

Pecking Order Theory, Trade-Off Theory and Determinants of Capital  
Structure: Empirical Evidence from Jordan

Ziad Zurigat

Submitted for the degree of Doctor of Philosophy

Heriot-Watt University

School of Management and Languages

March 2009

The copyright in this thesis is owned by the author. Any quotation from the thesis or use of any of the information contained in it must acknowledge this thesis as the source of the quotation or information.

## ABSTRACT

The theoretical framework of the pecking order and trade-off theories of capital structure has suggested the potential for exhibiting asymmetrical financing behaviour for firms with leverage below or above the target level of leverage or for firms with financial surplus or deficit. Such analyses shed light on how firms choose their capital structure under pecking order and trade-off theories and mainly when they have leverage target with leverage above-or below-target leverage or surplus or deficit. However, a lack of empirical studies on these issues can be noted in both developed and developing countries. This thesis examines a variety of pecking order and trade-off asymmetric models and compares their performance with the symmetric alternative.

Using data from 114 non-financial Jordanian firms (of which 62 are industrial firms and the remaining are services firms), we report evidence suggesting that firstly, equity issues track the financing deficit relatively more closely, suggesting that equity is not the last resort for financing as the pecking order theory predicts Secondly, Jordanian firms are more sensitive in retiring debt to take up surplus than in expanding debt to meet their financing requirement, implying that financial surplus and deficit affect leverage differently. Thirdly, Jordanian firms have a target leverage ratio and adjust their leverage at rate higher for above-target leverage than for below-target leverage and at rate higher for firms with financial surplus than those with financial deficit. Finally, we report evidence suggesting that the rates of adjustment vary depending on whether the deviation from the target level is large or small, with rates higher for large size deviation than for small size deviation.

## DEDICATION

*This thesis is dedicated*

*...to the soul of my father*

*...to my beloved mother, wife and son*

## ACKNOWLEDGEMENTS

**First I would like to address my profound thanks, gratitude and appreciation to my supervisor team; Dr. David Brown, Dr Julian Fennema and Dr Mohammad Shareif. My special thanks to Dr. Julian Fennema for his never ended support, encouragement, motivation, and patience. His keen mind and immense knowledge made this work possible especially at the crucial stages. Words cannot express my appreciation to him. I would like to thank the Internal and External examiners Dr Janusz Brzezczynski & Dr Yu Fu Chen for their valuable comments.**

**To my wife, I am deeply grateful for her love, support and patience. Deep and special thanks are due to my mother, brothers, sisters, who stood beside me throughout my life. I also sincerely thank my father and mother in law.**

**I would especially like to thank Yarmouk University for their financial support. At last my thanks are also extended to all my friends for their continual support and encouragement, to all of you thanks a lot. Special thanks to Hesham A.Haleem for his continues support.**

# DECLARATION STATEMENT

## ACADEMIC REGISTRY Research Thesis Submission



Name:	ZIAD ZURIGAT		
School/PGI:	SCHOOL OF MANAGEMENT AND LANGUAGES		
Version: <i>(i.e. First, Resubmission, Final)</i>	FINAL	Degree Sought:	PhD

### **Declaration**

In accordance with the appropriate regulations I hereby submit my thesis and I declare that:

- 1) the thesis embodies the results of my own work and has been composed by myself
- 2) where appropriate, I have made acknowledgement of the work of others and have made reference to work carried out in collaboration with other persons
- 3) the thesis is the correct version of the thesis for submission and is the same version as any electronic versions submitted\*.
- 4) my thesis for the award referred to, deposited in the Heriot-Watt University Library, should be made available for loan or photocopying and be available via the Institutional Repository, subject to such conditions as the Librarian may require
- 5) I understand that as a student of the University I am required to abide by the Regulations of the University and to conform to its discipline.

\* *Please note that it is the responsibility of the candidate to ensure that the correct version of the thesis is submitted.*

Signature of Candidate:		Date:	
-------------------------	--	-------	--

### **Submission**

Submitted By <i>(name in capitals)</i> :	ZIAD ZURIGAT
Signature of Individual Submitting:	
Date Submitted:	

### **For Completion in Academic Registry**

Received in the Academic Registry by <i>(name in capitals)</i> :			
1.1 Method of Submission <i>(Handed in to Academic Registry; posted through internal/external mail):</i>			
1.2 E-thesis Submitted			
Signature:		Date:	

# TABLE OF CONTENTS

<b>ABSTRACT</b> .....	II
<b>DEDICATION</b> .....	III
<b>ACKNOWLEDGEMENTS</b> .....	IV
<b>DECLARATION STATEMENT</b> .....	V
<b>TABLE OF CONTENTS</b> .....	VI
<b>LISTS OF TABLES</b> .....	VIII
<b>CHAPTER 1 - INTRODUCTION AND OVERVIEW</b> .....	<b>1</b>
1.1 INTRODUCTION.....	1
1.2 MOTIVATIