency cost, and the pecking order) better explain the capital structure choice in Jordanian firms traded in the Amman Stock Exchange (ASE). Based on panel data, the results show that the capital structure choice of Jordanian firms appear to follow pecking order theory, where firms' profitability and liquidity have a negative relation with the leverage ratio. In addition, the results show that firm leverage has a positive relationship with firm size and growth opportunities. Confirming findings of other literature the results show that Jordanian firms have a target leverage ratio and move toward this target quickly. In addition, in this chapter we examine the pecking order model, and test the firm's debt capacity and financial constraints.

4.2 MAIN CAPITAL STRUCTURE THEORY

4.2.1 *The Modigliani-Miller Theorem*

In their seminal paper, Modigliani and Miller (1958) present the first modern corporate finance theory, which stated that the firm's capital structure would not affect the firm's overall market value. Modigliani and Miller assume that the firm will pay a perpetual amount of cash flow to investors, and that the company's cash

flows are divided between bondholders and shareholders. Therefore, the expected cash flow that a firm pays is unrelated to the capital structure of the firm, and the value of the firm is the sum of the market value of its common shares and the market value of the debt. Notably, it is assumed that the capital market is perfect, meaning that investors have full access to all information related to the firm's value, and do not pay any costs to either buy or sell securities. This allows investors to utilise homemade leverage, thus enabling them to increase their leverage if the firm fails to meet the amount of risk they desire. Moreover, they can eliminate any unwanted leverage that the firm employs. Therefore, firm value is not affected by the leverage employed in its capital structure.

However, in the presence of the market imperfections (for example, transaction costs, taxes, bankruptcy costs, asymmetric information, and agency conflict), it is recognised that firms may prefer various sources of finance over others, and that the firm's capital structure will be relevant to its overall value. In order to overcome market imperfections, the firm will attempt to choose the capital structure components that maximise its value. There are many authors who propose theories to explain the firm's capital structure in the context of an imperfect market; however, the main two theories attempting to describe the financing behaviour of firms in the presence of market imperfections are the trade-off theory and the pecking order theory. Firstly, the trade-off theory balances between the costs and benefits of leverage, whilst the pecking order theory implies that adverse selection encourages firms to utilise internal cash flow over external sources of finance. The following two sections provide a full discussion of these two theories.

4.2.2   *The Trade-Off Theory*

The trade-off theory implies that the firm will balance the costs and advantages of leverage. Kraus and Litzenberger (1973) developed a model where "*the value of the levered firm is equal to the value of the unlevered firm plus the present value of the tax advantage after deducting the costs of bankruptcy*". According to Myers (1984), the firm's optimal balance of leverage is established by balancing the advantages of debt (represented by interest tax shields) against the cost of debt (represented by bankruptcy costs). The trade-off theory implies that each firm sets its optimal target

leverage ratio and accordingly moves towards this target. The sum of the present value of benefits from the interest tax shield and the present value of costs from bankruptcy determine the optimal leverage ratio for the firm. These bankruptcy costs occur when the firm fails to meet its obligations to creditors (Haugen and Senbet (1978)). Bankruptcy costs include direct and indirect costs: the direct costs include legal, court fees, and lost management time; indirect costs occur before the bankruptcy of the firm, and include costs resulting from disruption of firm business, such as disruption of firm-customer relationships, disruption of the firm-supplier relationship, and lost investment opportunities.

One of the earliest studies supporting the trade-off theory was conducted by Bradley *et al.,* (1984), who found that firms set optimal capital structure based on balancing between the tax advantage from debt and debt-related costs (financial distress cost). They show that:

1- Firm leverage level is inversely related to financial distress costs.

2- Greater non-debt tax shield decreases the firm leverage level.

3- Firm leverage level is inversely related to firm earnings volatility owing to higher earnings volatility implying a higher present value of distress costs.

4.2.3   *The Pecking Order Theory*

The pecking order theory of capital structure implies that the first choice of finance for firms is internal cash flow, followed by debt, and equity is the last resort (Myers (1984)). According to this theory, there is no optimal capital structure owing to the first and last preferences of funds representing two types of equity (i.e. internal cash flow and equity). Myers and Majluf (1984) developed a model where the presence of asymmetric information between managers and external investors leads to the creation of a ranking for sources of funds. The firm's managers know the true value of the firm's assets, whilst external investors can only guess at the true value. However, the firm's managers act in the interests of the existing shareholders. If the firm finances a new project by selling equity, external investors will undervalue the new issuance because they expect it will be in favour of existing shareholders. Myers and Majluf (1984) and Myers (1984) show that firms will prefer internal cash

flow to finance their investment for two reasons: First, the cost of using external sources of funds, such as issuance costs and administrative costs, and under-pricing the new securities; second, the cost of passing up a positive net present value project owing to asymmetric information cost prevents the firm from relying on external funds. Accordingly, the firm will build up reserves from internal cash flow to avoid passing up positive NPV projects.

Myers (1984) argues the firm must reduce the difference between the true and market value. The true value is the value of new shares when investors acquire inside information released from the firm's managers to the market. Myers proposes the following rule that firm managers must follow in their financing decisions: *"issue the safest possible securities; strictly speaking, securities whose future value change least when the manager's inside information is revealed to the market"*. Building on this argument, Myers further indicates that the debt has the minimum differences between the true and market value compared with equity. As a result, the firm will prefer debt to equity if external funds are required. Pecking order theory predicts that leverage and profitability are negatively related since a more profitable firm will have access to internal cash flow.

4.2.4   *Agency Theory*

Jensen and Meckling (1976) present agency costs as the main determinants of firm capital structure. An agency relationship exists because the firm owners delegate corporate decisions to the managers (the agent). If the firm's agent is a utility maximiser, i.e. if they use the firm's resources in their own interests, the firm's owners will expect the agent will make decisions that could harm the owners and the company. Accordingly, firm owners will pay some costs to prevent the agent from making decisions which are not in the interests of the owners. These agency costs include:

1- Monitoring costs: the amount the firm must pay to monitor the agent's decisions, in addition to any incentives paid to the agent.

2- Bonding expenditure: any expenditure that the firm's owners pay to the agent to encourage him or her to make the right decisions concerning the firm's

investment, or to otherwise prevent them from taking any actions that harm the firm's interests.

Jensen and Meckling emphasise the impact of outside equity financing on agency costs, highlighting that, as the firm uses more external equity, new equity holders will spend more money to monitor agent behaviour. The costs associated with outside equity financing are referred to as agency costs of equity. If the firm utilises debt financing, the agency costs related to debt financing include:

1- Monitoring costs: including the provisions that bondholders may use to constrain some of the firm management's decisions, such as paying dividends and issuing new debt. Bondholders impose these provisions to protect themselves from the reallocation of money from bondholders to equity holders.

2- Bankruptcy costs: if the firm issues debt, the firm is obligated to pay a fixed payment to the debt-holders. If the firm fails to meet its current obligations, the firm will be made bankrupt. The higher the amount of debt, the higher the probability the firm will become bankrupt, and the higher the required rate of return.

Where external funds have an agency cost, then when the owners identify a profitable investment opportunity, but internal cash flow is insufficient to finance this, the firm will suffer an opportunity loss. Firm owners must draw a comparison between the costs of opportunity loss and agency costs of external funds. External funds will be used as long as agency costs are less than the benefit from the investment opportunity. The marginal costs of debt are less than the marginal costs of equity, and so the optimal capital structure will be achieved by balancing these costs.

4.3 EMPIRICAL STUDIES ON CAPITAL STRUCTURE

4.3.1 *Capital Structure in Developed Countries*

One of the earliest papers to examine the determinants of firm debt level was conducted by Titman and Wessels (1988). They use firm attributes as determinants of the firm debt ratio, including collateral value of assets, non-debt tax shield, growth, uniqueness, industry classification, size, volatility, and profitability. Titman and Wessels argue that firms with a high level of collateral will use it to issue more debt, but the results do not support this argument. Further, they find no evidence of non-debt tax shields impacting on firm leverage. They find a negative relationship between debt and product uniqueness, implying that this is a measure of risk and difficulty in raising capital. Firms producing machines and equipment have low debt ratios because of higher liquidation costs, while small firms prefer to borrow from banks rather than issue long term debt because they pay higher issuance costs. In line with pecking order theory, more profitable firms depend on internal cash flow. However, there is no evidence of a relation between either earnings volatility and growth opportunities and the firm's debt ratio.

Bennett and Donnelly (1993) examine the cross-sectional determinants of capital structure in non-financial UK companies. They find a negative relation between debt and the non-debt tax shield, and a positive relation between tangibility of assets and leverage. In line with Titman and Wessels (1988), they find no evidence of a relation between growth opportunities and debt, while small firms rely more on bank loans and internally generated cash. Finally, highly profitable firms have higher internal cash flow and lower borrowing, and as expected, there is a negative relation between profitability and leverage. Rajan and Zingales (1995) broaden the analysis of the determinants of capital structure choice across the G-7 (Canada, France, Germany, Italy, Japan, United Kingdom, and United States). They focus on four factors that might determine capital structure (tangibility, growth, size, and profitability). Their results show that the debt level has a positive relation with tangibility of assets in all countries, a negative relationship with growth opportunities, and a positive relationship with size. Finally, they find that leverage is negatively related with profitability because the firm prefers using internal cash flow rather than more costly

external funds. The main limitation of Rajan and Zingales (1995) is that they only use four proxies to measure the main determinants of the capital structure choice, and exclude other variables such as non-debt tax shields.

Ozkan (2001) finds that growth opportunities, non-debt tax shields, liquidity, and profitability have a negative impact on firm leverage in the UK, while the size of the firm impacts positively on firm leverage.

A number of studies have since examined the capital structure decision in other developed countries. Miguel and Pindado (2001) investigate the impact on the capital structure decision of firm characteristics in Spain. They find non-debt tax shields and debt are negatively related, possibly because non-debt tax shields are larger in Spain than in the US. Second, the financial distress cost and debt are inversely related, because the higher the financial distress costs mean the higher the probability of bankruptcy. Third, the cash flow variable has a negative relationship with debt, which supports pecking order theory. Moh'd *et al.,* (1998) argue that institutional investors will play a key role in monitoring the firm's decisions, and will be a substitute for the disciplinary role of debt in firm financing behaviour. Their results support this, since there is a negative relationship between firm debt and the ownership percentage of institutional investors. Gaud *et al.,* (2005) explore the main determinants of capital structure of Swiss firms. They find a positive relation between both tangibility and firm size, and firm leverage, while profitability and growth are negatively related to debt.

Antoniou *et al.,* (2008) examine the capital structure decision separately for market-based and bank-based countries, arguing that the legal and financial systems influence the capital structure choice. They argue that firms in bank-oriented economies firms have more leverage than market-oriented economies, while they have lower transparency and investor protection than market-oriented economies. The results show the following: Profitability is negatively related to the leverage in all sample countries except Japan: Growth opportunities and debt are negatively related in all countries except the US. The strongest negative relation is found in Germany, which has the highest blockholders ratio which decreases the cost of monitoring the firm. The UK and Japan have the highest inverse relationship

between growth and leverage which suggests that high information asymmetries lead to high debt agency costs in these countries. Tangibility of firm assets and leverage are positively related in all countries, except the US. Creditors appear to use the firm's assets as collateral since the relation in the bank-based countries is higher than in market-based countries. Finally, the size of the firm and leverage are positively related in all countries except the US.

An alternative view is that firms do not have an optimal capital structure, Baker and Wurgler (2002). They argue that firms will increase equity finance when the market value of the stock is higher than the book value and past market values. They find that market timing affects the capital structure of the firm, and that firms with a low debt ratio issue equity when the market value of the stock is high.

Several papers have examined the firm's adjustment to a target debt ratio. Ozkan (2001) uses a partial adjustment model where the firm sets a long term optimal debt ratio and adjusts current debt toward this ratio. He finds that firms adjust their debt ratio toward the optimal debt ratio, but the adjustment process is not perfect because the firm will balance between the costs of adjusting toward target, and the cost of being away from target. Miguel and Pindado (2001) show that the adjustment speed toward target of Spanish firms is higher than the adjustment speed of US firms. They interpret this as a consequence of the structure of the Spanish financial market, where firms depend more on bank loans while US firms depend more on the bond market, so firms in Spain face lower transaction costs to adjust toward the optimal capital structure. A less developed bond market in Spain decreases the agency cost of debt because the banking sector is the main source of debt. Gaud *et al.,* (2005) argue that Swiss firms adjust towards their target more slowly than firms in the UK, US, Germany and France. The main reason for the slow adjustment process is the relatively easy credit available from cantonal banks, which are granted on subjective rather than objective criteria. Banks grant firms with low cost loans without taking into account the firm's risk level. They conclude it is not costly for Swiss firms to be in disequilibrium, and so firms have a slow adjustment process.

Finally, Graham and Harvey (2001) survey CFO's in the US and Canada to test the trade off and pecking order theories. They find no evidence that supports firm's debt

policy being affected by personal taxes or the costs of distress, and weak evidence that firms have a target debt ratio. They do find that credit ratings and earnings volatility play an important role in firms' debt policy. Overall, there is some support for both theories, since most firms do not issue equity because they believe their stock is undervalued, and that such issues are greater where asymmetric information is more pronounced.

4.3.2   *Capital Structure in Developing Countries*

The analysis of the capital structure decision has been applied to a variety of developing countries. In general, the results for firms in developing countries are similar to those for developed countries. Profit is negatively related to leverage, and tangibility of assets is positively related to leverage (Booth *et al.,* (2001)). However, there is clear evidence also that bank finance is particularly important to firms in developing countries. For example, a survey of firms in Indonesia by Ang *et al.,* (1997) finds that firms prefer to use bank loans before retained earnings because the credit market is very active, they have a good relationship with banks, and are able to negotiate the cost of debt and debt covenants.

In Thailand, the results show non-debt tax shields, market to book ratio, return on assets, profitability, and size are negatively correlated to debt level, while the tangibility of assets is positively related to debt (Wiwattanakantang (1999)). Consistent with agency theory, a high percentage of family ownership impacts positively on the leverage ratio. A high level of debt leads to an increase in their ownership percentage and reduces the probability of takeover.

Trade-off theory's prediction of the tax advantage of debt has been examined explicitly by Al-Sakran (2001) in Saudi Arabia. Here firms pay taxes (Zakat) only on the total net worth. The amount paid for Zakat will be the same if the firm uses debt or equity financing. Therefore, the advantage of a tax shield of debt will be minimised. They find no correlation between the debt ratio and tax, confirming that firms do not benefit from using debt to reduce the tax paid. There is also a positive relation between government ownership percentage and the debt level, consistent with creditors having greater confidence that these firms will pay back their debts.

In Turkey, Gonenc (2003) finds a positive relation between profitability and growth, which he explains by the possibility that banks use firm's profitability as a measure of firm performance and whether to lend, as shown by a positive relation between leverage and profitability. Their results also show a negative relation between tangibility and the debt ratio. This is confirmed by Caglayan and Sak (2010) for Turkish banks, and by Pandey and Chotigeat (2004) for Malaysian firms.

There is evidence consistent with trade off theory, there being several studies documenting a positive relationship between size and the leverage ratio (see Gonenc (2003) for Turkish firms, and Pandey and Chotigeat (2004) for Malaysian firms). This is also supported by Yu and Aquino (2009) and Caglayan and Sak (2010) for Philippine firms and Turkish banks respectively. However, there is mixed evidence in support of pecking order theory. Gonenc (2003) finds there is a negative relation between leverage and growth opportunities, while there is no relation for Malaysian firms (Pandey and Chotigeat (2004)), and evidence of a positive relation for Turkish banks (Caglayan and Sak (2010)). Yu and Aquino (2009) argue that pecking order theory will be unable to explain the financing hierarchy of Philippine firms because they tend to be family owned and very reliant on equity.

Finally, Ang *et al.,* (1997) also examined pecking order theory by surveying firms in Indonesia. They find that the firms in their sample use retained earnings because it has the lowest cost among the alternative financing sources.

4.4 DETERMINANTS OF CAPITAL STRUCTURE IN JORDAN

The following section aims to answer the following questions: Firstly, what are the determinants of the financing behaviour in Jordan? Secondly, whether the capital structure theories are applicable to the Jordanian capital market? Thirdly, are Jordanian firms have target capital structure ratio?

In order to answer the above questions, this section shows the sample characteristics, common size balance sheet, descriptive statistics, variables, hypothesis development, and results.

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4.4.1 *Descriptive Statistics Analysis*

Table 4.1 shows the different sources and uses of firm resources in Jordanian firms. The first step in studying the impact of leverage on firm capital structure is to define what we mean by leverage. The leverage term depends on what is our purpose of analysis. Rajan and Zingales (1995) show that if we want to test the impact of agency cost on firm capital structure the best measure is to use the ratio of the stock of debt to firm value. If our objective is to measure the ability of the firm to meet its fixed payment, the most appropriate measure of leverage is interest coverage ratio. They argue that total liabilities to total assets is a good measure because it will show the default risk in the near future. But this indicator will overstate leverage because it contains accounts payable, which is representative of transaction purposes. Rajan and Zingales also suggest that total debt (long term debt plus short term debt) will be more suitable to measure the firm leverage.

Table 4.1 shows that Jordanian firms are funding 23% of their total assets from debt (i.e. Credit Banks, Short Term Loans, Accrued Part of Long Term Loans, Long Term Loans, and Corporate Bonds). This ratio illustrates the importance of debt in Jordanian firms' capital structure. The largest source of funds is long term debt, which suggests that firms use long term debt to fund their investment, and therefore match long term fixed assets with long term debt.

The proportion of the long term debt is relatively constant over time. We can see from the table that the credit banks ratio is increasing over time, rising from 3.4 in year 2000 to 9.5 in year 2008, which represents the importance of credit banks on funding firm assets. Furthermore, total fixed assets decrease from 49.2 in 2000 to 35.2 in 2008, which indicates that Jordanian firms use more intangible assets in their operations, and demonstrates that Jordanian firms use less tangible assets as collateral for debt.

Table 4. 1 Common Size Balance Sheet for all Firms in the Sample

Balance sheet for all firms in the sample for the years 2000-2008. The value of each item is calculated as the sum of all firms averaged by total assets for all firms in each year. The sample contains non-financial firms listed in the Amman Stock Exchange.

ASSETS	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average
Cash on Hand & at Banks	7.3	7.0	7.4	8.8	11.8	12.4	13.5	10.9	11.0	10.0
Account Receivables	12.4	10.3	10.9	10.6	10.4	12.7	11.1	12.0	14.5	11.7
Short Term Investments	0.1	0.2	0.2	0.3	0.5	2.6	1.6	1.2	0.7	0.8
Inventory	11.6	11.8	12.6	11.2	11.9	7.3	11.6	11.5	11.4	11.2
Other Current Assets	5.3	5.8	5.7	7.0	6.3	12.8	8.8	10.9	9.5	8.0
Total Current Assets	36.7	35.1	36.8	37.8	40.9	47.8	46.6	46.5	47.1	41.7
Long Term Investments	6.1	7.6	8.0	9.0	10.3	10.3	10.8	11.2	9.9	9.3
Total Fixed Assets	49.2	49.1	48.2	46.4	39.7	34.4	35.0	34.8	35.2	41.3
Other Assets	8.0	8.2	7.0	6.8	9.1	7.5	7.6	7.5	7.8	7.7
Total Assets	100	100	100	100	100	100	100	100	100	100
LIABILITIES & OWNERS EQUITY										
LIABILITIES Accounts and Notes Payable	14.4	12.7	12.6	13.4	9.8	8.4	9.3	8.0	9.8	10.9
Credit Banks	3.4	3.5	3.6	2.9	4.4	5.6	6.2	9.8	9.5	5.4
Short Term Loans	1.2	1.2	1.4	1.3	1.3	1.3	1.4	2.1	3.1	1.6
Accrued Part of Long Term Loans	1.8	2.7	2.6	3.3	3.7	2.6	2.7	1.4	2.4	2.6
Other current Liabilities	3.9	3.3	2.8	1.4	1.7	1.0	1.7	1.8	1.8	2.1
Total Current Liabilities	24.7	23.4	22.9	22.5	20.8	18.9	21.3	23.1	26.6	22.7
Long Term Loans	10.5	11.2	11.5	10.0	10.2	9.0	10.8	12.7	10.2	10.7
Corporate Bonds	4.8	3.3	4.4	4.2	4.9	3.7	1.5	1.1	0.4	3.1
Other Liabilities	8.2	8.2	8.6	8.9	11.9	12.1	10.3	6.6	6.4	9.0
Total Liabilities	48.2	46.1	47.5	45.6	47.8	43.6	44.0	43.5	43.6	45.5
Total Shareholders equity	51.8	53.9	52.5	54.4	52.2	56.4	56.0	56.5	56.4	54.5
Total Liabilities & shareholders Equity	100	100	100	100	100	100	100	100	100	100
Total Number of firms	85	85	85	85	85	85	85	85	85	

Source: Amman Stock Exchange, Author calculations.

Table 4. 2 Summary of Descriptive Statistics

This table shows the summary of descriptive statistics for the variables used in the estimation. The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Leverage is the ratio of total debt to total book value of assets where total debt is measured by total liabilities minus accounts payable and other liabilities. Assets Tangibility is the ratio of book value of tangible fixed assets to the book value of total assets. Size is the natural log of total assets. Growth Opportunities is measured by the ratio of market to book value of equity. Non-debt Tax Shields is measured by the ratio of annual depreciation expenses to the book value of total assets. Liquidity is measured by the ratio of current asset to current liabilities. Profitability is the ratio of net operating income to book value of total assets. Earning Volatility is measured by the absolute value of the changes in net income. Dividend Payout Ratio is the ratio of dividends to net income. Blockholders is measured by the sum of all large external shareholders that own more than 5% of the stock in each firm. Institutional Investors is measured by the ratio the sum of all shares held by institutions to the total number of shares.

	Mean	Median	Minimum	Maximum	Std. Dev.
Leverage	0.197	0.157	0.0089	0.770	0.155
Assets Tangibility	0.384	0.351	0.00006	0.977	0.253
Size	16.565	16.447	12.516	20.587	1.341
Growth Opportunities	1.528	1.23	0.112	9.898	1.08
Non-debt Tax Shields	0.034	0.030	0.005	0.217	0.025
Liquidity	2.711	1.797	0.028	15.563	2.491
Profitability	0.036	0.033	-0.431	0.496	0.089
Earnings Volatility	1.268	0.662	0.008	9.713	1.721
Dividend Payout Ratio	0.373	0.001	0.0023	5.172	0.519
Blockholders	0.545	0.583	0	0.983	0.216
Institutional Investors	0.492	0.485	0.0001	0.9085	0.252
No. of firms	85				

Table 4.3 shows the correlation coefficients between the variables. Debt is positively correlated with tangibility and firm size, implying firms that increase their investment in fixed assets may be able to use these assets as collateral to issue new debt. Also, large firms use debt financing, suggesting they have better access to credit markets. In addition, the positive relation between debt and non-debt tax shields may be a result of firms with high tangibility having greater depreciation. On

the other hand, debt is negatively correlated with liquidity implying firms use internal cash flow to finance investment. Likewise, debt has a negative correlation with profitability. Debt and the dividend payout ratio are negatively correlated, indicating that firms that pay dividends are less dependent on debt. We also find that debt has a negative correlation with blockholders and institutional investors.

Tangibility of firm assets has a negative correlation with size, growth opportunities, liquidity, profitability, earnings volatility, dividend payout ratio, and blockholders. This suggests firms with substantial fixed assets have fewer investment opportunities. Firms with high tangibility may suffer from a low rate of profitability, because they have less flexibility to replace old equipment. The negative correlation between assets tangibility and liquidity may support the argument that firms with a high fixed assets ratio suffer from a shortage of liquidity. Blockholders also has a negative correlation with asset tangibility.

The size of the firm is positively correlated with growth opportunities, profitability, liquidity, and institutional investors. This suggests large firms are more profitable and have good investment opportunities, leading to a healthy financial position, as is clear from the positive correlation with the liquidity ratio. Moreover, the positive correlation with institutional investors suggests that institutional investors prefer to invest in larger firms.

To determine whether the variables in the study are collinear or not, we use the correlation matrix. Table 4.3 show that the correlation between variables is not high and this suggests that there is no significant collinearity problem.

Table 4. 3 Pairwise Correlation Coefficients between Variables

This Table presents the Pearson correlation coefficients between variables used in the regression estimation. The data from 85 non-financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Leverage is the ratio of total debt to total book value of assets where total debt is measured by total liabilities minus accounts payable and other liabilities. Assets Tangibility is the ratio of book value of tangible fixed assets to the book value of total assets. Size is the natural log of total assets. Growth Opportunities is measured by ratio of market to book value of equity. Non-debt Tax Shields is measured by the ratio of annual depreciation expenses to the book value of total assets. Liquidity is measured by the ratio of current asset to current liabilities. Profitability is the ratio of net operating income to book value of total assets. Earning Volatility is measured by the absolute value of the changes in net income. Dividend Payout Ratio is the ratio of dividends to net income. Blockholders is measured by the sum of all large external shareholders that own more than 5% of the stock in each firm. Institutional Investors is measured by the ratio the sum of all shares held by institutions to the total number of shares.

	Debt	Assets Tangibility	Size	Growth Opportunities	Non-debt Tax Shields	Liquidity	Profitability	Earnings Volatility	Dividend Payout Ratio	Blockholders
Assets Tangibility	0.120*									
Size	0.239*	-0.080*								
Growth Opportunities	0.085*	-0.050	0.160*							
Non-debt Tax Shields	0.146*	0.490*	-0.086*	0.043						
Liquidity	-0.497*	-0.352*	-0.236*	-0.015	-0.149*					
Profitability	-0.098*	-0.105*	0.307*	0.282*	0.067	0.125*				
Earnings Volatility	0.090*	-0.011	0.087*	-0.024	0.026	-0.023	-0.075*			
Dividend Payout Ratio	-0.195*	-0.165*	0.119*	0.094*	0.025	0.206*	0.293*	-0.026		
Blockholders	-0.012	0.102*	-0.124*	0.153*	0.074*	0.020	0.029	0.061	-0.084*	
Institutional Investors	-0.017	-0.0157	0.190*	0.101*	0.096*	0.122*	0.158*	0.069	0.042	0.430*

* indicate significance at 0.05. See table 4.4 for variables definitions.

4.5 MODEL DESIGN

A large body of capital structure studies use the ordinary least square (OLS) estimates with panel data to test the capital structure theories, (see Rajan and Zingales, 1995; Moh'd *et al.,* 1998; Wiwattanakantang, 1999; Booth *et al.,* 2001; Bevan and Danbolt, 2002; Chen 2003; Gonenc, 2003; Bharath, *et al.,* 2009; Qureshi, 2010; Abe do Jong *et al.,* 2008; Degryse *et al.,* 2012). As explained in section (4.5), firm debt will be affected by firm specific characteristics. We investigate the main determinants of capital structure using the following model:

$$Debt_{i,t} = \beta_0 + \beta_1 TAN_{i,t} + \beta_2 SZ_{i,t} + \beta_3 (M/B)_{i,t} + \beta_4 TS_{i,t} + \beta_5 LQ_{i,t} + \beta_6 PR_{i,t} + \beta_7 VOL_{i,t}$$
$$+ \beta_8 DIV_{i,t} + \beta_9 BLK_{i,t} + \beta_{10} INS_{i,t} + \lambda_t + a_i + \varepsilon_{i,t} \qquad eq.\,4.1$$

Where $Debt_{i,t}$ is the ratio of total debt to total book value of assets, where total debt is measured by total liabilities minus accounts payable and other liabilities. $TAN_{i,t}$ (asset tangibility) is the ratio of the book value of tangible fixed assets to the book value of total assets. $SZ_{i,t}$ (firm size) is the natural log of total assets. $(M/B)_{i,t}$ (growth opportunities) is measured by the ratio of the market to book value of equity. $NTS_{i,t}$ (non-debt tax shields) is measured by the ratio of annual depreciation expenses to the book value of total assets. $LQ_{i,t}$ (liquidity) is measured by the ratio of current assets to current liabilities. $PR_{i,t}$ (profitability) is the ratio of net operating income to the book value of total assets. $VOL_{i,t}$ (earning volatility) is measured by the absolute value of the changes in net income. $DIV_{i,t}$ (dividend payout ratio) is the ratio of dividends to net income. $BLK_{i,t}$ (blockholders) is measured by the sum of all large external shareholders owning more than 5% of each firm. $INS_{i,t}$ (institutional investor) is measured by the ratio of the sum of all shares held by institutions to the total number of shares.

4.6 THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

4.6.1   *Firm Characteristics and Capital Structure*

Based on the capital structure theories, firm characteristics affect firms' capital structure, as identified by Titman and Wessels (1988), Rajan and Zingales (1995), and Booth *et al.,* (2001) among others. They suggest a number of characteristics that will affect capital structure, although it is likely that the determinants will vary across country and over time. For example, Booth *et al.,* (2001) state that *"Knowing the country of origin is usually at least as important as knowing the size of the independent variables for both the total and long term book-debt ratios"*. Therefore, it is very important to know the economic and market factors that might affect the firm's financing decision.

4.6.2   *Leverage and Tangibility of Assets*

Tangibility of assets is measured by the ratio of book value of tangible fixed assets to the book value of total assets, Rajan and Zingales (1995). Higher tangibility increases the collateral that the firm can use to secure debt. According to trade off theory, the firm's collateral decreases distress costs. Furthermore, higher tangibility reduces the ability of the firm's shareholders to change the structure of the firm's assets (i.e. replace the secure assets with high risk assets) and this leads to a decrease in the agency cost of debt. Consequently, agency cost theory and trade off theory predict a positive relation between tangibility of assets and leverage ratio (see, Frank and Goyal 2008). Tangibility of assets has been found to have a significant impact on firm leverage, as shown by Bennett and Donnelly (1993), Flannery and Rangan (2006), and Chang and Dasgupta (2009). The common prediction is that $\beta_1 > 0$, we hypothesise that:

H1: *All else equal, the tangibility of firm assets will positively affect firm leverage.*

4.6.3   *Leverage and Size of the Firm*

Firm size is most often measured by the logarithm of the book value of total assets (see Antonio *et al.,* 2008). The rationale behind using firm size as a determinant of capital structure is that large firms are more diversified and have a lower probability of bankruptcy (see Titman and Wessels 1988). The cost of borrowing will be less in

large firms, which is consistent with the trade off theory. On the other hand, pecking order theory predicts a negative relation between leverage and firm size, because large firms have a good reputation and have a long relationship with fund providers, reducing the adverse selection problem. As a result, large firms will be able to raise capital from the equity market with low cost. The size of firm has been found to positively affect firm leverage (e.g. Hovakimian *et al.*, 2004 and Antoniou *et al.*, 2008). we expect that $\beta_2 > 0$, we hypothesise that:

H2: All else equal, firm size will positively affect firm debt.

4.6.4   *Leverage and Growth Opportunities*

Growth opportunities are measured by the market to book ratio of equity following Cleary (1999) and Gonenc (2003). From a theoretical perspective, the amount of debt issued will be negatively related to growth opportunities (Myers (1977)). This is known as the debt overhang problem, where firms with high debt will not invest, because any new investment will benefit the creditors, not the shareholders. Trade off theory predicts an inverse relationship between debt and growth opportunities, because the value of growth opportunities (i.e. new investment) will be very low where the firm enters bankruptcy (Gaud *et al.,* 2005). In growth firms, the agency cost of debt will be greater because shareholders will be able to invest in risky assets, to the benefit of shareholders. Also the creditors' ability to monitor firms' asset substitution (i.e. where they invest in risky projects) will be more difficult (see Frank and Goyal, 2008). Pecking order theory predicts a positive relation with growth opportunities as high growth firms will need more additional finance for their investments, and this means additional debt rather than equity. The evidence regarding the relationship between growth opportunities and leverage is not conclusive. Some studies find a negative relationship, Frank and Goyal (2003), Rajan and Zingales (1995), Gaud *et al.,* (2005), while others find a positive relationship, Bevan and Danbolt (2002) Gonenc (2003), Chen (2004), and Pandey and Chotigeat (2004). The usual prediction is that the $\beta_3 < 0$, we hypothesise that:

H3: All else equal, firm growth opportunities are negatively related to firms' leverage ratio.

4.6.5   *Leverage and Non-Debt Tax Shields*

Firm's investment in tangible or intangible assets may produce tax benefits by reducing the amount of tax paid, benefits that are unrelated to the source of funds. DeAngelo and Masulis (1980) show that non-debt tax shields that appear in financial statements substitute the benefits of a tax reduction from interest expenses on debt. Consequently, an inverse relation will exist between non-debt tax shields and leverage. On the other hand, the existence of higher non-debt tax shields (i.e. depreciation expenses) is a result of a high level of tangible assets (see Barclay *et al.,* 1995). Based on this argument, we might find a positive relation between non-debt tax shields and leverage, Ozkan (2001). Following Titman and Wessels (1988) and Ozkan (2001), the non-debt tax shields are measured by the ratio of annual depreciation expenses to the book value of total assets. The usual prediction is that $\beta_4 < 0$, we hypothesise that:

H4: All else equal, there is a negative relationship between non-debt tax shields and debt.

4.6.6   *Leverage and Liquidity*

Liquidity is measured by the ratio of current asset to current liabilities. Higher liquidity will help the firm to finance their investment from internal funds, and decrease the amount of debt, Ozkan (2001). Therefore, a negative relationship between liquidity and the debt ratio will exist. we expect that $\beta_5 < 0$, we hypothesise that:

H5: All else equal, the liquidity ratio has a negative effect on the firm's debt ratio.

4.6.7   *Leverage and Profitability*

Pecking order theory states firms will use internal cash flow before external funds (debt and equity issuance). The main source of internal cash flow is retained earnings. Higher profitability leads to greater internally generated cash flow, and so profitable firms should have a lower leverage ratio. Consequently, we expect a negative relationship between profitability and debt ratio, Rajan and Zingales (1995), Flannery and Ragan (2006), and Chang and Dasgupta (2009). Following

Leary and Roberts (2005) and Lemmon *et al.,* (2008), we measure firm profitability by the net operating income over the book value of total assets. On the other hand, a high level of profitability could decrease the probability of bankruptcy and distress costs. Therefore, a positive relationship may exist between profitability and leverage. The usual prediction is that $\beta_6 < 0,$ we hypothesise that:

H6: All else equal, Profitability of the firm will have a negative impact on the level of the firm's debt.

4.6.8 *Leverage and Volatility*

Graham and Harvey (2001) show that one of the important factors that affects firm capital structure is earnings volatility. Trade off theory predicts firms with a high probability of bankruptcy will have a low level of debt. A higher volatility of earnings will lead to a higher probability that the firm will not be able to pay its debt, so firms with high earnings volatility will have a low leverage ratio (see Harris and Raviv (1991), Fama and French (2002) and Antoniou *et al.,* (2008)). Following Leary and Roberts (2005), we measure the volatility of earnings by the absolute value of the change in net income. we expect to find that $\beta_7 < 0$, we hypothesise that:

H7: All else equal, volatility of firm earnings will have a negative effect on the firm's debt.

4.6.9 *Leverage and Dividend Payout Ratio*

The dividend payout ratio is another factor that may affect firm leverage. From an agency and transaction cost point of view, firms with a high payout ratio will have lower agency costs of equity, which encourages firms to use more equity financing Rozeff (1982). There should be an inverse relationship because paying dividends is a signal of an expected increase of future earnings and this leads to a decrease in the cost of equity financing (Antoniou *et al.,* (2008)). The typical measure of the dividend payout ratio is the ratio of dividends to net income. The usual prediction is that $\beta_8 < 0$, we hypothesise that:

H8: All else equal, the dividend payout ratio will inversely impact on firm leverage.

4.6.10 *Leverage and Ownership Structure (Large Blockholders, Institutional Investors)*

The relationship between leverage and ownership structure is rarely discussed in the literature, even though it represents an important factor affecting capital structure. Jensen (1986) argues that firms will use debt to reduce the agency cost of free cash flow. The free cash flow problem arises when managers use free cash flow to invest more than would be optimal, increasing the resources that they control, and increasing their bonuses, as bonuses relate to the firm's growth and size. Debt can control unnecessary spending. Large blockholders who monitor managerial investment decisions can fulfil some of the role, resulting in a reduction in the free cash flow problem and the agency cost premium of equity (Schiantarelli, 1996 and Shleifer and Robert, 1997). If blockholders decrease monitoring costs we can expect a negative relationship between blockholders and the leverage level, Bathala *et al.,* (1994). On the other hand, Brailsford *et al.,* (2002) argue that blockholders will monitor the firm's management, and the firm's management will not be able to use firm debt for their own interests. Consequently, they predict a positive relationship between firm leverage and the level of blockholders. Following Chen and Steiner (1999), we measure blockholders as the sum of all large shareholders owning more than 5% of each firm. Consequently, a negative relationship will exist between blockholders and the leverage ratio, we expect to find that $\beta_9 < 0$.

H9: All else equal, large blockholders will have a negative effect on the firm's leverage ratio.

Institutional investors have the skills to monitor both firm performance and managers' decisions. Hence, institutional investors will be a good substitute for the role of leverage and reduce the agency cost problem, Bathala *et al.,* (1994) and Crutchley *et al.,* (1999). Therefore, there should be a negative impact of institutional investors on firm debt. we define institutional investors as the sum of all shares held by institutions, to the total number of shares outstanding. The common prediction is that $\beta_{10} < 0$, we hypothesise that:

H10: All else equal, the number of institutional investors will be negatively related to the firm's leverage ratio.

Econometric specification:

In this chapter we use a balanced panel to estimate the model above[9]. Thus we use repeated observations on the same firm for several time periods. In this section we use OLS (Ordinary Least Square) the definition of OLS according to Cameron and Trivedi (2009) is "the estimator that minimizes the sum of squared errors".   In OLS we assume that each disturbance is independent of all of the others. Thus, the error term in ε_{it} are assumed to be independent draws from an identical distribution (i.i.d). In panel data, we have the pooled, fixed effects and random effects models. Pooled OLS (cross section) specifies constant coefficients, so that

$$y_{it} = a + \acute{x}_{it}\beta + u_{it} \qquad eq.\ 4.2$$

where $i = 1, 2, ..., N, t = 1, 2, ..., T, x_{it}$ is a $1 \times k$ vector of regressors and β is a $K \times 1$ vector of coefficients to be estimated.[10]This model assumes that the regressors are uncorrelated with the error, where the error captures differences over time and individuals. Thus, we can estimate the model using OLS. We group the data over i and t into one regression of NT observations. However, pooled OLS is inconsistent because if we have unobserved individual-specific effect that lead the error term to correlate over time for a given individual. Therefore we control for this correlation by including a dummy variable for each firm (i.e. we have some unobserved individual heterogeneity that may correlate with the regressors and should be included in the model, otherwise the omitted variables problem will arise). To overcome this problem, we can use the fixed effects or random effects models that allow each firm to have a different intercept term that captures the unobserved individual-specific effect across firms but does not vary over time (i.e. time invariant), so

$$y_{it} = a_i + \acute{x}_{it}\beta + \varepsilon_{it} \qquad eq.\ 4.3$$

In equation 4.3, we view the error in equation (4.2) $u_{it} = a_i + \varepsilon_{it}$, where ε_{it} is i.i.d over i and t. a_i are random variables that capture unobserved heterogeneity. In the

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[9] The discussion of this section is based on Cameron and Trivedi (2009)
[10] x' is a row vector consist of all of the independent variables.

fixed effect model a_i is an observed random variable that is permitted to correlate with the observed regressors x_{it}, in this model x_{it} do not correlate with ε_{it}. The random effect model assumes that the a_i (i.e. the unobservable firm effect) is purely random and distributed independently of the regressors x_{it} and ε_{it} is i.i.d so the random effect model is $y_{it} = x_{it}'\beta + (a_i + \varepsilon_{it})$, we estimate the random effect using the Generalized Least Square (GLS) technique. To estimate the fixed effect model, we can use Least Square Dummy Variable (LSDV) or within estimator, where in the LSDV we use OLS with N individual dummy variables to control for unobserved individual effects. If *N* is not too large relative to than in the time series an alternative and simpler way to compute the within estimator is by LSDV. Since LSDV uses many dummy variables for large N, alternatively we can use the within estimator. A within estimator does not need dummy variables, but it uses deviations from group means, so we take the average over time of equation 4.3 yields $\bar{y}_i = a_i + \bar{x}_i'\beta + \bar{\varepsilon}_i$. Subtracing this from y_{it} in equation 4.3 yields the within model:

$$y_{it} - \bar{y}_i = (x_{it} - \bar{x}_i)'\beta + (\varepsilon_{it} - \bar{\varepsilon}_i)$$

Pooled OLS is inconsistent if the true model is the fixed effects model, since pooled OLS ignores the individual dummies that capture the unobserved specific-individual effect that should be included in the model. To identify which empirical methodology is most appropriate – pooling, random effect, or fixed effect, we should use some statistical test. To test if we have individual-specific effects, we can use the Lagrangian Multiplier (LM) test (Breusch and Pagan, 1980). LM tests for the presence of individual-specific random effects against the null hypothesis assumption of i.i.d errors. If the null hypothesis is rejected, the pooled regression model is not appropriate, and we have significant differences across units. If we fail to reject the null hypothesis we conclude that random effects is not appropriate, and there are no significant differences across units[11].

The second step is to decide between the fixed effect and random effect models. We use the Hausman specification test (Hausman 1978), *"the test is used to test for orthogonality of the common effects and the regressors"* (Green, 2003). Under the null hypothesis that the individual-specific effects a_i are uncorrelated with the

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[11] I use STATA version 11 to estimate all regressions.

regressors in the model. If we reject the null hypothesis, the fixed effect is preferred to the random effect. The Hausman test is based on the following hypotheses:

H0: a_i is uncorrelated with X,

H1 : a_i is correlated with X,

The test-statistics :

Under the null hypothesis, if the individual specific effects (a_i) are uncorelated with the explanatory variables X_{it}, the random effects is consistent and efficient, the fixed effects esimtator is consistent, but not efficient. Under the alternative hypothesis, if the individual specific effects a_i are correlated with covaraites X_{it} are correlated with covaraites X_{it}, the fixed effect is consistent and efficient but the random effects is inconsistent (see, Green, 2003 and Heineck, 2004). *So, "under the null hypothesis, the two estimates should not differ systematically, and the test can be based on the difference"*, (Green, 2003. p576).

The Hausman statistic is distributed as χ^2 and is computed as

$$\text{Hausman Test} = [\hat{\beta}_{fe} - \hat{\beta}_{re}]'[V_{fe} - V_{re}]^{-1}[\hat{\beta}_{fe} - \hat{\beta}_{re}] \sim \chi^2_{k-1}$$

Under the null hypothesis, Hausman test is asymptotically distributed as chi − squared with k-1 degrees of freedom. We use the estimated covariance matrices of the slope estimator in the fixed effect model (within model) and the estimated covariance matrix in the random effects model, excluding the constant term.

Where,

$\hat{\beta}_{fe}$ is the coefficient vector from the fixed effect estimator .

$\hat{\beta}_{re}$ is the coefficient vector from the random effect estimator.

V_{fe} is the covariance matrix of the fixed effect estimator.

V_{re} is the covariance matrix of the random effect estimator.

4.7 RESULTS OF DETERMINANTS OF CAPITAL STRUCTURE

In order to examine the impact of firm characteristics on firm leverage for Jordanian firms, eq. 4.1 is estimated using OLS methodology with panel data. Capital structure policy may be different between firms, because each firm may have unique characteristics. a_i capture these differences across firms. The market and macroeconomics conditions might affect all firms in the market at one point in time, but these conditions will vary from year to year, λ_t capture these time-variant market conditions. Examples of market factors include interest rates and inflation. To choose which empirical methodology is most suitable , the Lagrangian Multiplier test is used under the null hypothesis that the individual effect, a_i, is zero. The results show that the chi-square statistic is equal to 706.5. Thus the null hypothesis is rejected at the 1% significance level. To compare between the fixed effect and random effect models, based on the Hausman test the null hypothesis is rejected at the 1% significance level. Thus, the results in Table 4.4 are from the fixed effect regression.

Table 4. 4 Determinants of Capital Structure in Jordan

Using OLS regression using equation 4.1, the table provides the regression results for the determinants of capital structure, The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. t-statistics are in parenthesis below the coefficient estimates, the Lagrangian Multiplier test (LM test) is used to test the random effect model versus the pooling, the Hausman specification test is used to test the fixed-effect model versus the random effect model. Wald is Wald test of the joint significance of the time dummies; Wald 1 is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as x^2 under the null of no relationship. Applying a two-tailed test, the asterisk ***, **, and * denotes that the coefficients are statistical significance at 1%, 5%, and 10% level, respectively. The results are based on two tailed Where $Debt_{i,t}$ is the ratio of total debt to total book value of assets, where total debt is measured by total liabilities minus accounts payable and other liabilities. $TAN_{i,t}$ (asset tangibility) is the ratio of the book value of tangible fixed assets to the book value of total assets. $SZ_{i,t}$ (firm size) is the natural log of total assets. $(M/B)_{i,t}$ (growth opportunities) is measured by the ratio of the market to book value of equity. $NTS_{i,t}$ (non-debt tax shields) is measured by the ratio of annual depreciation expenses to the book value of total assets. $LQ_{i,t}$ (liquidity) is measured by the ratio of current assets to current liabilities. $PR_{i,t}$ (profitability) is the ratio of net operating income to the book value of total assets. $VOL_{i,t}$ (earning volatility) is measured by the absolute value of the changes in net income. $DIV_{i,t}$ (dividend payout ratio) is the ratio of dividends to net income. $BLK_{i,t}$ (blockholders) is measured by the sum of all large external shareholders owning more than 5% of each firm. $INS_{i,t}$ (institutional investor) is measured by the ratio of the sum of all shares held by institutions to the total number of shares.

Independent variables	
$TAN_{i,t}$	-0.025
	(-0.51)
$SZ_{i,t}$	0.041***
	(2.75)
$(M/B)_{i,t}$	0.014**
	(2.03)
$NTS_{i,t}$	0.139
	(0.48)
$LQ_{i,t}$	-0.018***
	(-6.27)
$PR_{i,t}$	-0.219***
	(-2.78)
$VOL_{i,t}$	0.002
	(1.20)
$DIV_{i,t}$	-0.017**
	(-2.09)
$BLK_{i,t}$	0.170***
	(3.44)
$INS_{i,t}$	0.074*
	(1.81)
R^2	0.25
No. of firms	85
LM test-chi^2 (df)	706.50(1)
Hausman test -chi^2 (df)	49.0 (8)
Wald test (df)	3.17(8)
Wald test 1 (df)	10.22 (10)
F statistics (df)	7.60 (18)

4.7.1   *Results of Leverage and Assets Tangibility*

The results in Table 4.4 show no evidence that tangibility of assets affects firm leverage. While there is no obvious explanation why tangibility is not significant, some researchers obtain similar findings, Titman and Wessels (1988), Gaud *et al.,* (2005), Wiwattanakantang (1999), Rajan and Zingales (1995) for Italian firms, and Antonio *et al.,* (2008) for US firms. The results suggest creditors do not consider the firm's fixed assets when they provide loans, possibly because the collateral value in Jordan is low and would be difficult for the creditors to sell if the firm went bankrupt. The only providers of debt to firms in Jordan are banks. Jordanian banking law restricts Jordanian banks from engaging in industry, commerce, or services excluding financial activities[12], and they are not allowed to keep any real estate acquired as a settlement of debt for more than two years[13]. This means the liquidation cost of the firm's tangible assets may be high, and so banks do not use these assets as a source of collateral, and do not adjust the cost of loans to firms accordingly.

4.7.2   *Results of Leverage and Firm Size*

The proxy of firm size, measured by the log of total assets, is statistically significant at the 1% level. In light of the results, large firms have more debt in their capital structure. This supports trade off theory, where the firm employs more debt as the cost of debt is low, and large firms have better access to credit markets because they face lower bankruptcy costs. Small firms reduce their debt, because they are more exposed to bankruptcy costs. The results reject the hypothesis that firm size is a negative proxy for the information asymmetry problem (Gaud *et al.,* 2005). This hypothesis argued that large firms have a low level of asymmetric information, enhancing their ability to raise capital from the equity market and reducing their debt. These results are consistent with the findings of Booth *et al.,* 2003; Bennett

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[12] Jordan Banking **Law No. 28 of 2000 article 40.**
[13] Jordan Banking **Law No. 28 of 2000 article 40.**

and Donnelly, 1993; Antoniou *et al.,* 2008; Flannery and Rangan, 2006; and Hovakimian *et al.,* 2004.

4.7.3   *Results of Leverage and Growth Opportunities*

The regression results show that the coefficient of growth opportunities is positive and significant at a 5% level. Chen (2004) finds similar results for a sample of listed Chinese firms, arguing that industrial or service firms in developing countries use a low level of technology, and have low growth opportunities, because they have large amounts of fixed assets and few intangible assets such as research and development, patent, trademarks, and goodwill. This finding is consistent with Myer's (1977) argument, that firms with a high level of intangible assets use less debt. Therefore, growth firms with a low level of intangible assets will use debt to finance their investment opportunities. Recall Jordanian firms operate at a low technology level with few competitors, and growth opportunities will be investment in tangible assets. As a result, creditors will be confident the firm will not use borrowed money to invest in risky assets, and this reduces the agency cost of debt. A positive relation has also been found by Gonenc (2003) for firms in Turkey and Pandey and Chotigeat (2004) for firms in Malaysia.

4.7.4   *Results of Leverage and Non-Debt Tax Shield*

The proxy for non-debt tax shields, depreciation expenses over total assets, is positive but not significant. There is therefore no evidence to support the presence of a substitution effect of non-debt tax shields. This result is similar to findings by Wijst and Thurik (1993).

4.7.5   *Results of Leverage and Liquidity*

Liquidity has a significant negative relationship with the leverage ratio, the estimated coefficient being significant at a 1% level. Firms that have more liquidity employ less debt in their capital structure, supporting the pecking order theory, where firms prefer internal cash flow to external sources of finance. This finding supports the studies by Ozkan (2001) and Jong *et al.,* (2008).

4.7.6   *Results of Leverage and Profitability*

Firm profitability has a negative impact on firm leverage. The variable measured by net operating income to the book value of total assets is significant at a 1% level. This is consistent with pecking order theory, since firms with high profitability use more retained earnings and less debt in their capital structure. Both profitability and liquidity have an inverse relationship with the debt ratio, supporting the argument that Jordanian firms prefer to use internal funds rather than debt. These results are consistent with previous studies by Booth *et al.,* 2001; Lemmon *et al.,* 2008; Flannery and Ragan, 2006; Pandey and Chotigeat, 2004; and Rajan and Zingales, 1995.

4.7.7   *Results of Leverage and Earnings Volatility*

According to trade off theory, firms with high risk will have a low amount of debt. Here firm risk is approximated by earnings volatility. The results find no statistical relation and therefore are not consistent with the theory. A similar result was found by Titman and Wessels, 1988; Booth *et al.,* 2001; Wiwattanakantang, 1999; Pandey and Chotigeat, 2004; Chen, 2004; Leary and Roberts, 2005; and Lemmon *et al.,* 2008.

4.7.8   *Results of Leverage and Dividend Payout Ratio*

The results show an inverse impact of the dividend payout ratio on the debt ratio, statistically significant at 5%. This result may suggests firms with a higher payout ratio take advantage of a lower cost of equity financing and use more equity in their capital structure, consistent with the findings reported by Chen and Steiner (1999) and Rozeff (1982).

4.7.9   *Results of Leverage and Ownership Structure*

The coefficient for the proxies of blockholders and institutional investors are positive and significant. These results are inconsistent with the argument that suggests there should be a negative relationship if institutional investors and large blockholders are a substitute for debt. Here, the results are consistent with the argument that the firm uses leverage due to active monitoring from blockholders and

institutional investors. In other words, creditors can be confident that the firm will use debt effectively. The positive relation between institutional investors and debt is consistent with Crutchley *et al.,* (1999), while the positive relationship between blockholders and leverage is consistent with Brailsford *et al.,* (2002).

4.8 TARGET CAPITAL STRUCTURE

In the previous section, we estimated firm leverage using a set of explanatory variables. Trade off theory implies that each firm has a target capital structure and adjust their leverage toward this target. However, the target ratio is determined by the firm's specific characteristics. The firm must balance between being off target, and the cost of adjusting. If the adjustment process is costly, the firm's speed of adjustment may be slow. For example, one of the costs that firms face is the transaction cost associated with issuing new debt (see Miguel and Pindado 2001).

The firm's target capital structure is determined by the explanatory variables discussed in the previous section. Therefore, the model for the optimal target debt ratio (Debt *) can be written as follows:

$$\text{Debt}_{i,t}^* = \sum_{k=1} \beta_k\, x_{k,i,t} + e_{i,t} \qquad\qquad \textit{eq. 4.4}$$

Where *x* is a vector of explanatory variables K, and x *kit* represents the explanatory variable *k* for firm *i* in time *t*. Ten explanatory variables that determine the target debt ratio are (asset tangibility, size, growth opportunities, non-debt tax shields, liquidity, profitability, earnings volatility, dividend payout ratio, blockholders, and institutional investors). $e_{i,t}$ is the error term assumed to be serially uncorrelated, with zero mean. Following Ozkan (2001), Miguel and Pindado (2001) and Antoniou *et al.,* (2008), the adjustment process towards the optimal capital structure can be written as follows:

$$\text{Debt}_{i,t} - \text{Debt}_{i,t-1} = \lambda(\text{Debt}_{i,t}^* - \text{Debt}_{i,t-1}) \qquad\qquad \textit{eq. 4.5}$$

Alternatively equation (4.5) can be written to find the actual debt level as:

$$\text{Debt}_{i,t} = \lambda\text{Debt}_{i,t}^* + (1 - \lambda)\text{Debt}_{i,t-1} \qquad\qquad \textit{eq. 4.6}$$

Where *Debt*$_{i,t}$ and *Debt* $_{i,t-1}$ are the actual debt for year $_t$ and year $_{t-1}$, respectively. Debt$^*_{i,t}$ is the target debt ratio, where $0 < \lambda < 1$, the coefficient λ measure the firm's speed of adjustment toward its target. If $\lambda = 1$, then $Debt^*_{it}$ = Debt $_{it-1}$ and the transaction cost that the firm pays to adjust toward its target is minimal, and the adjustment toward target debt occurs without cost, or the cost of being away from target is very high, and the firm is always at its target Debt. On the other hand, if $\lambda = 0$, then Debt $_{it}$ = Debt $_{it-1}$ which means that transaction costs are very high, and there is no adjustment toward target debt (Ozkan, 2001). Substitution of equation (4.4) into equation (4.6) gives

$$\text{Debt}_{i,t} = (1 - \lambda)\text{Debt}_{i,t-1} + \lambda \sum_{k=1} \beta_k \, x_{k,i,t} + \lambda e_{i,t} \quad eq.\ 4.7$$

which can be written as :

$$\text{Debt}_{i,t} = a_0 \text{Debt}_{i,t-1} + \sum_{k=1} a_k \, x_{k,i,t} + \varepsilon_{i,t} \quad eq.\ 4.8$$

where $\alpha_0 = 1-\lambda$, $\alpha_k = \beta_k$, and $\varepsilon_{i,t} = \lambda e_{i,t}$

The dynamic capital structure model will be estimated to determine if Jordanian firms have a target debt ratio, and to measure the speed of adjustment toward the optimal debt ratio. The leverage adjustment model will be as follows:

$$Debt_{i,t} = \beta_0 + \beta_1 TAN_{i,t} + \beta_2 SZ_{i,t} + \beta_3 (M/B)_{i,t} + \beta_4 TS_{i,t} + \beta_5 LQ_{i,t} + \beta_6 PR_{i,t} + \beta_7 VOL_{i,t}$$
$$+ \beta_8 DIV_{i,t} + \beta_9 BLK_{i,t} + \beta_{10} INS_{i,t} + \lambda_t + a_i + \varepsilon_{i,t} \quad eq.\ 4.9$$

See section 4.6 for variables definition. To estimate equation 4.9 we use the difference-GMM estimator proposed by Arrelano and Bond (1991). This estimator addresses the problem of estimating a dynamic capital structure model, which is likely to suffer from the problem arising from the presence of unobserved individual-specific effect and a lagged dependent variable. To illustrate this, consider the simple dynamic model as follows:

$$y_{it} = a y_{it-1} + \beta \, x_{it} + e_{it}$$

Where:

$$e_{it} = a_i + \varepsilon_{it}$$

Where i=1,…,N cross section units and t=1,…,T time periods. The disturbance term has two components, a_i is an unobserved firm-specific effect, and the idiosyncratic shock ε_{it}. In this model, the lagged value y_{it-1} may correlate with the individual-specific effect which creates the problem of endogeneity. To solve this problem, we can estimate the model in first-differences. Then we obtain,

$$\Delta y_{it} = a\Delta y_{it-1} + \beta \, \Delta x_{it} + \Delta\varepsilon_{it}$$

By taking first differences, the a_i will be removed from the equation[14]. However, the OLS estimator still suffers from correlation between Δy_{it-1} and $\Delta\varepsilon_{it}$. In this case use of GMM is required for two reasons. First, Δy_{it-1} is correlated with $\Delta\varepsilon_{it}$, because the $\Delta y_{it-1} = y_{it-1} - y_{it-2}$ is correlated with $\Delta\varepsilon_{it} = \varepsilon_{it} - \varepsilon_{it-1}$, due to the correlation between y_{it-1} and ε_{it-1}. At the same time $\Delta\varepsilon_{it}$ is uncorrelated with Δy_{it-k} for k≥2. Therefore, we use lagged variables as instruments, where we can use y_{it-2} as an instrument for ($y_{it-1} - y_{it-2}$). Arrelano and Bond (1991) proposed the difference-GMM estimator where they use additional lags of the dependent variable as instruments, for example $y_{it-2} \, and \, y_{it-3}$ might be used as instruments. In the presence of heteroskedasticity and serial correlation, the two-step differenced-GMM is more efficient than the one-step differenced-GMM.

The estimated asymptotic standard errors of the efficient two-step robust differenced-GMM estimator are severely downward biased in small samples. we correct the standard errors for this bias using the method proposed by Windmeijer (2005), (see Roodman, a2009; page 11). A number of capital structure studies use the differenced-GMM model to examine the partial adjustment model (see, Ozkan, 2001; Gaud *et al.,* 2005; Gonzales and Gonzales, 2008; Florackis and Ozkan, 2009). Gonzales and Gonzales (2008) note that differenced-GMM is useful to study dynamic capital structure for three reasons:

1- "The unobserved firm-specific effect will be eliminated by taking the first difference of the variable.

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[14] The unobserved individual-specific effect (a_i) is eliminated because $e_{i,t} - e_{i,t-1} = (a_i - a_i) + (\varepsilon i, t - \varepsilon i, t-1)$.

2- The autoregressive process in the data, since the lagged value of leverage is included to capture the dynamic nature of the capital structure decision.

3- The possibility of endogeneity between the variables in the model".

The appropriateness of this approach is reinforced by the likelihood that shocks affecting the firm's leverage decisions will be the same across all the explanatory variables, Ozkan (2001). In addition, Gaud *et al.,* (2005) treat all the independent variables as endogenous since all the variables are based upon accounting values and these are likely to be determined simultaneously.

For consistent estimation and to avoid misspecification, the GMM estimator requires that the error $\varepsilon_{i,t}$ to be serially uncorrelated. Specifically, the $\varepsilon_{i,t}$ are serially uncorrelated when the $\Delta\varepsilon_{it}$ are correlated with $\Delta\varepsilon_{i,t-1}$, but not correlated with $\Delta\varepsilon_{i,t-k}$ for $k \geq 2$. Therefore, the GMM estimator is consistent if there is no second order serial correlation. To check for serial correlation, we test first order serial correlation (*AR 1*) and second order serial correlation (*AR 2*). The instruments used in the GMM estimator will be valid only if there is no correlation between the instruments and error term. A standard specification check for two-step differenced-GMM is the Hansen (1982) *J* -test. Hansen statistics test the over-identifying restrictions, under the null hypothesis that the instruments are uncorrelated with the error term.

We should also bear in mind that the differenced-GMM may suffer from a weak instruments problem. When the dependent variable and independent variables are persistent over time, the lagged value of these variables are weak instruments for the regression equation in differences since they are less correlated with subsequent changes. Blundell and Bond (1998) suggest using system-GMM, which imposes additional moment restrictions to solve the weak instruments problem. However, the main problem of system-GMM is that the standard errors may be severely downward biased when the instrument count is high (see, Roodman, b2009). System-GMM may not be reliable here since there are 11 explanatory variables and assuming that the firm's characteristics are endogenous for 9 years, the number of instruments may be greater than the number of cross sections, leading to inconsistent results. Applying system-GMM on the partial adjustment model of debt, however, the number of instruments is 160 if two lags are used as instruments, which is higher

than the number of cross sections (85 firms). Because the number of firms is limited, we cannot apply system-GMM and this caveat needs to be kept in mind while interpreting these results. To keep the number of instruments below the number of the cross section we use the second lag of the independent variables as instruments.

4.9 RESULTS OF TARGET CAPITAL STRUCTURE MODEL

We present the results for the equation (4.9) in Table (4.5). The specification tests show the model is valid. The Hansen test of overidentification restriction does not reject the null at any conventional level of significance. The Hansen test p-value (0.374) means we accept the validity of the instruments, since the instruments are uncorrelated with the error term. The test for serial correlation shows no evidence of second order serial correlation (*AR 2*). Time dummies are included to control for macroeconomic factors that can affect firms' leverage decision, and which may vary from year to year.

The results show that the coefficient of the lagged value of leverage is positive and significant at the 1% level. The coefficient of adjustment value λ *(1-a$_1$)* is 0.745. This suggests that Jordanian firms need 1.34 years to adjust their leverage towards target, which is a relatively fast speed of adjustment. Jordanian firms have a target leverage and quickly adjust their leverage toward this target, consistent with the findings of Ozkan (2001) and Miguel and Pindado (2001). The speed of adjustment is a trade off between the cost of transactions to adjust current leverage toward the target, and the cost of being in disequilibrium away from the target, and will be inversely related to transaction costs.

A speed of adjustment of 0.745 implies that low transaction costs encourage Jordanian firms to adjust their leverage towards target. The results are consistent with the main source of debt for Jordanian firms coming from private banks, and that firms rarely use bonds to raise capital. For instance, in Jordan only 7 firms issued bonds in 2008. The transaction cost related to bank loans is low, which encourages firms to adjust their capital. The result is consistent with Miguel and

Pindado (2001) who find similar results for Spanish firms. In short, the absence of an effective bond market and the presence of credit banks mean the transaction cost of adjustment is low and Jordanian firms adjust their leverage quickly.

Table 4. 5 Target Adjustment Model Results

The Table reports the regression results for target adjustment model, using Arellano and Bond's (1991) first-differencing GMM, .The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. See Table 3.3 for tests and variables definitions. The two-step GMM estimator is employed in the analysis with robust standard errors that are adjusted using the finite sample correction of Windmeijer (2005). The Hansen J-test of over-identifying restrictions (OIR) for the GMM estimators: the null hypothesis is that instruments used are not correlated with residual and so the over-identifying restrictions are valid. *AR (1)* is Arellano-Bond test for first-order serial correlation in the first-differenced residual, asymptotically distributed as N (0, 1) under the null of no serial correlation. *AR (2)* is Arellano-Bond test for second-order serial correlation in the first-differenced residual, asymptotically distributed as N (0, 1) under the null of no serial correlation. Time dummies included in the regression. t-statistics in parentheses. Applying a two-tailed test, the asterisk ***, **, and * denotes that the coefficients are statistical significance at 1%, 5%, and 10% level, respectively.

The dependent variables is Leverage$_{it}$	
Independent variable	GMM- first difference
$Debt_{i,t-1}$	0.255***
	(2.59)
$TAN_{i,t}$	-0.11
	(-1.23)
$SZ_{i,t}$	0.034
	(0.81)
$(M/B)_{i,t}$	0.018**
	(2.01)
$NTS_{i,t}$	0.099
	(0.16)
$LQ_{i,t}$	-0.022**
	(-2.32)
$PR_{i,t}$	-0.306**
	(-2.21)
$VOL_{i,t}$	0.001
	(0.18)
$DIV_{i,t}$	-0.008
	(-0.43)
$BLK_{i,t}$	0.065
	(0.59)
$INS_{i,t}$	-0.088
	(-0.90)
Arellano-Bond AR(1) test-p.value	0.001
Arellano-Bond AR(2) test-p.value	0.590
OIR J-test *p.value*	0.374
Wald (df)	19.43(7)
Wald 1 (df)	46.41(11)
F statistics (df)	103.5(16)
See table 4.4 for variables definitions.	

To compare the results of the determinants of capital structure in Jordan using dynamic GMM and a static OLS model, we should take into account that we have

now included the lagged value of the dependent variable. This lagged dependent variable in the adjustment model will absorb some of the variation in the dependent variables that is found when estimating a static OLS model, see Gonzalez and Gonzalez (2008). To examine this hypothesis, we run the partial adjustment model using fixed-effect OLS. The results show that firm size, institutional investors, and payout ratio are not significant at 5%, which confirms that including the lagged dependent value absorbs some of the variation in the dependent variables. Thus the results from using dynamic models based on OLS and differenced-GMM are the same regarding the significance of the variables; however, the Blockholders ratio is significant in dynamic OLS but not significant in dynamic GMM.

4.10 TESTS OF PECKING ORDER THEORY (SHYAM-SUNDER AND MYER'S MODELS)

Pecking order theory implies there is no target or optimal leverage ratio, and that asymmetric information is the main determinant of firms' leverage[15] ratio. The firm will use internal sources of funds followed by debt and equity financing respectively. Shyam-Sunder and Myers (1999) develop a model where the firm's debt level correlates with the internal financial deficit. They argue that if internal funds are not sufficient, and pecking order theory holds, the firm's debt level will respond to fluctuations of the financial deficit that the firm faces. They measure the financial deficit "*as the sum of dividend payments, capital expenditures, net increase in working capital and the current portion of long term-debt, minus operating cash flow*". According to their model, we can test pecking order theory by estimating:

$$\Delta \, Debt_{i,t} = a + \beta_{PO} \, Def_{i,t} + \varepsilon_{i,t} \qquad \qquad eq. \, 4.10$$

Pecking order implies that $\beta_{PO} = 1$, since the firm's first choice to finance the financial deficit is debt. Using data from 157 non-financial US firms over the period 1971 to 1989, they obtain a coefficient of the financial deficit of 0.75 with R^2 equal to 0.68. They argue this supports the ability of the model to describe firm financing behaviour. However, their results may be biased, because they are based on a sample

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[15] The terms "debt" and "leverage" are used interchangeably.

consisting only of large firms. One can also question whether we can apply this model to firms in emerging markets.

Frank and Goyal (2003) overcome the biased sample in Shyam-Sunder and Myers (1999) by examining a wider sample of 768 US nonfinancial firms between 1971 and 1998. Their results do not support pecking order theory. Frank and Goyal expand the Shyam-Sunder and Myers model by disaggregating the financial deficit term. They argue that the financial deficit may explain the change in net debt issue, but not in the way that is proposed by pecking order theory. Therefore, if we disaggregate the financial deficit, the information content of the individual components will be better able to explain pecking order theory. They propose the following specification to test pecking order theory:

$$\Delta\ Debt_{i,t} = a + \beta_1\ CD_{i,t} + \beta_2\ CE_{i,t} + \beta_3 \Delta\ WCA_{i,t} - \beta_4\ CF_{i,t} + \varepsilon_{i,t} \quad eq.\ 4.11$$

Where Δ *Debt* $_{i,\ t}$ is the new issuance of debt (gross debt issue) or change in debt ratio. CD is the cash dividends, CE is the capital expenditure, WCA is the Working Capital, and CF is the Cash flow. λ_t is the year dummies, a_i is the firm specific effect.

In the following sections, we empirically examine pecking order theory on firms listed in Amman Stock Exchange (ASE), using Shyam-Sunder and Myers's model and Frank and Goyal's model. Section 4.10.1 presents a descriptive analysis and correlation matrix between the variables. Section 4.10.2 presents the model development and econometric specification, and main results of the models.

4.10.1 *Descriptive Analysis*

Table 4.6 shows the correlation matrix between all variables in the study. The financial deficit and capital expenditure are positively correlated with new debt. This suggests firms use debt to finance their financial deficit and capital expenditure. The proxy of cash dividends and new debt is negatively correlated, which suggests that firms with a high dividend ratio issue less debt.

Table 4. 6   Pairwise Correlation Matrix

The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. New issuance of debt is the increase in the total leverage from year $_{t-1}$ to year $_t$. Change in total debt is the change of total debt. Financial deficit is the sum of change in working capital, paid dividends, firm capital expenditures, minus internal cash flow. All variables are scaled by the book value of total assets.

	New Issuance of Debt	ΔTotal Debt	DEF	CD	CE	ΔWCA
ΔTotal Debt	0.843*					
Def	0.107*	0.032				
CD	-0.107*	0.416	-0.089*			
CE	0.182*	0.159*	0.376*	-0.056		
ΔWCA	-0.101*	-0.145*	0.466*	0.112*	0.256*	
CF	-0.078*	-0.047	-0.373*	0.481*	0.013	0.356*

An asterisk indicates significance at the 5% level.

Table 4.7 shows the descriptive statistics for the sample used. It shows the mean, median, minimum, maximum, and standard deviation.

Table 4. 7   Descriptive Statistics of Sample

The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. New issuance of debt is the increase in the total debt from year $_{t-1}$ to year $_t$. Δ Total debt is the change of total debt. DEF (Financial deficit) is the sum of change in working capital, paid dividends, firm capital expenditures, and minus internal cash flow, all divided by total assets. All variables are scaled by the book value of total assets. See section 4.10.2.3 for variables definition.

	Mean	Median	Min	Max	Standard deviation
New issuance of debt	0.039	0.003	0	0.679	0.075
ΔTotal Debt	0.010	0.003	-0.531	0.68	0.107
DEF	0.038	0.004	-0.617	1.30	0.154
CD	0.027	0.001	0	0.352	0.041
CE	0.050	0.02	0	0.903	0.093
ΔWCA	0.009	0.007	-0.959	0.736	0.136
CF	0.065	0.066	-1.775	0.521	0.124

Table 4.8 shows the corporate cash flow and main sources and uses of funds for the sample. Most items are consistent over time. The largest item of uses of funds is capital expenditure, with an average amount equal to 0.051, demonstrating the importance of investment in fixed assets for Jordanian firms. In addition, it may indicate that capital expenditure consumes a large amount of the firm's funds. In addition, it is notable that the two external sources of funds are similar (net equity and net debt).

Table 4. 8 Uses and Sources of Funds of Sample

This Table shows sources of funds and uses of funds. The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. New issuance of debt is the increase in the total debt from year $_{t-1}$ to year $_t$. Change in total debt is the change of total debt. Financial deficit is the sum of change in working capital, paid dividends, firm capital expenditures, and minus internal cash flow. All variables are scaled by the book value of total assets. The Table is similar to table 2 of Frank and Goyal (2003). See section 4.10.2.3 for variables definition.

	2001	2002	2003	2004	2005	2006	2007	2008	Average
CD	0.028	0.026	0.025	0.031	0.027	0.028	0.029	0.026	0.027
CE	0.051	0.043	0.054	0.066	0.055	0.046	0.040	0.050	0.051
ΔWCA	0.009	0.000	0.003	0.009	0.049	-0.022	0.018	0.010	0.009
CF	0.064	0.064	0.058	0.087	0.089	0.056	0.065	0.043	0.066
DEF	0.025	0.005	0.025	0.018	0.042	-0.004	0.022	0.043	0.022
New Debt Issues	0.024	0.034	0.031	0.045	0.035	0.053	0.043	0.054	0.040
New Equity Issuance	0.015	0.018	0.046	0.073	0.055	0.034	0.051	0.017	0.038
Total External Financing	0.038	0.052	0.077	0.118	0.090	0.087	0.094	0.071	0.078

4.10.2 *Model Design*

4.10.2.1   *Pecking Order and Shyam-Sunder and Myers's Model*

In the first step we employ the Shyam-Sunder and Myers (1999) model to test the pecking order theory for listed Jordanian firms between 2000 and 2008. Following their methodology, we use ordinary least squares (OLS) with panel data. The model is as follows:

$$\Delta \, Debt_{i,t} = a + \beta_{PO} \, Def_{i,t} + \lambda_t + a_i + \varepsilon_{it} \qquad eq. \ 4.12$$

Where the dependent variable $\Delta \, Debt_{i,t}$ represents the change in the total debt to total assets ratio, or new issuance of debt for firm $_i$ in year $_t$. New issuance of debt (gross debt issue) is net increase of total debt[16] from year $_{t-1}$ to year $_t$. The second

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[16] Total debt is (Total liabilities in year $_t$) – (Accounts Payables in year $_t$) – (Other Liabilities in year $_t$)

measure of Δ *Debt* $_{i,t}$ is the change in total debt, measured by total debt in year $_t$ minus total debt in year $_{t-1}$. Net increase in debt and change in debt level are divided by total assets to minimise a heteroskedasticity effect. The *Def* $_{i,t}$ (Financial deficit) is the sum of change in working capital, paid dividends, firm capital expenditure, minus internal cash flow. Working capital in year $_t$ is the difference between current assets and current liabilities at year $_t$ and year $_{t-1}$ for each firm, Δ Working capital is the change in working capital between year $_t$ and year $_{t-1}$. The paid dividends are the paid dividends for year $_t$. Internal cash flow is the net income plus depreciation for year $_t$. Capital expenditure is the fixed assets in year $_t$ minus the fixed assets in year $_{t-1}$ plus depreciation in year $_t$. λ_t represents a year dummy, a_i is the firm specific effect, and $e_{i,t}$ represents the error term. we expect β_{po} to equal 1.

H1, All else equal, there is a positive relation between leverage (debt) ratio and the firm's deficit.

4.10.2.2   *Results of Shyam-Sunder and Myers's Model*

Table 4. 9 Results from Shyam-Sunder and Myers's Model

Using OLS regression, the table provides the regression results testing the Pecking order theory based on Shyam-Sunder and Myers (1999) model. The following equation is estimated: $\Delta Debt_{it} = a + \beta_{Po}\ Def_{i,t} + \lambda_i + a_i + \varepsilon_{it}$ eq.4.12   The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Δ Debt $_{i,t}$ = Change in the total debt to total assets ratio, or new issuance of debt for firm $_i$ in year $_t$. *Def* $_{i,t}$ is the sum of change in working capital, paid dividends, firm capital expenditures, and minus internal cash flow, all divided by total assets. Standard errors are heteroskedasticity-robust and clustered by firm. t-statistics are in parenthesis below the coefficient estimates. Applying a two-tailed test, the asterisk ***, **, and * denotes that the coefficients are statistical significance at 1%, 5%, and 10% level, respectively.

Dependent Variable	(A) New issuance of debt	(b) ΔDebt ratio
Independent Variable		
$Def_{i,t}$	0.048*	0.023
	(1.80)	(0.56)
R^2	0.028	0.031
No. of firms	85	85
LM test-chi^2 (df)	17.73(1)	0.7(1)
Hausman test -chi^2 (df)	1.48(1)	0.01(1)
Wald test (df)	18.71(7)	29.89(7)
Wald test 1 (df)	3.92(1)	0.58(1)
F statistics (df)	22.02(8)	33.26(8)

Panel (A) in Table (4.9) shows the regression result for new issuance of debt. The majority of the results show that the random effect is the most appropriate specification since the hausman test is insignificant. we therefore report only the results of the random effect specification (although the results using pooled, random,

and fixed effects are qualitatively the same). The result shows that the financial deficit is significant at a 10% level, and the coefficient is $\beta_{po} = 0.048$. The coefficient sign is of the right order, but is lower than expected since pecking order predicts the coefficient to be close to one. Panel (B) presents the results for the change in debt. In all regressions the results for the proxy of the financial deficit is not significant at any level. Furthermore, the results show very low values for R^2, which suggests that the goodness of fit is very low. In other words, the model may not fully capture the change in debt or new issuance of debt.

4.10.2.3   *Frank and Goyal's Model*

The second step of the research is to test pecking order theory using Frank and Goyal's model, applying disaggregated financial deficit.

$$\Delta\,Debt_{i,t} = a + \beta_1\,CD_{i,t} + \beta_2\,CE_{i,t} + \beta_3\Delta\,WCA_{i,t} - \beta_4\,CF_{i,t} + \lambda_t + a_i + \varepsilon_{i,t}\ \ eq.\ 4.13$$

Where the dependent variable $\Delta\,Debt_{i,t}$ represents the change in the total debt to total assets ratio or new issuance of debt for firm $_i$ in year $_t$. The independent variables are as follows; CD is the paid dividends for year $_t$. CE is the capital expenditure on fixed assets in year $_t$ minus the fixed assets in year $_{t-1}$ plus depreciation in year $_t$. WCA is the working capital in year $_t$ is the difference between current assets and current liabilities at year $_t$ and year $_{t-1}$ for each firm, Δ WCA is the change between working capital in year $_t$ and year $_{t-1}$. CF is the internal cash flow and represents the net income for firm $_i$ in year $_t$ plus depreciation for the year $_t$. To reduce the firm size effect and heteroskedasticity, all independent variables are scaled by total book value of assets.

4.10.2.4   *Results of Frank and Goyal's Model*

Table 4.10 shows the results for the disaggregation of financial deficit. Panel (A) shows the regression results for new issuance of debt. The proxy for cash dividends is negative and significant at 5%, consistent with the finding of Frank and Goyal (2003). The results suggest that firms that pay dividends use less debt in financing their capital structure. Frank and Goyal argue that capital expenditures are positively

related to debt. The results support this argument, the capital expenditure coefficient is positive and with the predicted sign. These findings support the pecking order theory. The proxy for the change in working capital and internal cash flow is not significant. Panel (B) shows the regression results for change in the debt ratio. All the results are the same as for new debt issuance, except the cash dividends coefficient becomes insignificant. However, the models' power to explain firms' debt behaviour is weak, the R^2 range from just 1% to 5%.

Table 4. 10   Results for Frank and Goyal Model

Using OLS regression with panel data, the table provides the regression results testing pecking order theory based on Frank and Goyal's (2003) model. The following equation is estimated:

$$\Delta\, Debt_{i,t} = a + \beta_1\, CD_{i,t} + \beta_2\, CE_{i,t} + \beta_3 \Delta\, WCA_{i,t} - \beta_4\, CF_{i,t} + \lambda_t + a_i + \varepsilon_{i,t} \quad eq.\,4.13$$

The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Standard errors are heteroskedasticity-robust and clustered by firm. Wald is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as x^2 under the null of no relationship. Applying a two-tailed test, the asterisk ***, **, and * denotes that the coefficients are statistical significance at 1%, 5%, and 10% level, respectively. Where the dependent variable $\Delta\, Debt_{i,t}$ represents the change in the total debt to total assets ratio or new issuance of debt for firm i in year t. The independent variables are as follows; CD is the paid dividends for year t. CE is the capital expenditure on fixed assets in year t minus the fixed assets in year $t-1$ plus depreciation in year t. WCA is the working capital in year t is the difference between current assets and current liabilities at year t and year $t-1$ for each firm, Δ WCA is the change between working capital in year t and year $t-1$. CF is the internal cash flow and represents the net income for firm i in year t plus depreciation for the year t. all independent variables are scaled by total book value of assets.

Dependent variable	(A) New Issuance of Debt	(B) Δ Debt
Independent variables		
$CD_{i,t}$	-0.152**	-0.034
	(-2.30)	(-0.37)
$CE_{i,t}$	0.127**	0.155**
	(2.54)	(2.41)
$\Delta\, WCA_{i,t}$	-0.018	-0.080
	(-0.642)	(-1.48)
$CF_{i,t}$	-0.018	0.0005
	(-0.642)	(0.01)
R^2	0.05	0.05
No. of firms	85	85
Year Dummies	yes	yes
LM test-chi^2 (df)	13.62(1)	0.16 (1)
Hausman test -chi^2 (df)	4.45(4)	7.32(4)
Wald test (df)	19.62(7)	28.03(7)
Wald test 1 (df)	27.74(4)	16.01 (4)
F statistics (df)	40.42(11)	43.53(11)

4.10.3 *Pecking Order Model and Debt Capacity*

Pecking order theory implies that firms use internal cash flow followed by debt, and equity is the last resort. As aforementioned in section (4.10), Shyam-Sunder and Myers' (1999) model assumes that the financing deficit should be matched by a change in corporate debt. Therefore, if pecking order theory holds, the slope coefficient of the financial deficit should be close to one. However, this model ignores the possibility that the firm's financing behaviour of the firm will be affected by other factors beyond the firm's choices, where firms with similar financial needs face different constraints to issue debt. Recent studies show that the firm's ability to raise funds from the debt market would affect the pecking order coefficient in Shyam-Sunder and Myers' model. Studies by Lemmon and Zender (2010) and Abe de Jong *et al.,* (2010) and Bulan and Yan (2010) find that the pecking order model performs better if we account for a firm's debt capacity; debt capacity refers to the ability of the firm to issue debt in the market. Thus, firms with low restrictions to raise funds from the debt market could cover their financial deficit with debt, so the pecking order coefficient should reflect their financing behaviour better than firms with higher restrictions. To test if the firms are constrained by their debt capacity, they use the firm's characteristics and bond rating to differentiate between constrained and unconstrained firms.

They propose that the pecking order coefficient is higher for unconstrained firms since they have good access to relatively low-cost borrowing. So, they finance their financial deficit by issuing debt. Their higher debt capacity might arise because of less asymmetric information with the market. On the other hand, the financing behaviour for firms that face financing restrictions should be different because they cannot issue debt easily, and they avoid using debt because they are concerned about their debt capacity. The results show that unconstrained firms do use debt to satisfy their external financing needs, the pecking order coefficient being larger than for constrained firms (Lemmon and Zender, 2010).

The aim of this section is to test the pecking order model, accounting for a firm's debt capacity using the firm's market listing and characteristics (size, age and dividend policy). Unconstrained firms should have larger pecking order coefficients than constrained firms (i.e. β_{PO} to be close to 1).

In order to measure whether firms face financing constraints in the external financial market, we use the same measures as in section (3.4) in Chapter Three , where we assumed that large firms should have good access to the debt market and can easily use debt without concern for debt capacity. Mature firms have a close relationship with lenders and they should have greater debt capacity than young firms. Dividend paying firms are expected to have better access to the debt market than non-dividend paying firms. In Jordan there are the first and second markets, where first market firms are more profitable, stable and less constrained with a greater debt capacity. Consequently, the null hypothesis is that unconstrained firms are less likely to be concerned over debt capacity, are more likely to use debt to finance their deficit, and are better able to obtain loans on better terms than constrained firms.

We divide the sample into two groups, giving four classification criteria:

1- Market listing; first market and second market firms, where firms listed in the first market are unconstrained firms.

2- Firm size; classified by total assets and total sales. Firms above or below the sample median belong to large or small firms, respectively. Large firms are assumed to be financially unconstrained.

3- Age of the firm; classified by the point at which the firm is established. Firms above or below the sample median are classified as mature and young firms, respectively. Mature firms are assumed to have good access to the debt market and are therefore unconstrained.

4- Dividend policy: firms are split by the payout ratio, Firms above or below the median are classified as high or low payout firms, respectively. For robustness, we use dividend paying and non-dividend paying firms as another criterion.

4.10.3.1 *Debt capacity and market listing*

This section applies the Shyam-Sunder and Myers model to test pecking order for firms most likely to be constrained by their debt capacity[17]. To compare my results with other studies we use the change of debt as the dependent variable. The pecking

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[17] All of the results in this section are based on random effect estimation. In unreported robustness tests, the results from pooled or fixed effect are very similar to those reported here.

order model should perform better for unconstrained firms because they can issue debt more easily than constrained firms. The first measure is market listing, where firms listed in the first market are assumed to have good access to the debt market and use debt to finance their financial deficit.

Table 4. 11 Debt Capacity and Market Listing

The following equation is estimated: $\Delta Debt_{it} = a + \beta_{Po}\ DEF_{i,t} + \lambda_t + a_i + \varepsilon_{it}$ eq. 4.11 . Where $\Delta Debt_{i,t}$ is the change in the total debt to total assets ratio, $DEF_{i,t}$ is the financial deficit to total assets, Standard errors are heteroskedasticity-robust and clustered by firm. t-statistics are in parenthesis below the coefficient estimates. See Table 4.9 for variables definition.

Dependent Variable	$\Delta Debt_{it}$	
Independent Variable	First market	Second market
Constant	-0.006	-0.004
	(-0.54)	(-0.15)
$DEF_{i,t}$	0.109**	0.015
	(2.45)	(0.20)
R^2	0.08	0.11
Year dummies	yes	yes
No. of firms	35	22
LM test-chi^2 (df)	9.15(1)	1.29(1)
Hausman test -chi^2 (df)	0.05(1)	0.23(1)
Wald test (df)	18.23(7)	35.85(7)
Wald test 1 (df)	6.02(1)	0.2(1)
F statistics (df)	27.45(8)	35.95(8)

In Table 4.11 the results for both first and second market do not support pecking order theory, the coefficient for both of them is significantly lower than one[18]. The results also show that the estimated coefficient on the deficit variable is statistically significant for first market firms and not statistically significant for second market firms. The estimated coefficient for first market firms is 0.109, showing that first market firms issue debt to finance part of their financial deficit. However, there is no evidence that change in debt due to financial deficit is statistically different between the two groups, the t-statistic for the difference is not significant (the interaction variable is 1.21, and t* = 0.72). So, the null hypothesis that debt capacity

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[18] The Wald test of null hypothesis that $\beta_1 = 1$ is rejected for both first and second market firms (p-value = 0.000)

has a different impact on the financing behaviour of the two groups is rejected [19]. The results suggest that first market firms use debt to finance their financial deficit and are less concerned about their debt capacity.

4.10.3.2   *Debt capacity and firm size*

Large firms should less restricted in issuing debt because they have a better relation with the credit market, and they have a lower probability of bankruptcy because they are more diversified and provide better collateral. Small firms tend to use less debt since they would be more likely to liquidate if they are in financial distress. Thus, small firms are more likely to be constrained by their debt capacity. Thus, the pecking order model should perform better for large firms and the pecking order coefficient should be close to one.

Table 4.12 shows that the pecking order coefficient is significantly lower than 1 for both large and small size firms[20,21]. The results show that the financial deficit coefficient is statistically significant for large firms 0.117 and insignificant for small firms -0.03. The difference in the estimated financial deficit variable between the two groups is significant (the interaction variable is 1.67, and t* = 2.23), so the null that the slope coefficient between the two groups is the same is rejected.

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[19] To test if the deficit variable is statistically different between firms in first and second market, I pool the observations from two groups, and use a group dummy variable (set to 1 for first market firms and 0 for second market firms) as well as an interaction variable (financial deficit interacted with group dummy). A t-test of the interaction term variable then yields the statistical significance of the differences in the estimated sensitivities for the two groups. I refer to this test by *t*. For robustness, I use the t-test for the differences that is calculated as $t* = (y_1 - y_2) \sqrt{s_1^2 - s_2^2}$ where y_1 and y_2 are the coefficient of financial deficit variable for first market and second market respectively and $S_1^2 \ and \ S_2^2$ are the standard errors on the coefficients, I refer to this test by *t**. I use the same methodology for all other estimations in this section.

[20] For robustness, I use firm sales as a proxy for firm size, the results are qualitatively similar, so the results are not reported.

[21] The Wald test of the null hypothesis that $\beta_{po} = 1$ is rejected for both large and small firms (p-value = 0.000)

Table 4. 12 Debt Capacity and Firm Size

The following equation is estimated: $\Delta\,Debt_{it} = a + \beta_{Po}\,DEF_{i,t} + \lambda_t + a_i + \varepsilon_{it}$ eq. 4.11 . Where $\Delta\,Debt_{i,t}$ is the change in the total debt to total assets ratio, $DEF_{i,t}$ is the financial deficit to total assets, Standard errors are heteroskedasticity-robust and clustered by firm. t-statistics are in parenthesis below the coefficient estimates. See Table 4.9 for variables definition.

Dependent Variable	$\Delta\,Debt_{i,t}$	
Independent Variable	Large	Small
Constant	-0.006	-0.023
	(-0.54)	(-1.45)
$DEF_{i,t}$	0.117**	-0.03
	(2.18)	(-0.46)
R^2	0.07	0.05
No. of firms	42	43
Year dummies	Yes	Yes
LM test-chi^2 (df)	4.87(1)	0.94(1)
Hausman test -chi^2 (df)	4.23(1)	3.29(1)
Wald test (df)	23.77(7)	19.60(1)
Wald test 1 (df)	4.77(1)	0.21(1)
F statistics (df)	36.67(8)	20.56(8)

The results show that large firms follow pecking order, while small firms do not. Thus large firms finance their financial deficit with debt, in line with Abe de Jong (2010). Jordanian banks prefer to lend to large firms because they are less risky and the probability of bankruptcy is lower compared to small firms. Furthermore, large firms may take the advantage of having lower asymmetric information to obtain lower-cost debt financing, and are therefore less constrained by their debt capacity.

4.10.3.3   *Debt capacity and firm age*

Mature firms should have larger debt capacity because they are well known, with a longer history, and have a close relation with creditors. Table 4.13 shows that there is no evidence to support the pecking order model, since the financial deficit coefficient is not significant. This means debt capacity is unaffected by firm age, implying banks do not take the firms age into account when lending. The results are

in contrast with those of Bulan and Yan (2010), who find that mature firms follow the predictions of pecking order closer than young firms.

Table 4. 13 Debt Capacity and Firm Age

The following equation is estimated: $\Delta\, Debt_{i,t} = a + \beta_{Po}\, DEF_{\,i,t} + \lambda_t + a_i + \varepsilon_{i,t}$ eq. 4.11 . Where $\Delta\, Debt_{i,t}$ is the change in the total debt to total assets ratio, $DEF_{i,t}$ is the financial deficit to total assets, Standard errors are heteroskedasticity-robust and clustered by firm. t-statistics are in parenthesis below the coefficient estimates. See Table 4.9 for variables definition.

Dependent Variable	$\Delta\, Debt_{i,t}$	
Independent Variable	Mature	Young
Constant	-0.004	0.024
	(-0.35)	(-0.023)
$DEF_{\,i,t}$	0.048	0.024
	(1.06)	(0.32)
R^2	0.04	0.03
No. of firms	42	43
LM test-chi^2 (df)	0.11 (1)	0.14 (1)
Hausman test -chi^2 (df)	0.01(1)	0.11 (1)
Wald test (df)	1.13 (1)	0.1 (1)
Wald test 1 (df)	31.25 (7)	15.64 (7)
F statistics (df)	38.06 (8)	19.82 (8)

4.10.3.4 *Debt capacity and dividends*

Firms with a high payout ratio should be less financially constrained because they expect to finance their financial deficit from financial markets. Their debt capacity will have less of an impact on their decision to issue debt. Table 4.14 shows no support for this hypothesis. The pecking order model fails to describe the financing behavior for either high or low dividend paying firms, the coefficient being insignificant for both[22].

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[22] I repeated the analysis for dividend paying firms and non-dividend paying firms the results are qualitatively similar. The results are not reported here.

Table 4. 14 Debt Capacity and Dividends

The following equation is estimated: $\Delta\,Debt_{i,t} = a + \beta_{Po}\,Def_{i,t} + \lambda_t + a_i + \varepsilon_{i,t}$ eq. 4.11 . Where $\Delta\,Debt_{i,t}$ is the change in the total debt to total assets ratio, $DEF_{i,t}$ is the financial deficit to total assets, Standard errors are heteroskedasticity-robust and clustered by firm. t-statistics are in parenthesis below the coefficient estimates. See Table 4.9 for variables definition.

Dependent Variable	$\Delta\,Debt_{i,t}$	
Independent Variable	Dividend paying	Non-dividend paying
Constant	-0.009	-0.018
	(-0.97)	(-1.05)
$DEF_{i,t}$	-0.006	0.057
	(-0.10)	(0.90)
R^2	0.04	0.06
No. of firms	42	43
LM test-chi^2 (df)	0.12 (1)	0.13 (1)
Hausman test -chi^2 (df)	2.25 (1)	1.10 (1)
Wald test 1 (df)	20.21 (7)	34.34 (7)
F statistics (df)	20.39 (8)	35.27 (8)

4.10.4 *Pecking Order Model and Large Financial Deficit*

Lemmon and Zender (2010) extend Shyam-Sunder and Myers (1999), by including the square of the financing deficit in their model:

$$\Delta\,D_{i,t} = a + \beta_{PO}\,DEF_{i,t} + \beta_1\,DEF_{i,t}^2 + \lambda_t + a_i + \varepsilon_{i,t} \quad eq.\,4.13$$

This term allows them to differentiate between large and small deficits, since they argue that firms will finance their financial deficit with debt until they reach their debt capacity, and thereafter that they will issue equity. Thus, if firms are constrained by their debt capacity, they will use debt to finance a small deficit, and equity to finance a large deficit. Consequently, in the presence of debt capacity constraints, changes in debt will follow a concave function, and the coefficient on the squared deficit will be negative (Chirinko and Singha, 2000). In this model, if firms use equity to finance their financial deficit, and then use debt as a second choice, the coefficient on the squared deficit will be positive. Finally, if firms use debt and equity in fixed proportions, then the coefficient on financial deficit would show no relation with the change in debt (Bulan and Yan 2010).

In Table 4.15, the coefficient on the financial deficit is 0.027, while the coefficient on the squared financing deficit is 0.023, neither statistically significant. Thus there

is no support that this model captures the financing behaviour of Jordanian firms. Finally, we apply the Lemmon and Zender model to the analysis of financial constraints and debt capacity among different type of firms. In particular we repeated the analysis from section 4.10.3 using equation 4.13. The results are qualitatively the same as the results in that section, and therefore we do not report them here.

Table 4. 15 Pecking Order Model and Large Financial Deficit

The following equation is estimated: $\Delta Debt_{i,t} = a + \beta_1 Def_{i,t} + \beta_2 Def^2_{i,t} + \lambda_t + a_i + \varepsilon_{i,t}$ eq. 4.13 . Where $\Delta Debt_{i,t}$ is the change in the total debt to total assets ratio, $DEF_{i,t}$ is the financial deficit to total assets, Standard errors are heteroskedasticity-robust and clustered by firm. t-statistics are in parenthesis below the coefficient estimates. See Table 4.9 for variables definition.

Dependent Variable	Δ in Debt ratio ΔD_{it}
Independent Variables	
Constant	-0.014
	(-1.51)
$DEF_{i,t}$	0.027
	(0.55)
$DEF^2_{i,t}$	0.023
	(0.23)
R^2	0.03
No. of firms	85
LM test-chi^2 (df)	0.06 (1)
Hausman test -chi^2 (df)	1.48 (2)
Wald test (df)	0.60 (2)
Wald test 1 (df)	30.7 (7)
F statistics (df)	34.71 (9)

Overall, the results in this section provide limited support for pecking order theory. In particular, there is no consistent evidence that the Shyam-Sunder and Myers model can capture the financing behaviour of Jordanian firms. The model predicts that firms should finance their financial deficit using debt financing as their first choice. It is possible that its inability to capture the financing behaviour of Jordanian firms is that there are hidden costs of issuing debt or hidden associated benefits of issuing equity (Chirinko and Singha, 2000). Alternatively, the results show that Jordanian firms do not have a particular preference for issuing equity or debt, and that as a result they are issued in proportions that are comparable to their initial state. As a result, the financial deficit has no impact on the change in debt ratio. Jordanian

capital structure is therefore determined not only by the financial deficit, but by the other factors discussed in section 4.7.

4.11 CONCLUSION

This chapter examines the main determinants of the capital structure choice by Jordanian firms, and in so doing also examines the main theories that have been proposed for firms' capital structure decisions. The chapter also examines the dynamic nature of leverage, whether Jordanian firms have a target capital structure and then measures the speed of adjustment towards this target. In addition, the chapter examines the implications of pecking order theory explicitly by applying Shyam-Sunder and Myers's (1999) and Frank and Goyal's (2003) models. The analysis uses panel data for 85 firms listed on the Amman stock exchange over the period 2000-2008. The main findings are the following:

1. The results show a negative relation between profitability and firm leverage, which is consistent with the predictions of pecking order theory. The negative relation suggests that firms' first recourse is to internal cash flow, followed by external sources of funds.

2. Regression results may also support the pecking order theory, where liquidity has a negative impact on the debt ratio. This suggests that firms with high liquidity prefer to use their internal funds before borrowing from external sources.

3. In light of the results, it would appear that large firms tend to have more debt in their capital structure. The positive relationship between debt and firm size seems to support the trade off theory, where the firm is predicted to employ more debt if the firm's cost of debt is low and it has good access to the credit markets.

4. In contrast to expectation, growth opportunities and non-debt tax shields show a positive relation with firm debt. However, the results find inconclusive evidence to support the firm's ownership structure having an impact on the firm's leverage ratio.

5. The results show that Jordanian firms have a target debt ratio, and adjust their leverage quickly to move toward this target.

6. Finally, the results present inconclusive and very limited evidence to support that we can test pecking order theory in Jordan by using Shyam-Sunder and Myer's model or Frank and Goyal's model.

Table 4. 16 A Summary of Empirical Studies on the Determinants of Capital Structure

Independent variable	Positive relation with debt	Negative relation with debt	No relation with debt
Assets tangibility	Frank and Goyal (2003), Rajan and Zingales (1995), Chen (2004)	Gonenc(2003)	Gaud *et al.,* (2005), Bennett and Donnelly (1993), Titman and Wessels (1988), Bevan and Danbolt (2002), Huang and Ritter (2009),
Firm size	Frank and Goyal (2003), Gonenc(2003), Rajan and Zingales (1995), Wiwattanakantang (1999),	Rajan and Zingales (1995) for Germany, Gaud *et al.,* (2005), Chen (2004)	Ozkan (2001)
Growth opportunities	Gonenc(2003), Chen (2004), Pandey and Chotigeat (2004), Bevan and Danbolt (2002)	Frank and Goyal (2003), Rajan and Zingales (1995), Gaud *et al.,* (2005), Wiwattanakantang (1999)	Bennett and Donnelly (1993), Titman and Wessels (1988), Bevan and Danbolt (2002)
Non-debt tax shield	Moh'd *et al.,* (1998)	Miguel and Pindado (2001), Bennett and Donnelly (1993), Wiwattanakantang (1999)	Titman and Wessels (1988), Chen (2004)
Liquidity		Ozkan (2001),	
Profitability		Frank and Goyal (2003), Gonenc(2003), Rajan and Zingales (1995), Gaud *et al.,* (2005), Ozkan (2001), Chen (2004)	
Volatility	Bennett and Donnelly (1993)		Titman and Wessels (1988), Antoniou *et al.,* (2008), Chen (2004)
Dividend payout ratio	Crutchley *et al.,* (1999),	Rozeff(1982), Chen and Steiner (1999)	Antoniou et al. (2008),
Blockholders	Brailsford *et al.,* (2002)		
Institutional investors	Crutchley *et al.,* (1999)		Gonenc(2003)
Presence of target leverage ratio	Miguel and Pindado (2001), Frank and Goyal (2003), Ozkan (2001), Huang and Ritter (2009), Antoniou *et al.,* (2008), Lemmon et al. (2008), Flannery and Rangan (2006), Gaud *et al.,* (2005)		

CHAPTER FIVE

DIVIDEND POLICY IN JORDAN

5.1 INTRODUCTION

One of the most important decisions for any firm's management is the dividend payment decision. Managers need to be vigilant and careful when making the decision concerning whether or not to pay dividends, as well as the amount of dividends. Many researchers have attempted to establish theories and empirically test the main determinants of the dividend payout decision. Most have found that the firm's characteristics and market structure are the most important factors affecting the dividend policy; however, there is no consensus on the main determinants of dividend policy as researchers utilise data from different countries and sometimes different time spans for the same country, as well as use different statistical methodologies.

Most of the studies to examine dividend policy have been carried out in developed countries, although some researchers have considered dividend behaviour in developing countries. The differences between developed and developing countries may help to change our perspective on dividend behaviour in developing countries. More specifically, the Jordan case presents at least four main factors motivating the study of dividend policy. First, in Jordan, there are no taxes on dividends and capital gains, which makes Jordan different from most other countries. Second, in Jordan, the capital market relies on the banking sector, which means that the relationship between creditors and firms is close, which may affect the asymmetric information and agency cost problems. Third, there is a highly concentrated ownership structure. Fourth, according to Jordanian Companies Law, Jordanian firms are not permitted to pay dividends if they have any losses or have accumulated losses during a specific year.

This chapter considers the main dividend policy theories, including agency cost, signalling, and free cash flow. In addition, lifecycle theory is considered, owing to the fact that this framework incorporates the impact of the firm's financial age.

Dividend policy in Jordan is investigated as follows; first, the main determinants affecting the probability of dividend payment using Logit regression are investigated; second, the main determinants known to affect the amount of dividends that firms pay are analysed through the use of the Tobit model; third, standard errors are rectified using two statistical methodologies (Fama and MacBeth, 1973; Petersen, 2009); fourth, the dynamic nature of the dividends are analysed through the application of Lintner's model, with examination concerning whether there is any stickiness of dividends, as proposed by Lintner (1956); and finally, whether or not there is any target payout ratio is established, as well as whether firms follow a dividend smoothing pattern. We apply the GMM method to estimate the target payout ratio, as suggested by Arellano and Bond (1991).

5.2 MAIN DIVIDEND THEORIES

5.2.1 *Miller and Modigliani Theorem (1961)*

Miller and Modigliani (1961) introduce the irrelevance proposition of dividend policy, showing that, under certain conditions, the firm's dividend policy will not affect the firm value, and further emphasising that the only relevant decision that will affect firm value is the firm's overall investment decisions. They argue that a firm's dividends represent the residual between firm investments and firm earnings, and prove that investors will offset the firm's dividend decision by selling the firm stock if the firm retains dividends, or reinvest the dividends if the firm distributes dividends; this is referred to as homemade dividends. Consequently, the firm's dividend policy should be irrelevant, and the firm's investors will not pay a higher price for firms that follow a certain dividend policy.

One of the most important conditions Miller and Modigliani assume for dividend policy to be irrelevant to firm value is that the capital market is perfect, which means:

1. All investors have costless access to all information related to the operation and value of the firm, with the firm's management and investors holding the same information regarding the firm's future earnings;

2. There are no transaction costs or brokerage fees on trading the firm's shares, with the tax remaining the same on the capital gain and dividends from the firm's shares; and

3. The investors are rational, meaning that the investors prefer more wealth to less, where increases in wealth derive from cash payment from shares or an increase in the market value of shares.

As these conditions are unlikely to hold, we can expect the firm's dividend policy to affect the firm's value for the following reasons:

1. The tax effect: In real life, tax is different between capital gains and dividend payments, and it is expected that some investors will prefer dividends over capital gains, and vice versa. However, capital gains are often taxed less than dividends.

2. Transaction costs: These are incurred when receiving dividends, but are lower than when trading the shares.

3. Agency costs: Many studies show that managers have better information concerning the firm's overall value than investors. Thus, we expect that some uses of dividends include reducing the asymmetric information problem between managers and investors. Countries with weak minority investors' protection pay more dividends to reduce agency-related problems, Ferris *et al.,* (2009).

5.2.2 *Signalling Hypothesis*

The signalling theory implies that the firm's management with superior information uses dividends to communicate a good signal/impression to market participants

concerning the current and future earnings of the firm (see Bhattacharya (1979), Miller and Rock (1985), Ambarish *et al.,(1987)* and John and Williams (1985)) Private information is revealed to the market when the firm pays regular dividends, or imposes a cut in dividends (an indicator that future earnings are declining), Accordingly, firms will try to avoid a cut in dividends, explaining dividend stickiness. Some studies have established a significant impact in relation to changing dividends payments on firm stock returns, which confirms that changes in dividend policy affect firm value (Aharony and Swary, 1980; Asquith and Mullins, 1983; Benartzi, *et al. 1997*; Allen *et al.,* 2000; Koch and Sun, 2004; Dong *et al.,* 2005; Jensen *et al.,* 2010; Fuller and Blau, 2010). However, some studies find weak evidence to support the signalling theory (Barclay *et al.,* 1995; Brav *et al.,* 2005; Li and Zhao, 2008).

5.2.3   *Agency Cost Theory*

The agency cost theory implies that the separation of firm ownership from management could create problems owing to there being differences between the priorities of the managers and shareholders. According to agency theory, managers utilise the firm's resources to increase resources under their control. In many firms, managers' bonuses are positively related to the profitability and size of the firm. In large firms, it is easier for managers to hide unjustified consumption of the firm's resources (Kalay and Lemmon, 2008), so managers invest beyond optimal investment levels (the overinvestment problem). Easterbrook (1984) argues that dividends play a key role in reducing agency problems between shareholders and management. Furthermore, increasing the amount of dividends reduces the amount of internal cash flow that managers can use to fund new investments, thus increasing their dependency on external sources of capital. A higher frequency of using external finance increases the external monitoring on managers' investment decisions.

Jensen (1986) supports the agency cost theory, and accordingly presents the free cash flow theory, arguing that free cash flow can be utilised to reduce agency costs. Free cash flow represents the cash flow available to the firm after funding all positive net present value investments, and which the managers will be tempted to

invest in negative net present value projects and increase the resources under their control. Managers believe that the larger the firm, the greater the discretionary funds available to them to consume, and so they will seek to build an empire rather than maximising the firm's value for the benefit of the shareholders. This suggests that firms with free cash flow will suffer more from the conflict between shareholders and managers. Managers encourage firms to reduce the free cash flow available, either through paying dividends or increasing the firm's debt and committing the firm to pay debt interest.

5.2.4 *Lifecycle Theory*

The lifecycle theory of dividends suggests mature firms are better positioned to pay dividends because they have accumulated internal cash flow and have good access to external finance, DeAngelo *et al.,* (2006). The lifecycle stage of the firm provides a good indication of the firm's ability to pay dividends. In the early stages of the firm's life, the firm has many investment opportunities, external finance is costly, and low profitability. Small, low-profit firms with high investment opportunities pay lower dividends, Fama and French (2001). DeAngelo *et al.,* (2006) propose using the amount of retained earnings as a proxy for the stage of the firm's lifecycle, which in turn will provide them the capacity to pay dividends.

5.3 EMPIRICAL STUDIES OF DIVIDEND POLICY

This section is divided into two; the first presents the main studies concerned with dividend policy in developing countries, the second section focuses on developing countries. The main reason for this distinction is that there are many differences in dividend policy between developed and developing countries. For instance, the institutional environment, such as the close relationship between banks and firms in developing countries, has a significant impact on dividend policy, Aivazian *et al.,* (2003a). Consequently, the main theories of dividends which seek to explain dividend policy in developed countries, may not provide a comprehensive explanation for dividend policy in developing countries owing to such theories assuming that creditors have imperfect monitoring of the firm's operations.

5.3.1   *Dividend Policy in Developed Countries*

In general, there is strong evidence that firm characteristics play an important role in determining whether or not a firm pays dividends, Fama and French (2001). This evidence has then been used to support one or other of the above theories for the payment of dividends. For example, Barclay, Smith and Watts (1995) find that firms with high investment opportunities have a relatively lower dividend payment, and vice versa. They also highlight a significant negative relationship between dividend payout and growth opportunities, and a positive relationship with the size of the firm. These results are consistent with dividends helping to mitigate firm overinvestment and the free cash flow problem. Similar results relating to growth opportunities and firm size were found by Fama and French (2001), Denis and Osobov (2008), Eije and Megginson (2008) for firms across the EU, and Renneboog and Trojanowski (2010) for UK firms. Denis and Osobov (2008) and Renneboog and Trojanowski (2010) also find that dividend-paying firms are relatively more profitable, suggesting firms reduce the resources under managers' control to avoid any growth of the firm beyond the optimum.

An alternative view is that firms pay dividends to attract institutional investors. Institutional investors prefer to invest in dividend payers because they have a tax advantage over individual investors, but also because dividends increase the value of the firm by reducing information asymmetries, Allen *et al.,* (2000). The presence of institutional investors leads to the effective monitoring of the managers' decisions, and subsequently reduces agency problems. They show that firms utilise dividend policy to signal firm quality to the market through the use of ownership clientele effects. An ownership clientele effect is supported by Grinstein and Michaely (2005), who find that institutional investors prefer dividend-paying firms over non-dividend-paying firms. However, institutional investors show no preference between firms that pay low dividends and those that pay high dividends, and have no impact on the dividend payout ratio. Desai and Jin (2011) also explore the relation between institutional shareholder tax characteristics and firm payout ratio, and argue that some institutional shareholders will be averse to dividends. They find that the proportion of dividend-averse institutional shareholders is negatively related to the probability of the firm to initiate dividends.

The importance of ownership and its impact on the agency problem is further highlighted by Khan (2006), who finds that a higher ownership concentration leads to a reduction in the payout ratio. Close monitoring by blockholders overcomes the asymmetric information between managers and shareholders, and offsets the need for dividends. Barclay *et al.,* (2009) also investigate the relationship between dividend payment and ownership concentration, and find that the amount of dividends, or the propensity to pay dividends, is not affected by the corporate blockholders' ownership ratio.

The catering theory of dividends proposes simply that firms pay dividends when investors put a stock price premium on dividend payers. Thus managers cater to investor demand, which means that firms follow the market trend in terms of whether or not to pay dividends, Baker and Wurgler (2004). They measure the dividend premium by the difference between the average market-to-book value of dividend payers and non-payers. They show that the dividend paying decision is affected by the dividend premium. This is supported by Ferris *et al.,* (2006) for the UK, who show that managers have responded to a declining demand by investors for dividends, and accordingly reduced the amount of dividends paid. Similarly, Renneboog and Trojanowski (2010) argue that tax, and the tax treatment of dividends, has had an important impact on the dividend decision of UK firms. They argue that changes in the propensity to pay dividends in the UK can be related to changes in the tax treatment of dividends, supporting the argument that firms cater to investors' preferences when making their dividend decision. However, based on wider international evidence, Denis and Osobov (2008) find no evidence to support a catering effect on dividend policy.

An important development in research on dividend policy has been the establishment of the lifecycle theory of dividends. This theory proposes that mature and established firms are more likely to pay dividends, since the dividend decision is influenced directly by the proportion of retained earnings in the firm's capital, DeAngelo, DeAngelo and Stulz (2006). They argue that the earned/contributed capital ratio measured by retained earnings to total equity is a valid proxy for the lifecycle of the firm, which describes the degree to which a firm uses internal or external sources of finance. Furthermore, they argue that firms with a high

percentage of retained earnings to total equity are more likely to pay dividends. This is because such firms have cumulated large profits over the years. Firms are less likely to pay dividends when the firm's equity is contributed rather than earned, because this type of firm requires capital and is likely to have more investment opportunities. They also show that the probability of the firm to pay dividends is positively related to profitability and the size of the firm, and negatively related to the firm's growth opportunities. A number of recent papers have supported the lifecycle theory to explain dividend policy, Denis and Osobov (2008), Brockman and Unlu (2009), Chay and Suh (2009) and Coulton and Ruddock (2011).

Chay and Suh (2009) provide evidence to support the lifecycle theory, confirming that earned/contributed capital has a positive impact on the amount of dividends paid. However, they do not find evidence to support the notion that growth opportunities have an impact on the amount of dividends paid. Coulton and Ruddock (2011) test the lifecycle theory in Australia, and find that size and profitability of the firm positively affect the probability of paying dividends, while growth opportunities have a negative impact on the dividend payment decision.

There is also evidence of the importance of cash flow uncertainty on the dividend decision. Chay and Suh (2009) show that cash flow uncertainty has a negative impact on the amount of dividends firms pay, since they may expect the internal cash flow will decline in the future. In addition, external sources of funds are more costly for firms with a high volatility of cash flow, which subsequently leads to additional financial costs. Firms with high cash flow uncertainty will rely more on internal cash flow, and will accordingly pay fewer dividends. However, Eije and Megginson (2008) are unable to confirm this result for firms across the European Union, finding that there is no link between firms' income risk and the likelihood they will pay dividends**.**

Brockman and Unlu (2009) examine the impact of creditor rights on the dividend decision, arguing that creditor rights will affect the agency costs between the creditors and shareholders. Using data for firms from 52 different countries, the results show that creditors' rights have a positive impact on both the probabilities and the amount of dividends paid, by reducing the agency conflict between

shareholders and creditors. From the same perspective, Ferris *et al.,* (2009) explore the impact of legal protection to minority shareholders on the firm dividend policy. The results support the argument that firms in countries with low investor protection are more likely to pay dividends to substitute the poor legal protection to shareholders.

Finally, research has examined dividend payout policy by surveying investors or firms. Dong *et al.,* (2005) surveyed individual Dutch investors, and find that they prefer dividend payers because the cost of selling stock is greater than the cost of cash dividends. Their results show that investors regard dividends as a signal of future firm profitability, but do not support the free cash flow theory because they do not consider dividends are a tool to reduce the overinvestment problem. Brav *et al.,* (2005) surveyed US executives, and found they assign the same importance to paying dividends as investing in positive net present value projects. This contradicts the argument that dividends are residual cash flow, and therefore does not support the free cash flow theory that dividends play a role in imposing self discipline on managers. However, the survey did suggest quite strongly that dividend paying firms have a target payout ratio.

5.3.2 *Dividend Policy in Developing Countries*

Aivazian *et al.,* (2003a) investigate the main determinants of dividend policy in developing markets, and how this contrasts with that in developed countries. They consider the impact of business risk, size, tangibility, return on equity (ROE), market-to-book value, and debt ratio on dividend policy in 8 developing countries. Some results are similar to those for developed markets, including the positive relation with firm profitability, (see also Naceur *et al.,* (2006) for Tunisian firms and Huang *et al.,* (2010) for Chinese firms). Consistent with dividend signalling, they find a negative relation between the dividend payout ratio and earnings volatility, which shows that firms with a high volatility of earnings prefer not to pay dividends. They also consider the issue of access to external finance. Large firms, or those with high asset tangibility, should have better access to external finance, and therefore should be more willing to pay dividends. While results do not support this

conjecture, Huang *et al.,* (2010) do find a positive relation between firm size and the payout ratio for Chinese firms.

Dividend policy in Tunis, where the market is dominated by the banks and ownership is highly concentrated, is investigated by Naceur *et al.,* (2006). Both of these institutional characteristics imply close monitoring of management and a reduction in the agency cost of equity, and in turn a lower payout ratio. However, they find no link between ownership concentration and firms' dividend policy. A similar analysis has also been applied to non-financial firms in China (Huang *et al.,* 2010). Their results highlight that firms with high-growth opportunities tend to pay a lower dividend, or choose not to pay dividends at all, demonstrating that firms use internal cash flow because the cost of internal cash flow is lower than the cost of external finance.

5.4 THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

This section outlines the theoretical framework that identifies the main determinants of dividend policy, and how we can test the dividend policy theories. In this section, relationships between dividends and profitability, growth opportunities, firm size, volatility, ownership structure, and retained earnings will be discussed, together with how these relate to the dividend policy theories.

5.5 THE MAIN DETERMINANTS OF DIVIDEND POLICY

5.5.1 *Dividend Policy and Profitability*

The greater the firm's profitability, the more cash available for managers to spend; therefore, we expect that more profitable firms will be more likely to pay dividends to reduce the agency costs of free cash flow, as proposed by Easterbrook (1984) and Jensen (1986). Furthermore, firms with a high profitability ratio will have better access to low-cost external financing because investors utilise profitability as one indicator of the firm's financial health and accordingly reduce the premium required on capital. This reduces the need for internal sources of finance, as the firm will rely more on external sources of finance because it has the ability to repay the debt. Consequently, firms with high profitability show a greater likelihood to pay

dividends and have a higher payout ratio, as found by Fama and French (2001), Aivazian *et al.,* (2003a), Denis and Osobov (2008), and Brockman and Unlu (2009). The typical measure for firm profitability is the net operating income divided by total assets (see Desai and Jin, 2011; Perris *et al.,*2009; Barclay, 2009; Coulton and Ruddock, 2011).

H1 A: All else equal, the profitability of the firm increases the probability the firm will pay dividends, supporting the free cash flow hypothesis and agency cost problem.

H1 B: All else equal, the profitability of the firms increases the size of dividend, which supports the free cash flow hypothesis and agency cost problem.

5.5.2 *Dividend Policy and Growth Opportunities*

Firms with high growth opportunities would have lower dividend payments since new investment will consume large amounts of internally generated cash, which has a lower cost compared with external funds. Firms with high growth opportunities have profitable uses for their internal cash flows, and therefore pay smaller dividends. Rozeff (1982) and Mayers and Majluf (1984) argue that the firm's investment policy will significantly affect its dividend policy because the costs associated with the external sources of finance will create competition between investment opportunities and dividend payments. Importantly, this argument is also supported by the findings of many researchers (see Fama and French, 2001; DeAngelo *et al.,* 2006; Brockman and Unlu, 2009; Ferris *et al.,* 2009; Chay and Suh, 2009; Fuller and Blau, 2010). Moreover, Barclay *et al.,* (1995) argue that firms with low investment opportunities will pay high dividends to reduce any overinvestment problem. On the other hand, however, firms with high investment opportunities will have lower dividends payment to protect themselves from the underinvestment problem since the cost of external sources of finance may prevent the company from investing in projects with positive net present value. Therefore, a negative relationship will exist between growth opportunities and dividends. Following Aivazian *et al.,* (2003a), Naceur *et al.,* (2006), and Chay and Suh (2009), market value of equity over the book value of equity is used as a proxy for growth opportunities.

H2 A: All else equal, there is a negative impact of growth opportunities on the probability of the firm to pay dividends.

H2 B: All else equal, the growth opportunities variable has a negative effect on the amounts of dividends that the firms pay.

5.5.3   *Dividend Policy and Firm Size*

Fama and French (2001) show that large firms pay more dividends than small firms, highlighting that the total assets of dividend-paying firms is more than eight times that of non-paying firms. Many researchers suggest that large firms will have better access to the capital market since large firms are well known, have long-standing relations with investors, are more diversified, and have a lower probability of bankruptcy (see Fama and French, 2001; Aivazian *et al.,* 2003a; Denis and Osobov, 2008; Eije and Megginson, 2008; Brockman and Unlu, 2009). Thus, the cost of external of finance will be lower for large firms.

In large firms, the resources under the firm's management are significant, which implies difficulties for shareholders to monitor managers' investment decisions, Shareholders will seek to reduce the agency costs of free cash flow by encouraging firms to pay dividends, thereby increasing the interaction between the firm's management and the capital market. Following Barclay *et al.,* (2009), Chay and Suh (2009), Brockman and Unlu (2009), Jensen *et al.,* (1992), and Gugler and Yurtoglu (2003), the natural logarithm of the book value of total assets will be used as a proxy for firm size.

H3 A: All else equal, there is a positive impact of firm size on the probability the firm will pay dividends, and this supports the agency cost and asymmetric information problem.

H3 B: All else equal, there is a positive relation between firm size and the amount of dividends paid, and this supports the agency cost and asymmetric information problem.

5.5.4   *Dividend Policy and Volatility*

Firms with high earnings volatility will have a low propensity to pay dividends for two reasons; first, if the signalling model holds, firms with fluctuating earnings will pay a higher cost to replace the internal funds used to maintain the level of dividends when earnings decline (see Aivazian *et al.,* 2003a). In the case of Jordan, maintaining dividends in years of losses is difficult owing to the fact that Jordanian firms are not allowed to pay dividends if they have losses for the current year or have otherwise accumulated losses from previous years. Second, firms with fluctuating earnings are regarded as being more risky than those with lower earnings fluctuations. Therefore, firms with fluctuating earnings will reduce dividend payments, and instead will accumulate internal cash flows to finance their investment. Importantly, this also overcomes the problem of utilising costly external finance, or of foregoing positive net present value investments (see Fama and French, 2002; Chay and Suh, 2009).

This argument is supported by Eije and Megginson (2008), who find that income risk as measured by variability of net income negatively affects the probability of paying dividends. Consequently the absolute value of the change in annual net income is used as a proxy for earnings volatility (see Leary and Roberts (2005)).

H4 A: All else equal, there is a negative impact of the firm's earnings volatility on the likelihood that the firm will pay dividends.

H4 B: All else equal, earnings volatility has a negative relationship with the amount of dividends paid.

5.5.5   *Dividend and Ownership Structure*

Ownership concentration reduces the agency costs of equity because large shareholders have the ability and incentive to monitor managers' decisions due to the economies of scale in monitoring costs (see Shleifer and Vishny, 1986). This is recognised as being consistent with the argument Jensen and Meckling (1976) and Easterbrook (1984), and accordingly the firm's ownership structure has an important impact on the firm's dividend decisions.

Denis and Serrano (1996) show that blockholders actively monitor the manager's performance and provide useful control efforts. In countries with low protection of shareholders rights, minority shareholders will prefer to receive dividends in order to get a return on their investment and accordingly reduce the possibility of insider expropriation by reducing the resources under the insider control (see La Porta *et al.,* 2000). Therefore, it is expected that a negative relationship will be established between dividend and the percentage of shares owned by blockholders. Following Barclay *et al.,* 2009, the proxy for blockholder ownership is the sum of shares held by corporate blockholders who own more than 5% of the firm's shares.

The above argument also holds for institutional investors, because institutional investors have the ability to reduce agency costs since they have the required skills to monitor the firm's management (Jensen and Meckling, 1976). Therefore, institutional shareholders will reduce agency cost problems, and dividends will not be used as a tool to reduce the agency problem.

On the other hand, the tax preference hypothesis and the tax clientele effect predict a positive relationship between dividend payout and institutional investors because institutional investors have a tax advantage in regard to dividends. However, this is unlikely to be the case in Jordan since all shareholders do not pay tax on dividends. Nevertheless, Grinstein and Michaely (2005) and Allen *et al.,* (2000) argue that tax preferences are not the only reason for institutional investors to prefer dividend-paying firms. The prudent man rule encourages institutional investors to invest in firms that pay dividends (see, also, Renneboog and Trojanowski (2010))

Overall, it is expected there will be a negative relationship between dividend payment and institutional investors. Following Grinstein and Michaely (2005), Moh'd *et al.,* (1995), and Li and Zhao (2008), the ratio of common stock held by institutions to total shares outstanding is used as a proxy for institutional investors.

1- Blockholders

H5.1 A: All else equal, there will be a negative impact of blockholders' ownership on the likelihood the firm will pay dividends, and this will support the agency cost theory.

H5.1 B: All else equal, a higher proportion of stock owned by blockholders will reduce the amount of dividends paid.

2- Institutional Investors

H5.2 A: All else equal, there will be a negative relation between institutional investors' ownership and the probability the firm will pay dividends.

H5.2 B: All else equal, the percentage ownership by institutional investors has a negative impact on the amount of dividends paid.

5.5.6 *Dividend and Retained Earnings*

De Angelo *et al.,* (2006) state that mature, established firms will have a large ratio of retained earnings to total equity (and total assets), and further emphasise that the ratio of retained earnings will be a good proxy for the life stage of the firm. In the early stage of the firm's life, the firm will have a small cumulative profit, and will accumulate cash flow to finance growth opportunities since the costs (e.g. agency costs) of retained cash flow will be lower than the costs of the external sources of finance (e.g. flotation costs and asymmetric information). On the other hand, mature firms will have a large cumulative profit and therefore tend to pay dividends because they have the ability to generate cash flow that is sufficient for paying dividends and financing the growth opportunities of the firm.

As shown by De Angelo *et al.,* (2006), Denis and Osobov (2008), Ferris *et al.,* (2008), Eije and Megginson (2008) and Brockman and Unlu (2009), it is expected that a positive relationship will be found between earned/contribute capital and dividends. Notably, the proportion of retained earnings to total equity will be used as a proxy to measure the Lifecycle Effect. For a robustness check, the retained earnings to total assets will be used.

H6 A: All else equal, there is a positive relation between retained earnings and the probability of the firm to pay dividends, and this will test the Lifecycle Theory.

H6 B: All else equal, there is a positive impact of retained earnings on the amount of dividends paid, and this will test the Lifecycle Theory.

5.5.7 *Measuring the Dividends Payments Variable*

In this study, two main proxies are implemented for the firm's dividend policy; the amount of dividends and the likelihood of paying dividends.

The first proxy is the total amount of dividends in year $_t$ divided by net income in the same year[23]; this proxy will measure the amount of dividends paid to the shareholders. Following Barclay (2008) and Moh'd *et al.,* (1995), the dividend payout will be as follows:

$$Dividend\ payout = \frac{Jordanian\ Dinar\ amount\ of\ dividends}{Jordanian\ Dinar\ amount\ of\ net\ income}$$

The second proxy will measure the firm's likelihood to pay dividends; thus, the dependent variable will take a value of 1 if the firm pays dividends in year $_t$ and a value of 0 if the firm does not pay dividends in year $_t$ [24] (see Ferris *et al.,* 2006; Eije and Megginson, 2008; Li and Zhao, 2008).

5.6 DESCRIPTIVE STATISTICS FOR DETERMINANTS OF DIVIDEND POLICY IN JORDAN

Table 5.1 shows the descriptive statistics of the dividend policy over the sample period. The Table shows that, when considering the percentage of the firms that pay dividends, the range is between 38% and 52%, with the percentage of firms paying dividends increasing from 40% in 2000 to 52% in 2004, before subsequently declining to 38% in 2008.

For example, Fama and French (2001) find that the number of firms paying dividends in the US declined to less than 21% in 1999 compared to 66.5% in 1978. Denis and Osobov (2008) further state that the proportion of firms paying dividends declined over time in Canada, France, Germany, Japan, the UK and the US for the

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[23] The Jordanian Companies Law No. 22 of 1997 And its amendments article 186 paragraph A mentioned that 'The *Public Shareholding Company may not distribute any dividends to its shareholders except from its profits,and after settling the rotated losses of the previous years*.' Therefore, no negative observations will exist if we use the ratio of dividends to net income as a measure of the amount of dividends.

[24] Firm year observations with zero dividends will take a value of zero.

period 1989–2001. In addition, it can be seen that the total amount of dividends paid by firms increased over time from JD 55.43 million in 2000 to JD 164.01 million in 2008, thus indicating that Jordanian firms tended to increase their dividend payments. Together, Table 5.1 and Figure 5.1 show that the dividend payout ratio measured by dividends to net income is also increasing over time, from 31% in 2000 to 37% in 2008, which supports the notion that Jordanian firms have tended to increase their dividends over this time. Markedly, the results are the same when utilising the ratio of dividends to total assets; the dividend payout is seen to increase from 2.1% in 2000 to 3% in 2008.

The analysis of the time trend in cash dividends shows that Jordanian firms tend to pay dividends. The key indicators of dividend policy, such as the number of firms paying dividends, dividend payout ratio, and the amount of dividends paid increase over time. The time series trend shows that Jordanian firms tend to pay high dividends, which may be because Jordanian tax law encourages firms to pay dividends by exempting dividends from income tax[25].

Table 5. 1 Times Series Examination of Dividend Policy by Jordanian Companies

This Table shows the time trends in cash dividends. The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. The percentage of firms paying dividends is defined as total number of firms paying dividends to common shareholders in year $_t$ to total number of the firms in the sample. Payout ratio is the ratio of dividends paid to common shareholders divided by net income or total assets. Total amount of dividends is the total amount of dividends paid to common shareholders by all firms in the sample in year $_t$.

Year	Percentage of firms paying dividends	Dividend payout ratio (dividends over net income)	Dividend payout ratio (dividends over total assets)	Total nominal amount of dividends paid (in JD thousands	Total real amount of dividends paid (in JD thousands, year 2000 prices)
2000	0.44	0.31	0.021	JD55,426	JD55,426
2001	0.44	0.34	0.028	JD69,477	JD65,360
2002	0.45	0.39	0.031	JD64,981	JD59,170
2003	0.47	0.41	0.028	JD65,728	JD57,335
2004	0.52	0.38	0.033	JD111,238	JD94,760
2005	0.42	0.37	0.033	JD176,844	JD145,835
2006	0.51	0.47	0.030	JD150,998	JD122,773
2007	0.47	0.49	0.029	JD162,312	JD129,155
2008	0.38	0.37	0.030	JD207,596	JD164,083
No. of companies: 85					

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[25] Jordan Income tax law No.57 of 1995.

Figure 5.1 shows the time trend for the payout ratio of dividends over the sample period. The results show that the number of firms paying dividends is relatively stable over time. Notably, such results are not in line with the findings of research in the US, where the number of firms paying dividends has declined over time.

Figure 5. 1   Dividend Payout Ratio Time Series Analysis
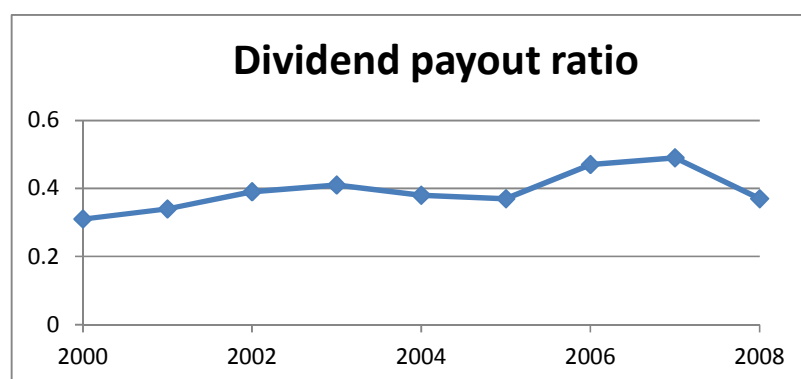
Figure 5.1 time series of Jordanian payout ratio for the period from 2000 to 2008, where dividend payout ratio is the amount of dividends divided by the net income.

Table 5. 2   Summary of Descriptive Statistics

This Table shows the summary of descriptive statistics for the variables used in the estimation. The data are from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Profitability is the net operating income scaled by the total assets. Growth Opportunities is the market value of the shares outstanding scaled by the book value of the total equity. Volatility measured by the absolute value of the change in the net income. Blockholders is the percent of shares held by the shareholders that have more than 5% of the firm shares to total shares outstanding. Institutional Investor is the percent of common stock held by institutions to total shares outstanding. Retained Earnings is the proportion of retained earnings scaled by total book value of equity.

	Mean	Median	Std. Dev.
Dividend Payout Ratio	0.373	0	0.519
Profitability	0.037	0.033	0.086
Growth Opportunities	1.537	1.231	1.093
Size	16.51	16.38	1.325
Earnings Volatility	1.284	0.662	1.762
Blockholders	0.544	0.579	0.216
Institutional Investors	0.496	0.493	0.252
Retained Earnings	-0.033	0.007	0.195
No. of firms	85		

Table 5.3 shows the correlation between the variables in the study. The payout ratio has a positive correlation with profitability, implying that when firm profitability increases, dividends increase as well, so firms with high profitability are more able to pay dividends from internal sources of funds. Furthermore, firm size is positively related to the payout ratio, owing to the fact that large firms may have better access to the external market and are therefore not as reliant on internal funds. Furthermore, there is a positive relation between payout ratio and institutional investors, which shows that institutional investors prefer to invest in firms that pay dividends, because dividends are an indicator of the financial health of the firm. In addition, there is a positive relationship between payout ratio and retained earnings, which suggests that firms with a large amount of retained earnings are more able to pay dividends, which supports the Lifecycle Theory. On the other hand, the payout ratio is negatively correlated with volatility because firms with net income volatility prefer not to pay dividends as it is difficult for them to maintain the payment of dividends in the future, and they will be less able to raise funds from external sources of finance.

Table 5. 3 Pairwise Correlation Coefficients among Variables

This table presents the Pearson correlation coefficients between variables used in the regression estimation. The data from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Payout ratio is the amount of paid dividends to net income. Profitability is the net operating income scaled by the total assets. Growth Opportunities is the market value of the shares outstanding scaled by the book value of the total equity. Volatility is measured by the absolute value of the change in the net income. Blockholders is the percent of shares held by shareholders that have more than 5% of the firm shares to total shares outstanding. Institutional Investor is the percent of common stock held by institutions to total shares outstanding. Retained Earnings is the proportion of retained earnings scaled by total book value of equity.

	Payout Ratio	Profitability	Growth Opportunities	Size	Earnings Volatility	Blockholders	Institutional Investors
Profitability	0.302*						
Growth Opportunities	0.126*	0.260*					
Size	0.124*	0.295*	0.174*				
Earnings Volatility	-0.121*	-0.147*	-0.046	-0.026			
Blockholders	-0.08*	-0.030	0.121*	-0.132*	0.091*		
Institutional Investors	0.045	0.113*	0.092*	0.194*	0.021	0.436*	
Retained Earnings	0.160*	0.360*	-0.277*	0.280*	-0.046	-0.096*	0.032
* Indicate significance at 0.05.							

Table 5.4 shows the mean and the median for the variables by classifying firms into dividend-paying and non-dividend-paying. Tests for a difference in mean and difference in median (Wilcoxon) between dividend-payers and non-payers are significant at the 1% level for all variables.

The following results show the different characteristics between dividend-payers and non-payers. First, the descriptive statistics shows that the profitability of dividend-payers is higher than that of the non-payers: The difference is 8% in favour of dividend-paying firms, which suggests that more profitable firms pay more dividends. Second, the growth opportunities variable shows that dividend-paying firms have a higher mean and median than non-dividend-paying firms, which is not consistent with the view that firms with high-growth opportunities are less likely to pay dividends. Third, dividend-payers are larger than non-payers. Fourth, the mean and median of earnings volatility is higher for non-payers than dividend-payers. The difference in mean is 0.53, which suggests that firms with a high fluctuation in earnings tend not to pay dividends because it is difficult for them to maintain paying dividends in the future. Fifth, dividend-payers have fewer shares owned by blockholders. The difference in mean is 4.7%, which highlights that blockholder investors are a good substitute for dividends in reducing agency costs. Sixth, dividend-payers are larger than non-payers in terms of institutional investors, suggesting that institutional investors prefer to invest in firms that pay dividends, or otherwise that the institutional investors drive the firm to pay dividends. Seventh, dividend-payers have a higher mean and median of retained earnings than non-payers, which is in line with Lifecycle Theory, and suggests that firms with a large amount of retained earnings tend to pay dividends because they have fewer growth opportunities and more internal cash flow to pay dividends.

Table 5. 4 Test of Differences between Dividend Payer and Dividends Non Payers Firms

This Table presents the mean and the (median) for the variables used in the regression estimation. The data are from 85 non financial Jordanian firms listed on the Amman Stock Exchange (ASE) with complete observations for the period 2000-2008. Profitability is the net operating income scaled by the total assets. Growth Opportunities is the market value of the shares outstanding scaled by the book value of the total equity. Volatility is measured by the absolute value of the change in the net income. Blockholders is the percent of shares held by shareholders that have more than 5% of the firm's shares to total shares outstanding. Institutional Investor is the percent of common stock held by institutions to total shares outstanding.   Retained Earnings is the proportion of retained earnings scaled by total book value of equity. t-statistics is t-test for a difference in mean. The Wilcoxon z- statistics test for a difference in median.

	Dividend payers	Dividends non-payers	Mean difference	Test for mean differences
				t-statistics (Wilcoxon-statistics)
Profitability	0.079	-0.001	-0.080	-13.85***
	(0.065)	(0.004)		(-13.6***)
Growth Opportunities	1.77	1.334	-0.436	-5.62***
	(1.50)	(1.094)		(-6.205***)
Size	16.85	16.2	-0.651	-6.540***
	(16.61)	(16.14)		(-6.024***)
Earnings Volatility	0.997	1.532	0.533	4.00***
	(0.482)	(1.535)		(5.684***)
Blockholders	0.519	0.566	0.047	2.82***
	(0.575)	(0.603)		(2.523**)
Institutional Investors	0.529	0.466	-0.063	-3.29***
	(0.510)	(0.467)		(-3.26***)
Retained Earnings	0.042	-0.207	-0.253	-5.42***
	(0.026)	(-0.013)		(-10.32***)

** and *** indicate statistical significance at 0.05 and 0.01 respectively.

5.7 THE DETERMINANTS OF THE LIKELIHOOD TO PAY DIVIDENDS

We estimate the relation between the dependent variable, which is the firm's likelihood of paying dividends (Pay dividend) and the independent variables, using the Logit model. This is because the dependent variable takes only two values, 1 if the firm pays dividends in year t and zero if the firm does not pay dividends in year t. The major benefit of using a Logit model is to answer the following question. What factors affect whether the firm pays dividends or not?

In a binary model, the dependent variable y takes two values:

$$y = \begin{cases} 1 \\ 0 \end{cases}$$

When y=1 the probability of occurrence for the dependent variables y is p_i, whereas the alternative outcome that the probability of y will not occur is 1- p_i.

If the probability of occurrence p_i depends on a function of independent variable $x^{'}\beta$, where x is a K x 1 vector of independent variables which influence y, and β is the vector of coefficients associated with the independent variables x. Thus, the conditional probability for the regression of binary outcome model is:

$$P_i = E(Y = 1|X_i) = F(x_i\beta')$$

The Logit model is used to compute the functional form of the cumulative distribution function $F(x_i\beta')$.

5.7.1 *The Logistic Model*

The functional form of the $F(x_i\beta')$ under the Logit model is known as the cumulative logistic distribution, and has the form of

$$P_i = E(Yit = 1|X_{it}) = F(\acute{X}_{it}\beta) = \frac{1}{1+ e^{-(\acute{X}_{it}\beta)}} \qquad eq.5.1$$

To ease the computation, we can write the above equation in the following form

$$P_i = \frac{1}{1+ e^{-\acute{X}_{it}\beta}} = \frac{e^{\acute{X}_{it}\beta}}{1+ e^{\acute{X}_{it}\beta}} \qquad eq.\ 5.2$$

Where P_i is the probability that y =1, then the probability of not paying dividends is (1- P_i), So,

$$1- P_i = \frac{1}{1+ e^{\acute{X}_{it}\beta}}.\ \text{Thus}\ \frac{P_i}{1- P_i} = \frac{1+ e^{\acute{X}_{it}\beta}}{1+ e^{-\acute{X}_{it}\beta}} = e^{\acute{X}_{it}\beta}$$

Here $\frac{P_i}{1- P_i}$ is the odds ratio in favour of paying dividends, it measures the probability of the firm to pay dividends relative to the probability that it will not pay dividends. If we take the natural log of this ratio, we obtain

$$L_i = \ln\left(\frac{P_i}{1- P_i}\right) = \acute{X}_{it}\beta$$

The left hand side of the equation can vary between minus and plus infinity as P_i varies between zero and one. The coefficient on the independent variables (contained in X) represents a change in the log-odds of paying dividends for one unit change in the underlying variable.

5.8 MODEL DESIGN

In section 5.9, we present the Logit model, and we show that the relationship between the dependent and the independent variable will be as follows:

$$y_{it}^* = \beta' X_{it} + uit \quad eq.\,5.3 \qquad i = 1,2, \ldots,n \text{ and } t = 1,2 \ldots T$$

Where y^* is an unobserved variable, X_{it} is a set of explanatory variables which influence y^*, and u is the residual. The decision to pay dividends takes the value 1 and not paying takes the value 0. Although y^* is not observed, we observe y (Goergen *et al.,* 2005):

y = 0 if y^* = 0,if the firm does not pay dividends in year $_t$

y = 1 if y^* > 0, if the firms pay dividends in year $_t$

To be consistent with a large body of dividend policy literature (See, Fama and French, 2001; DeAngelo *et al.,* 2006; Denis and Osobov (2008), Hoberg and Parbhala, 2009; and Brockman and Unlu (2009); Coulton and Ruddock, 2011, Desai and Jin, 2011), we estimate a Logit regression using Fama and Macbeth (1973) statistical methodology. This methodology "*is convenient and conservative way to account for potential cross-correlation in residual*" (see Desai and Jin, 2011). According to the Fama and Macbeth statistical methodology, we calculate the coefficient of the independent variable by running the regression for each year separately and take the average of the coefficients for all years, and the t-statistics are calculated as the average coefficient divided by its standard error (i.e. "*the time-series standard deviation of the regression coefficient divided by the square root of the number of years in the period*") - "*time-series averages of the coefficient are used to draw inference, using the time-series standard errors of the average slopes",* Desai and Jin, 2011.

The following model is employed to test whether the likelihood the firm will pay dividends is dependent on the firm's characteristics. The Logit model for the probability that the firm will pay dividends $_i$ in year $_t$ is specified as follows:

$$Pay\ Dividend = F \left\{ \begin{array}{l} \text{Profitability, Growth Opportunities, Size, Volatility, Blockholders,} \\ \text{Institutional Investor, Retained Earnings} \end{array} \right\}$$

The dependent variable takes a value of 1 if a firm $_i$ pays dividends in year $_t$ and zero otherwise. Profitability is the net operating income scaled by total assets. Growth opportunities is the market value of shares outstanding scaled by the book value of total equity. Size is the natural logarithm of total assets. Volatility is measured by the absolute value of the change in net income. Blockholders is the percent of shares held by shareholders that have more than 5% of the firm's shares to total shares outstanding. Institutional investor is the percent of common stock held by institutions to total shares outstanding. Retained earnings is the proportion of retained earnings scaled by total book value of equity or total assets. To reduce a possible endogeneity problem, we employ one year lagged values of the independent variables in the estimation (See, Eije and Megginson, 2008, and Renneboog and Trojanowski, 2010).

5.9 RESULTS OF THE DETERMINATIONS OF DIVIDEND POLICY

This section provides the main results for the determinants of dividend policy in Jordan. Section 5.10 shows the determinants of the probability of paying dividends using Logit analysis with the application of the statistical methodology provided by Fama and Macbeth (1973). In Section 5.11, the main determinants affecting the amount of dividends using the Tobit regression will be discussed. In addition, Section 5.12 presents the results from the Logit, and Tobit regressions, correcting for standard errors using the statistical methodology of Petersen (2009).

Table 5. 5   The Likelihood of the Firm to Pay Dividends Using Logit Regression

The Table provides the results from Logit analysis for Jordanian firms listed on the Amman stock exchange for the period 2000-2008. The dependent variable takes a value of 1 if a firm $_i$ pays dividends in year $_t$ and zero otherwise. Profitability is the net operating income scaled by the total assets. Growth Opportunities is the market value of the shares outstanding scaled by the book value of the total equity. Volatility measured by the absolute value of the change in the net income. Blockholders is the percent of shares held by the shareholders that have more than 5% of the firm shares to total shares outstanding. Institutional Investor is the percent of common stock held by institutions to total shares outstanding. Retained Earnings is the proportion of retained earnings scaled by total book value of equity or total assets. The average coefficient is the mean value of the fitted coefficients for 8 Logit regressions (one each year over 2001-2008), and t-statistics calculated using the Fama and Macbeth approach from the time series of fitted Logit coefficient, the t-statistics calculated as the mean divided by its standard error (the time-series standard deviation of the regression coefficient divided by the square root of the number of years in the period). R^2 is the average pseudo-R^2 for the 8 annual Logit regressions. The asterisk ***, **, and * denotes that the coefficients are statistically significant at 1%, 5%, and 10% level, respectively.

Dependent variable : Dividend	
Independent Variables	
Profitability	14.881***
	(5.088)
Growth Opportunities	0.450***
	(3.10)
Size	0.014
	(0.12)
Volatility	-0.133***
	(-3.45)
Blockholders	-1.811***
	(-4.80)
Institutional Investors	1.982***
	(3.93)
Retained Earnings/Total Equity	3.701***
	(3.71)
Intercept	-1.350
	(-0.74)
R^2	0.32
No. of Firms	85
No. of Observations	680

5.10   RESULTS OF DETERMINANTS OF DIVIDEND POLICY LOGIT MODEL

In order to examine the impact of firm characteristics on the dividend policy of Jordanian firms, Table 5.5 shows the results from the application of the Logit regression. Interpreting coefficients themselves allows us to discuss the direction and significance of the effects. The decision to pay dividends is denoted by 1 and the opposite state is assigned 0, therefore a positive coefficient indicates that the

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independent variable is positively correlated with the firm's decision to pay a dividend, and a negative coefficient indicates that the independent variable is negatively correlated with the firm's decision to pay a dividend.

5.10.1 *Results of Dividend Policy and Profitability*

Table 5.5 shows that the firm's propensity to pay dividends is positively related to firm profitability, and is statistically significant at a 1% level. The results suggest that firms with a high profitability will tend to pay dividends. Importantly, such results are consistent with the free cash flow hypothesis, which suggests that profitable firms tend to pay dividends in order to reduce the cash flow under the control of the managers. Importantly, the results are also consistent with the hypothesis that firms with high profitability have better access to low-cost external sources of funds; hence, they are more likely to pay dividends than less profitable firms. Similar results are found by Fama and French (2001), DeAngelo, DeAngelo and Stulz (2006), and Eije and Megginson (2008).

5.10.2 *Results of Dividend Policy and Growth Opportunities*

The results in Table 5.5 show that shareholders are more likely to receive dividends from firms that have high growth opportunities; however, the results are inconsistent with expectations that assume that the growth opportunities variable has a negative impact on the firm's dividend policy.

The results are inconsistent with the findings of Fama and French (2001), but consistent with Aivazian, Booth and Cleary (2003a), who emphasise a positive relationship between dividends and growth opportunities in a sample of developing countries. They argue that the market-to-book value may be indicative of a higher cash flow ratio resulting from the present value of existing investment opportunities, and might reflect the current performance of the firm. Naceur *et al.,* (2006) also point out the positive results for a sample from Tunisia. Chay and Suh (2009) state that investment opportunities do not affect dividend policy in Australia, Canada and Japan; however, the results may be inconclusive owing to

the robustness regression, which shows that growth opportunities are not significant at a 5% level.

5.10.3   *Results of Dividend Policy and Size*

As can be seen in Table 5.5, there is no evidence to support the firm propensity to pay dividends being related to firm size. The coefficient on firm size is positive but not significant; therefore, it would appear that our results do not support the hypothesis that shareholders in large firms use dividends to reduce the agency cost of free cash flow, and force the firm's management to use external sources of funds.

The results are consistent with pecking order theory, where all sizes of firms prefer to use internal rather than external sources of finance. The results are inconsistent with the findings of Fama and French (2001), but consistent with Aivazian, *et al.,* (2003a), who state that there is no relationship between dividend policy and firm size in some developing countries.

5.10.4 *Results of Dividend Policy and Earnings Volatility*

Table 5.5 shows that the probability of paying dividends is negatively related to earnings volatility. The coefficient on earnings volatility is negative and statistically significant at a 1% level. The result supports the signalling model because it is difficult for the firm to maintain dividends when earnings decline, since if the firm stops paying dividends, the value of the firm will suffer. This is supported by the fact that Jordanian firms are not allowed to pay dividends during years of losses because Jordanian Companies Law prevents firms from paying any dividends if they have net losses at the end of the year. The results also support the argument that firms with fluctuating earnings are more financially constrained and also tend to accumulate cash flow through retained earnings in order to reduce the need for costly external cash. The results are consistent with findings of Eije and Megginson (2008) and Chay and Suh (2009) for developed countries. In addition, Aivazian, Booth and Cleary (2003a) find similar results for some developing countries.

5.10.5   *Results of Dividend Policy and Blockholders Ownership*

As we can see in Table 5.5, the probability the firm will pay dividends is negatively related to the amount of shares owned by blockholders. The results are consistent with expectation, and are significant at a 1% level, which suggests that firms with a large amount of shares owned by blockholders are less likely to pay dividends. The result also supports the agency cost theory, which stipulates that firms with close-monitoring shareholders use internal cash flow more than external cash.

The results also imply that blockholders are a good substitute for dividends in reducing the agency cost of management, providing close monitoring of management's performance. If we take into account that Jordan is one of the developing countries where shareholders may not be fully protected by law, the results then support that low protection of shareholders' rights encourages firms with a low number of blockholders to pay dividends (i.e. firms that may suffer from agency costs because of weak monitoring by shareholders). This is consistent with the findings of Khan (2006) and Renneboog and Trojanowski (2010).

5.10.6 *Results of Dividend Policy and Institutional Investors*

As shown in Table 5.5, the likelihood of dividend payments is positively related to the institutional investor variable. The coefficient of the institutional investor variable is positive and statistically significant from zero at a 1% level. This is not consistent with the expectation that institutional investors decrease the probability that the firm will pay dividends. While the tax preferences model predicts a positive relation between dividend payment and institutional investors, the results cannot be explained in the context of tax preferences as dividends in Jordan are tax-exempt for all shareholders. However, the results are nevertheless consistent with Grinstein and Michaely (2005), who state that institutional investors prefer to invest in dividend-paying firms rather than non-paying firms owing to the prudent-man rule. Importantly, this confirms the results of Del Guercio (1996), who finds that investment managers in banks tend to invest in firms that pay dividend 'prudent stocks' because dividends can be considered as one of the characteristics of a high-quality investment. It would appear that the institutional clienteles effect

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may go some way towards explaining the positive impact of institutional investors on the probability of paying dividends, where institutional investors prefer to invest in firms that pay dividends because they assume that this is one of the attributes of high-quality investments. Jordan is a developing country where finding financial advisors and financial analysts is not easy and likely to be costly, so managers prefer to use simple indicators (i.e. dividend paying firms) to support their investment decision. Institutional investors act as short term investors rather than owners of the company, and consequently are looking for current income rather than future earnings. Hence, they prefer to have dividends rather than wait until the firm reinvest the retained earnings in profitable investment opportunities.

5.10.7 *Results of Dividend Policy and Retained Earnings*

As shown in Table 5.5, the likelihood of dividend payments is positively and significantly related to retained earnings, as expected. This strongly supports the Lifecycle Theory, which postulates that firms with a high level of retained earnings are more likely to pay dividends. The financial age[26] of the firm, as measured by the earned versus contributed capital of the firms, strongly explains the probability of paying dividends. The results are consistent with the findings of De Angelo *et al.,* (2006), Denis and Osobov (2008), and Chay and Suh (2009). The results also are qualitatively similar when estimating the regression using the ratio of retained earnings to total assets as a measure of Lifecycle Theory; this proxy measures the amount of assets funded by the retained earnings.[27]

5.11 RESULTS OF THE DETERMINANTS OF THE AMOUNT OF DIVIDENDS (TOBIT REGRESSION)

We now turn to estimating the impact of firm characteristics on the amount of dividends paid. In Jordan, many firms do not pay dividends so the value of the dependent variable would be zero, and using Ordinary Least-Squares (OLS) regression will give inconsistent results owing to the sample containing many observations with zero values. A sample in which information on the dependent variable is available for some observations is known as censored sample (see Cameron, 2009, p. 521). In this study many observations of the dependent variable

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[26] This term used for the first time by Eije and Megginson(2008)
[27] Results not reported.

are zero or positive, so the data are censored in the lower tail of the distribution (left side). The pooled Tobit model is as follows for the amount of dividends paid:

$$y_{it}^* = a + x_{it}'\beta + e_{it}$$

Where the observed variable y_{it} is related to latent variable y* through the observation rule

$$y = \begin{cases} y^* & if \ y^* > 0 \\ 0 & if \ y^* \leq 0 \end{cases}$$

The following model is employed to test the impact of the firm attributes on the amount of dividends. The Tobit model for the amount that the firm pays in dividends $_i$ in year $_t$ is specified as follows:

$$Dividend \ Ratio = F \begin{cases} \text{Profitability, Growth Opportunities, Size, Volatility, Blockholders,} \\ \text{Institutional Investor, Retained Earnings} \end{cases}$$

The dependent variable is the dividend payout ratio and is calculated by the amount of dividends divided by the net income for firm $_i$ in year $_t$. Profitability is the net operating income scaled by total assets. Growth Opportunities is the market value of the shares outstanding scaled by the book value of total equity. Size is the natural logarithm of total assets. Volatility is measured by the absolute value of the change in net income. Blockholders is the percentage of shares held by the shareholders that have more than 5% of the firm's shares to total shares outstanding. Institutional investor is the percentage of common stock held by institutions to total shares outstanding. Retained Earnings is the proportion of retained earnings scaled by total book value of equity or total assets. In order to reduce an endogeneity problem, a one-year lagged value of all the independent variables was used in the estimation (see Eije and Megginson, 2008; Renneboog and Trojanowski, 2010).

The dependent variable in Table 5.6 is the dividend amount measured by the cash dividend divided by net income. As we can see in Table 5.6, the results from the determinants of the amount of dividend are qualitatively similar to those from the determinants of the probability of dividend payment.

The results support the notion that the profitability has a strong and significant impact on the amount of dividends; second, the growth opportunities variable has a positive and significant impact on the amount of dividends; third, the size of the firm has a positive impact but is not statistically significant; fourth, earnings volatility has a strong negative impact on the amount of dividends; fifth, the amount of shares owned by blockholders has a negative and significant impact on the amount of paid dividends; sixth, the results support that institutional investors have a strong positive impact on the amount of dividends, and the results from institutional investors also indicate that the institutional investor not only affects the probability of the firm to pay dividends, as shown in the Logit analysis, but also the amount of dividends paid. This positive impact of institutional investors is not consistent with Grinstein and Michaely (2005), who argue that institutional investors prefer fewer dividends.

Table 5. 6 Results of Dividend Policy Using Tobit Regression

The average coefficient is the mean value of the fitted coefficients for 8 Tobit regressions (one each year over 2001-2008), and t-statistics calculated using the Fama and Macbeth approach from the time series of fitted Tobit coefficient, the t-statistics calculated as the mean divided by its standard error (the time-series standard deviation of the regression coefficient divided by the square root of the number of years in the period). The asterisk ***, **, and * denotes that the coefficients are statistically significant at 1%, 5%, and 10% level, respectively. See Table 5.5 for Variables definition.

Dependent variable : Dividend payout ratio	
Independent variables	
Profitability	3.93***
	(5.79)
Growth Opportunities	0.06***
	(2.42)
Size	0.012
	(0.34)
Volatility	-0.06***
	(-3.7)
Blockholders	-0.7***
	(-5.53)
Institutional Investors	0.65***
	(3.70)
Retained Earnings/Total Equity	1.58***
	(4.47)
Intercept	-0.199
	(-0.32)
R^2	0.21
No. of Firms	85
No. of Observations	680

5.12 RESULTS OF DIVIDENDS WITH CLUSTERED STANDARD ERRORS

Since we use panel data, Petersen (2009) point out that the Fama-MacBeth standard errors may understate the standard errors when the panel data contains a firm effect and year effect. *"Petersen (2009) approach correctly adjusts the standard errors to account for both time and firm dependence."* (See Rubin and Smith, 2009). So, for a robustness check we estimate the Logit and Tobit models with clustered standard errors by both firm and year, which are robust to within firm and within time correlation. This is called the two dimensional clustered standard errors (i.e. standard errors that are clustered by firm and year). Many recent researchers in dividend policy use two dimensions standard errors, such as Denis and Osobov (2008), Ferris *et al.,* (2009b), and Rubin and Smith (2009).

5.12.1 *Results of Dividend Policy (Logit Model with Clustered Standard Error)*

Table 5. 7 Results for the Logit Model with Clustered Standard Errors

The likelihood of the firm to pay dividends using Logit regression with clustered standard errors. The asterisk ***, **, and * denotes that the coefficients are statistically significant at 1%, 5%, and 10% level, respectively. See table 5.5 for Variables definition.

Dependent variable : Dividends	
Independent Variables	
Profitability	13.942***
	(4.12)
Growth Opportunities	0.254*
	(1.76)
Size	0.049
	(0.34)
Volatility	-0.122**
	(-2.08)
Blockholders	-1.600***
	(-2.63)
Institutional investors	1.630***
	(2.76)
Retained Earnings/ Total Equity	2.670***
	(2.63)
Intercept	-1.620
	(-0.68)
No. of Firms	85
No. of Observation	680

Table 5.7 shows the regression results from a Logit analysis with clustered standard errors, the results of which are qualitatively similar to those from the Logit regression using the statistical method provided by Fama and Macbeth (1973). However, the results show that the growth opportunities variable is significant at a 10% level.

5.12.2 *Results of Dividend Policy (Tobit Model with Clustered Standard Errors)*

Table 5.8 shows the regression results from the Tobit analysis with two-dimensional clustered standard errors corrected for both time and firms dependences; the results are qualitatively similar to those of the Tobit regression utilising the Fama and Macbeth (1973) statistical methodology. However, the growth opportunities coefficient shows no statistically significant impact on the amount of dividends paid.

Table 5. 8 Results of Dividend Policy with the Tobit Regression Using Clustered Standard Errors

The asterisk ***, **, and * denotes that the coefficients are statistically significant at 1%, 5%, and 10% level, respectively. See Table 5.5 for Variables definition.	
Dependent variable : Dividend payout ratio	
Independent Variables	
Profitability	2.930***
	(3.87)
Growth Opportunities	0.050
	(1.11)
Size	-0.021
	(-0.61)
Volatility	-0.050***
	(-2.62)
Blockholders	-0.630***
	(-3.97)
Institutional Investors	0.462**
	(2.04)
Retained Earnings/Total equity	1.770***
	(3.51)
Intercept	0.340
	(0.38)
No. of Firms	85
No. of Observations	680

• **Fixed Effect Logit**

For the fixed effect model, we control for any possible unobserved heterogeneity by adding an individual-specific effect to equation 5.3

$$Prob\ (Y = 1(paydividend)) = \frac{e^{a_i + X'_{it}\beta}}{1 + e^{\ a_i + X'_{it}\beta}}$$

Where a_i is the firm specific effect, this equation indicates that η_i and β are unknown parameters of the model. In finite T the number of parameters a_i increases with N, in case of panel data, a_i cannot be consistently estimated, this is known as the *incidental parameters* problem. For estimation of a binary variable in panel data with non linear regression, Chamberlain (1980) suggests maximizing the conditional likelihood function:

$$L_c = \prod_{i=1}^{N} Pr\left(Y_{i1}, Y_{i2}, \dots .. Y_{iT_i} \left| \sum_{t=1}^{Ti} Y_{it} \right. \right)$$

For the Logit model, he showed that $\sum_{t=1}^{Ti} Y_{it}$ is a minimum sufficient statistic for a_i. Thus, by conditioning on $\sum_{t=1}^{ti} Y_{it}$ we can sweep away the a_i[28]. To test for individual fixed effects, the Hausman test could be used based on the difference between Chamberlain's conditional maximum likelihood model and the usual Logit maximum likelihood. Usual Logit maximum likelihood is consistent and efficient only under the null of no individual specific effect and inconsistent under the alternative. Chamberlain's conditional maximum likelihood model is consistent whether the null is true or not, but not inefficient under the null (see Baltagi, 2005: page 211).[29]

In order to test for firm specific effects one can use a Hausman-type test based on the difference between fixed effect Logit and usual Logit model[30] . The Hausman test statistics χ^2 (12.89) is not significant *p-value (0.08)* so the null that the intercepts are homogeneous is not rejected.

In addition, there are some problems that should be addressed when using fixed-effect Logit:

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[28] "For nonlinear panel data model, it is not possible to get rid of the a_i by taking differences or performing the Within transformation" Baltagi, 2005: page 234.
[29] Note that we lost 36% of our sample (30 firms out of 85).

1- The research question in this chapter is what are the determinants of dividend policy in Jordan? However, in fixed effect Logit estimation including firms fixed effects would reduce the sample size as it will drop all firms that pay dividends and do not pay dividends for all periods, since these firms will not contribute to the conditional likelihood. This would mean deleting a large amount of available information since more than 36% of the firms would drop out, and consequently we could not generalise the research findings. In addition, limiting the sample of firms that change their dividend policy would produce a biased sample. Kim and Maddala, 1992 argue that excluding firms that do not pay dividends may create a biased sample. Deshmukh (2003, p 353) states that "i*f firms find it optimal to not pay dividends, then their exclusion from any empirical analysis may create a selection bias in the sample, resulting in biased and inconsistent estimates of the underlying parameters. In such cases, generalizations about corporate dividend policy may be inappropriate*". The same thing will occur if we exclude firms that pay dividends all the time. This will create a biased sample because those firms may find that their optimal dividend policy is to pay dividends all the time. This study investigate the main determinants of dividend policy, and this should include firms that pay dividends and do not pay dividends all the time, as well as those firms that change their dividend policy[31].

In most similar studies, the main aim is to examine the main determinants of dividend policy. Hence, there is enough evidence that excluding the data or the number of firms from the sample cannot help to identify an appropriate answer to the above question. Furthermore, excluding these firms from the proposed estimation will prevent a comparison with similar previous studies. One of the main objectives in this study is to test the Life Cycle Theory. This theory implies that firms with high retained earnings to total equity tend to pay dividends more than firms with low retained earnings to total equity. DeAngelo *et al.,* (2006) find that *"the proportion of firms that pay dividends is high when the ratio of the earned to total common equity is high and falls with decline in this ratio, reaching near-zero levels for firms with negligible retained earnings"*. In their regression, they

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[31] It is notable that it is very rare to use a fixed-effect Logit model in dividend policy studies.

build their results using data from all firms without excluding any firm[32]. So, if we drop firms that never paid dividends or paid dividends all the time, we will not be able to test the life cycle theory correctly because we will exclude these firms. we find that the common factor among the majority of the excluded firms is the retained equity ratio, 26 firms are excluded with consistently positive or negative retained earnings. Therefore it is precisely the firms that are excluded that the life cycle theory has been developed to explain their dividend behaviour. Moreover, excluding these firms from our analysis would not help us to examine other dividend policy theories such as the agency cost theory, since firms with high profitability are more likely to pay dividends all the time to reduce the agency cost of free cash flow.

Consequently, a sample bias from excluding these firms from our sample will lead to an inappropriate test of dividend policy. Overall, all dividend policy theories investigate the dividend behaviour of all the firms in the sample, because the aim is to understand what the factors are that affect the firm's dividend policy in Jordan. If we want to test the theories and compare the results with findings of other researchers, we need to include all the firms. In a similar study Denis and Osobov (2008) use the Fama and MacBeth (1973) approach, and show that in the presence of time effects or firm effects using the methodology of Petersen (2009) will be a good robustness check. We follow their approach and apply this methodology.

  2- Fixed effect Logit estimates use only within- individual differences, so if the independent variable has little variation over time for each firm, then the fixed effect estimator will not be very efficient and will have large standard errors (see, Allison 2009). If the variation of the covariate is between variation rather than within variation, Cameron and Trivedi (2009, p 607) state that *"FE estimator will not be very efficient because they rely on the within variation. Also fixed effect parameter estimates may differ considerably from the other estimator if the within and between variation tell different stories"*. This study examines the impact of ownership structure on dividend policy, the ownership structure may vary between firms but not within the firm itself. The decision to change the percentage of ownership is difficult and may take a long time for blockholders and institutional

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[32] It is notable that in their estimations they use Logit with Fama MacBeth (1973) methodology.

investors. To test this proposition, we calculated the within and between variation for blockholders and institutional investors. For Blockholders regressor the between variation is 0.1705 and within variation is 0.0994. For Institutional investors regressor the between variation is 0.215 and the within variation is 0.0917. For the size regressor, the between variation is 1.005 and the within variation is 0.500. Consequently, we expect the fixed effect Logit will not be efficient and may not be applicable for this study.

For robustness check, in order to control for year effect we transformed the data. That is transforming the variables into deviations from time means (i.e. the mean across the N individual firms for each period) (see Bond *et. al 2001*). The results are qualitatively same as in Table 5.5. Table 5.9 shows the results from the transformed data, where we control for year effect by using transformed data. In addition, we used the normalised ratio to transform the data, the results are qualitatively similar.

Table 5. 9 Logit Results from Transformed Data

The Table provides the results from Logit analysis for Jordanian firms listed in Amman stock exchange for the period 2000-2008. The results in panel 1 are based on Logit model with Fama MacBeth methodology and transformed de-meaned data. The results in panel 2 based on Logit model with transformed data based on normalized ratio, for firm i in year t the normalized ratio individual observation $= \frac{(r_{it} - \bar{r}_t)}{se_t}$, where r_{it} is the firm observation in year t, and $\bar{r}_t$ is the mean value for all firms year t, se_t is the standard error for all observations in year t alone. Panel 3 is Logit model based on demeaned data where the variables transform into deviations from time means.

Dependent variable : Dividend			
Independent variables	1	2	3
Profitability	14.909***	0.120***	13.570***
	(5.09)	(7.00)	(6.94)
Growth Opportunities	0.452***	0.0342**	0.330***
	(3.10)	(2.53)	(2.66)
Size	0.014	0.01	0.05
	(0.12)	(0.87)	(0.66)
Volatility	-0.136***	-0.023***	-0.110**
	(-3.45)	(-3.06)	(-2.10)
Blockholders	-1.811***	-0.037***	-1.631**
	(-4.81)	(3.06)	(-3.09)
Institutional Investors	1.981***	0.042***	1.570***
	(3.93)	(3.34)	(3.41)
Retained Earnings/Total Equity	3.701***	0.091***	2.450***
	(3.71)	(3.13)	(3.53)
R^2	0.25	0.257	0.26
No. of Firms	85	85	85
No. of Observation	680	680	680

Marginal Effect

Table 5.10 Results of marginal effects from the choice of paying dividend

Dependent variable: dividend indicator (1 if the firm pay dividend and 0 otherwise). The results for Logit model. The asterisk ***, **, and * denotes that the coefficients are statistically significant at 1%, 5%, and 10% level, respectively. See Table 5.5 for Variables definition.	
Dependent variable : Dividend payout ratio	
Independent Variables	
Profitability	0.030***
	(6.93)
Growth Opportunities	0.008**
	(2.52)
Size	0.002
	(0.87)
Volatility	-0.005**
	(-2.26)
Blockholders	-0.009***
	(-3.07)
Institutional Investors	0.010***
	(3.34)
Retained Earnings/Total equity	0.022***
	(3.18)
No. of Firms	85
No. of Observations	680

In table 5.9 we show the results from Logit after control for year effects, Table 5.10 reports the marginal effects obtained from the choice-to pay dividends evaluated at the mean values of each independent variable. First, the results show that the profitability of the firm has a significantly positive effect on dividend payouts. A 1% increase in the firm profitably ratio raises the probability of dividend payouts only by about 0.03 percentage points. Second, size of the firm is insignificant. Third, Growth opportunities, institutional investors, and Retained earnings ratio has positive and significant impact on dividend payouts. Finally, Volatility and Blockholders have negative and significant impact on the probability of the firm to pay dividends.

The positive impact of profitability and firms with growth opportunities supports the findings from the previous chapter that healthy firms enjoy better access to relatively low-cost credit. The results also support the life cycle theory, where retained earnings positively impact the payment of dividends,

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The impact of ownership structure on dividend policy shows that blockholders prefer firms that do not pay dividends, this supports the agency cost theory. In contrast, institutional investors prefer to receive dividends, which is consistent with the view that they regard dividends as indicators of firms' financial strength. Institutional investors act as short term investors rather than owners of the company, and consequently are looking for current income rather than future earnings.

5.13 DIVIDEND POLICY AND TARGET ADJUSTMENT MODEL

In this section, the empirical model that examines the adjustment of dividends toward a target dividend policy or the optimal dividend policy is discussed. Lintner (1956) proposes the Partial Adjustment Model, which sees firms adjust their dividend smoothly toward a target dividend payout ratio.

Lintner (1956) argues that, '*the belief on the part of many managements that most stock-holders prefer a reasonably stable rate and that the market puts a premium on stability or gradual growth in rate-were strong enough that most managements sought to avoid making changes in their dividend rates that might have to be reversed within a year or so*'. Lintner further states that firms change dividends toward the target in a gradual way (partial adjustment) in order to reduce the adverse shareholders' reactions relating to a changing dividend. In addition, he argues that current earnings is the most important factor affecting the rate of dividends, and also determines the target payout ratio; this is because the firm's management believes that shareholders expect that dividends increase if earnings increase, and may therefore accept the cut in dividends if the earnings decrease; therefore, we can see that there is stickiness between previous rates of dividend payout and current dividends, and the change in dividends follows a smoothing pattern rather than radical changes.

The asymmetric information between firm's management and investors affects the adjustment process of dividends. In markets with higher asymmetric information,

the adjustment process is slow towards the optimal target payout ratio because investors may consider any change in dividend policy as a signal about future earnings. On the other hand, markets with a low asymmetric information problem show a quicker adaptive process toward target payout ratio owing to investors being fully informed about the firm. From another perspective, the dividends payment is used to reduce the agency cost problem; therefore, we can expect that investors in markets with a high agency problem use dividends to reduce the agency cost problem.

In bank-based markets, the asymmetric information problem and agency cost problem are lower since the main provider of funds is banks. A close relationship between the company and the banks reduces these problems. In addition, banks may have access to private information and have the ability to monitor the firm's activities; therefore, using dividends as a signalling device to reduce the agency cost problem will be lower in the bank based market (see Aivazian *et al.,* 2003b).

In Jordan, the bond market is very thin, with most listed companies rarely using it to raise funds. The main characteristic of the financial market in Jordan is that banks are the main providers of debt for firms. In addition, the banking sector in Jordan is developed and working well on a commercial basis, banks providing loans based on firm performance (see Aivazian *et al.,* 2003b); therefore, a close relationship between firms and banks encourages stable dividend payments, and dividend smoothing is not important for signalling future earnings or reducing agency cost problems.

H0: The Lintner model holds, and the current dividend payments are highly sensitive to past dividend payments, and highly sensitive to current earnings.

To test the above argument, the Lintner's model is implemented. This model suggests that all companies have a target payout ratio and move toward this target gradually, with the current earnings (*Ear*) affecting the target payout ratio (*Div**). Following Lintner's argument—which states that the most important determinant of a change in the dividend policy is the current earnings—we note the impact of earnings on the target payout ratio as follows:

$$Div^*_{it} = r_i Ear_{i,t} \qquad eq.\ 5.4$$

where r_i represents the optimal payout ratio, and means that firm $_i$ has a target amount of dividends (*Div**) in year $_t$ related to earnings (*Ear)*.

In any given year, the adjustment process towards the optimal dividend payout of the firm only partially moves to the target dividend level; thus, the change from the dividend payout from year $_{t-1}$ to year $_t$ will be as follows:

$$Div_{i,t} - Div_{i,t-1} = c_i(Div^*_{i,t} - Div_{i,t-1}) \qquad eq.\ 5.5$$

where *c* equals the 'speed of adjustment coefficient'.

Alternatively, Equation 5.5 can be written to find the actual dividend payout as:

$$Div_{i,t} = c_i Div^*_{i,t} + (1 - c_i)Div_{i,t-1} \qquad eq.\ 5.6$$

where $Div_{i,t}$ and $Div_{i,t-1}$ are the actual *Div* for year $_t$ and year $_{t-1}$, respectively. Div^*_{it} is the firm target dividend ratio. Where $0 < c < 1$, the coefficient c measures the firm speed toward its target. If the c =1, then $Div^*_{it} = Div_{it-1}$ and the transaction cost that the firm pays to adjust toward its target dividend payout is zero and the adjustment toward target dividends occurs without cost and the firm is always at its target. On the other hand, if *c=0,* then $Div_{it} = Div_{it-1}$ which means that the transaction cost that the firm pays to adjust towards target is too high, and there is no adjustment. Now a substitution of equation (5.4) into equation (5.6) gives

$$Div_{i,t} = (1 - c_i)Div_{i,t-1} + c_i r_i\ Ear_{i,t} + e_{i,t} \qquad eq.\ 5.7$$

which can be alternatively written as :

$$Div_{i,t} = \beta_1 Div_{i,t-1} + \beta_2\ Ear_{i,t} + e_{i,t} \qquad eq.\ 5.8$$

where $\beta_1 = 1-c$ represents the speed of adjustment, $\beta_2 = c_i r_i$, and ε_{it} is the error term. The equation shows that the current dividend payout ratio is a function of the

lagged value of the payout ratio and the current earnings per share.[33] In this case the target payout ratio is related to the firm's earnings is $\beta_2/(1-c)$. Using Ordinary Least Squares (OLS) estimator for the above equation provides a biased estimation since the lagged value of the dependent variable is included in the model. The fixed and random OLS estimators are inconsistent and biased in dynamic panel data model (see Baltagi 2005).[34]

5.13.1 *Results of Target Dividend Ratio*

Table 5.11 shows the regression results for Lintner's model; the Lagrange Multiplier test shows that the pooled model is more appropriate than the random effect model. The null hypothesis in the LM test is that variances across firms is zero. This is, no significant difference across firms. The p-value from LM is insignificant at any conventional level, here we failed to reject the null and conclude that random effects is not appropriate. This is, not significant differences across firms is found.

When the OLS estimator is used, the speed of adjustment (1- c) is between 78% and 90%; however, in the fixed effect model, the lagged dividends variable is not significant at any conventional level. The inconsistency of the OLS estimation may suggest that OLS may give incorrect results. In addition, the lagged value of the dividend payout is not significant in the GMM estimation[35]. Because the lagged value of the dividend payout is not significant, the results may not support the path-dependence in payout policies. The target dividend payout ratio equals 19.54% (i.e. 0.17/(1-0.13)) which is lower than the sample average (i.e. 37.3% (see Table 5.2). This suggests that Jordanian firms do not change their current payout ratio towards a long-run optimal payout ratio. The results are similar to the findings of Naceur *et al.,* (2006), who state that Tunisian firms do not adjust their current dividend payout ratio towards the long-term target dividend payout ratio since the lagged value of the dividends is not statistically significant from zero.

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[33] Following Aivazian *et al.,* (2003b) I use the current earnings per share as a measure of earnings.
[34] For more details regarding this issue please refer to section 4.6 from chapter 4.
[35] For GMM estimators, the p- value of the Sargan test and the (AR 1) and (AR 2) statistics appear not to reject the null of instrument validity and correct model specification. Please see chapter 4 section 4.6 for more details about this issue.

Table 5. 11 Results for the Target Dividend Payout Ratio

Regression analysis for Lintner's model. Regression analysis for dividends, test for regression for all firms in sample. Using OLS regression and GMM first differences, the table provides the regression results for dividends sensitivities, for Jordanian firms for the period 2000-2008, all variables are defined in section 5.13. The dependent variable is dividend payout ratio and calculated by the amount of dividends divided by the net income for firm $_i$ in the year $_t$ .Earnings per share is the net income divided by number of shares outstanding at the end the year. Standard errors are heteroskedasticity-robust and clustered by firm. T-statistics are in parenthesis below the coefficient estimates, the Lagrangian Multiplier test (LM test). Wald is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as x^2 under the null of no relationship. Serial Correlation (*AR 1*) is a test for first-order serial correlation, asymptotically distributed as N(0,1) under the null on no first-order serial correlation. Serial Correlation (*AR 2*) is a test for second-order serial correlation, asymptotically distributed as N(0,1) under the null on no second-order serial correlation. OIR is Sargan test   for-over-identifying restrictions under the null of valid instruments. The asterisk ***, **, and * denotes that the coefficients are statistical significance at 1%, 5%, and 10% level, respectively.

Dependent variable : Dividend Payout ratio

Independent Variables	Pooling	OLS Random effect	Fixed Effect	GMM-first difference
Lagged Dividends	0.216***	0.209***	0.091	0.130
	(3.22)	(3.21)	(1.23)	(1.22)
Earnings Per Share	0.521***	0.472***	0.191***	0.171**
	(4.19)	(3.68)	(3.51)	(1.96)
LM test	2.66			
Wald		116***	14.09***	5.48*
OIR J-test *p-value*				0.43
Arellano-Bond AR(1) test-p.value				-2.35**
Arellano-Bond AR(1) test-p.value				-0.63
R^2	0.70	0.24	0.30	n.a
Speed of Adjustment	78.4%	79.1%	90.9%	87%
Target Payout	66.4%	59.4%	20.8%	19.5%
No. of Firms	85	85	85	85

To compare the results with other findings, we can state the following findings from other researchers who examine Lintner's Model. Aivazian *et al.,* (2003b) use a sample of US firms and find that the speed of adjustment is between 12.2% and 24.9%. In addition, the results in Table 5.10 are not consistent with the findings of Aivazian *et al.,* (2003b), who find that the lagged value of dividend payout is 39.4% and statistically significant at 1%. However, their results may not be consistent because they estimate the regression using OLS on the sample of pooled data, and they note that using a relatively small sample size might lead to this

result. However, here the sample is twice as large. Renneboog and Trojanowski (2010) find that the speed of adjustment for firms in the UK is between 73% and 63%.

The results in Table 5.10 show that Jordanian firms do not utilise the current dividend as a signal about their expectation for future earnings. The results also show that there is no stickiness of dividends, and that current dividends are independent of past dividends. This supports the view that there is no dividend smoothing towards a target dividend payout ratio.

5.14   THE CONCLUSION

In this chapter, the main determinants of dividend policy for Jordanian firms have been analysed and the main theories of dividend policy examined. Some of the results are similar to those from either developed or developing countries, whilst some are different from these countries. The main reasons for these differences are the legal and institutional structure of the Jordanian market. For instance, in Jordan, there are no taxes on dividends or capital gains, the firms cannot pay dividends if they have any losses or accumulated losses in that year, and the financial market is bank-centric. All of these factors contribute to the results being different from previous researchers.

 In this chapter, different estimation methodologies have been applied. In order to estimate the probability that the firm pays dividends, the Logit estimator was utilised alongside the statistical methodologies of Fama and MacBeth (1973) and Petersen (2009) to correct for standard errors. Furthermore, the Lintner's model to test for stickiness of dividends and to test whether there is a target dividend payout ratio was also estimated. The main findings are the following:

1. Regression results may support the free cash flow hypothesis, where the probability of paying dividends and the amount of dividends are positively related to the profitability of the firm. The results support the existing findings from developed and developing countries.

2. The results suggest that firm size is not an important factor to affect the dividend payout ratio. The results also highlight that earnings volatility has a negative impact on the firm's overall ability to pay dividends. The results provide some evidence to support the positive impact of growth opportunities on the dividend payout ratio.

3. The regression results suggest the impact of ownership structure on dividend policy. On the one hand, blockholders negatively impact the probability of paying dividends and the amount of dividends. The results may support that poor legal protection for small investors leads them to encourage firms to pay dividends. The results also support that institutional investors follow the prudent-man rule and positively impact the dividend payout ratio.

4. The results show evidence to support the Lifecycle Theory. Firms with a large amount of retained earnings relative to total equity or total assets are more likely to pay dividends and pay a larger amount of dividends. This emphasises the importance of the firm's financial age on its dividend policy.

5. The results show no evidence to support Lintner's model, where the lagged value of dividends has no significant impact on current dividends. Importantly, the regression results suggest that Jordanian firms have no long-term target payout ratio. This indicates that there is no stable dividend payout policy for Jordanian firms. In addition, there is no evidence to support dividend smoothing, since firms change their dividend payout policy without taking into consideration the past pattern of the payout ratio.

CHAPTER SIX

CONCLUSION, LIMITATION, AND FUTURE RESEARCH

This chapter summarises the main findings of all previous chapters. In addition, the limitations and suggested future research areas are provided.

6.1 CONCLUSION

This thesis provides an extensive and comprehensive review of the main financing theories, and empirically tests these theories on firms listed on the Amman Stock Exchange (ASE). In general, the results show that the firm's characteristics factors have an effect on the firm's management decisions concerning the capital structure and dividends policy. The results also show that the asymmetric information in the capital market has an effect on main decisions regarding raising capital or paying dividend.

6.2 FINANCIAL CONSTRAINTS ON THE FIRM'S INVESTMENT:

This research provides new evidence which does not support the notion that the financing and investment decisions are separable, as proposed by Modigliani and Miller. This research shows that asymmetric information may increase the costs of external financing where firms with high asymmetric information have more investment-internal cash flow sensitivities. The research uses different criterion to divide firms into two groups of firms: the first group comprise firms with lower asymmetric information, and which are assumed to be less financially constrained than the second group. The market structure of Amman Stock Exchange (ASE)

offers a great opportunity to divide firms into financially constrained firms and financially unconstrained firms. The ASE is divided into two markets: the first market firms are those which are considered to be profitable, healthy, and have normal free float volume; the second market includes those firms that have experienced losses or suffered from losses for three consecutive years, and which also have low free float volume. The results show inconclusive evidence to support that the market listing, dividend policy, size, and age of the firms are useful to discriminate between financially constrained and financially unconstrained firms.

6.3 CAPITAL STRUCTURE POLICY

Chapter Five results show that firms listed in the Amman Stock Exchange face various financial restrictions; therefore, Chapter Six of the research explores the main factors affecting the firm's decisions concerning the shape of the firm's capital structure. This research creates a model based on the main capital structure theories (Pecking Order Theory, Trade-off Theory, and Agency Cost Theory) to explain the relationship between the firm's characteristics and capital structure. The results show evidence to support the Pecking Order Theory since the profitability and liquidity have negative impacts on the firm's leverage. Moreover, the size of the firm has a positive impact on the leverage ratio, which supports the Trade-off Theory. The research supports the target adjustment model, where the results show that the firms set target leverage ratio and move toward this target in the short time.

6.4 DIVIDEND PAYOUT POLICY

Chapter Seven of this research analyses those firm attributes that determine the dividend policy in Jordan. The model includes the main factors representing the main explanatory theories (Signalling, Agency Cost, Free Cash Flow, and Lifecycle) of dividend policy. The result shows that the dividend policy in Jordan is influenced by the same factors affecting dividend policy in developed countries. The results further support the Free Cash Flow hypothesis since the profitability has a positive impact on the dividend payment. Furthermore, the results support the

Lifecycle Theory, as there is a positive impact of retained earnings ratio on the likelihood of paying dividend and amount of dividends. Furthermore, the results support the impact of Agency Cost where firm capital structure affects the dividend policy.

The results garner inconclusive evidence to support that the firm size impacts dividend policy. In addition, the results show that Jordanian firms do not target dividend payout ratio.

6.5 LIMITATIONS OF THE RESEARCH:

The main limitation of this research is that it depends on data based on financial statements; data from financial statements may not represent all factors that influence the financing decisions. For example, regarding financing decisions, the management may be affected by human characteristics, such as attitudes, experience, and knowledge; therefore, the study may need to conduct survey analysis so as to investigate the impacts associated with management characteristics on financing decisions.

Another limitation of this study is that it depends on annual data. The utilisation of annual data may reduce the ability of the research to have the most accurate results regarding the financings decisions because, as is known, the financing decision is a continuous process, and we need to know and understand those factors that affect this decision according to each timespan as opposed to waiting at the end of the year. For instance, the use of quarterly data may give us more robust results concerning the relationship between the variables in the study.

6.6 FUTURE RESEARCH:

The results of this research depend mainly on data from financial statements. As is known, there are various limitations relating to financial statement data; however, the research holds the belief that the use of surveys and personal interviews with firm management and market investors may augment the current results and

accordingly provide a clear understanding of the financing theories and their applications. For example, conducting a survey and personal interviews with investors may provide the main factors that cause them to impose various restrictions on providing firms with funds. Furthermore, this may help to establish the relationship between the investment and financing decisions, which can be achieved if managers are asked about those factors affecting decisions.

In addition, the main factors affecting the capital structure decisions are examined, which can also be achieved by interviewing the managers, investors and banks. Finally, the results of the dividend policy decision can be augmented if the managers and inventors show their opinions regarding the firm's dividend policy.

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APPENDIX

A.1 DATA COLLECTION PROCESS

All data used for regression in this research are obtained from Amman Stock Exchange (ASE) web site[36]. ASE website provides data for all of listed firms in ASE, for example the web site includes data such as financial statements, financial ratios, stock prices, trading statistics, etc[37].

The data collection process as following:

1- I exclude all of financial firms.

2- I exclude all firms that merged or spilt during the sample period.

3- I exclude all of firms that bankrupted or delisted from the index during the period[38].

ASE website provides an excel sheet file for each firm, this file contains all of financial statements (balance sheet, income statement, and cash flow statement) for the all period in a unified form for all firms as following. So, each item of the financial statements have same cell of excel sheets for all of firms in the sample. For example, cell B65 contains the operating revenues for year 2008. Thus, cell B65 in all of excel files for the other firms contains the operating revenues for year 2008. And cell C65 for year 2007 and the same thing for all year.

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[36]The link for Amman Stock exchange web site is : http://www.ase.com.jo/
[37] I would like to thank Dr. Tareq Mashoka for his help in this section.
[38] One may argue that the survivorship bias may exist. However, this is not the case in this research because there are very few companies bankrupted or delisted from the index during the sample period.

Income Statement (JD)	2008	2007	2006	2005
Operating Revenues	8,905,038	6,288,605	6,732,370	8,127,405
Operating Expenses	6,221,747	4,706,025	4,945,646	5,316,833
Gross Profit	2,683,291	1,582,580	1,786,724	2,810,572
General and Administrative Expenses	431,777	350,900	372,966	325,549
Selling and Distribution Expenses	1,101,547	558,133	508,705	534,028
Depreciation (period)	1,363,196	1,333,353	1,463,819	1,544,434
Other Operating Expenses	0	0	1,549	24,184
Net Operating Income	1,149,967	673,547	903,504	1,926,811
Other Revenues	54,176	51,577	325,792	9,295
Other Expenses	0	0	0	14,108
Income Before Interest & Tax	1,204,143	725,124	1,229,296	1,921,998
Interest Expenses	7,745	8,695	47,879	78,612
Net Income before Tax	1,196,398	716,429	1,181,417	1,181,417
Income Tax (Period)	13,924	31,033	46,004	54,672
Income Tax (Previous Years)	25,126	0	0	0
Universities and Research Train Fees	98,151	24,433	35,167	64,672
Board of Directors Remuniration	0	42,000	60,000	60,000
Net Income	1,059,197	618,963	1,040,246	1,664,042

To copy the data without any human error I use Visual Basic for Applications (VBA). This method allowed me to avoid any error relating to data collection process (i.e. copy the data from the excel files and place it in one common file). For example, If I want to collect the operating revenues for all firms the steps will be as follows:

I download all of excel files for the firms in the sample from ASE, the total number of downloaded excel files equal to 85 files.

I save all of excel files in one folder.

I open new excel file and open the VBA window and I wrote the following command

```
Microsoft Visual Basic - 1Book2.xlsm - [Module1 (Code)]
File  Edit  View  Insert  Format  Debug  Run  Tools  Add-Ins  Window  Help
                                    Type a question for help
Ln 2, Col 22

Project - VBAProject                (General)                      profit_before_tax

VBAProject (1Book2.xlsm             Option Explicit
  Microsoft Excel Objects           Sub operating revenues()
    Sheet1 (Sheet1)                 Dim oWbk As Workbook
    Sheet2 (Sheet2)                 Dim sFil As String
    Sheet3 (Sheet3)                 Dim sPath As String
    ThisWorkbook                    Dim i As Integer
  Modules                           i = 1
    Module1                         'location of files
                                    sPath = "\\acfs3\ecpg\ecpgaaa1\My Documents\Data set"

                                    ChDir sPath

                                    sFil = Dir("*.xls") 'change or add formats
                                    Do While sFil <> "" 'will start LOOP until all files in folder sPath have been looped through
                                    Set oWbk = Workbooks.Open(sPath & "\" & sFil) 'opens the file


                                    ' do something
                                    'Dim i As Integer


Properties - Module1                Range("B65:J65").Select
                                    Selection.Copy
Module1 Module

Alphabetic  Categorized             ThisWorkbook.Worksheets("sheet1").Activate
(Name) Module1                      Cells(i, 1).Select
                                    Selection.PasteSpecial Paste:=xlAllExceptBorders

                                    i = i + 1

                                    oWbk.Close True 'close the workbook, saving changes
                                    sFil = Dir



                                    Loop ' End of LOOP
                                    End Sub
```

In this way the programme collect all data that we want from all firms and place them in one common file. In this example the VBA open the excel file sheet for the first firm and copy the data from cell B65 to cell J65, which covers the period from year 2000 to year 2008 and paste them in the new excel file sheet. The second step is that the programme close the first excel file for the first firm and open the excel file for the second firm and do the same things above, and so on until it collect the data from the last firm. After that the programme close itself and the new excel sheet will be as following:

The above method gives us the confidence that all data in this research collected

with accuracy. In addition, this method saves the time because it collects the data

quickly.

A.2 SELECTED FINANCIAL RATIOS FOR ALL FIRMS LISTED IN AMMAN STOCK EXCHANGE.

Some selected financial ratios for all sample firms, average for the period 2000/2008:

Financial Ratios	
Turnover Ratio %	105.75
Earning Per Share (JD)	0.11
Dividend Per Share (JD)	0.09
Book Value Per Share (JD)	2.19
Price Earnings Ratio (Times)	69.82
Dividend Yield %	1.89
Dividends Per Share to Earning Per Share %	32.03
Price to Book Value (Times)	1.70
Gross Margin %	18.35
Margin Before Interest and Tax %	20.20
Profit Margin %	14.83
Return on Assets %	2.42
Return on Equity %	-3.39
Debit Ratio %	28.90
Equity Ratio %	71.10
Interest Coverage Ratio (Times)	16.66
Total Assets Turnover (Times)	0.57
Fixed Assets Turnover (Times)	2.78
Working Capital Turnover (Times)	4.40
Current Ratio (Times)	2.45
Working Capital (JD)	8263952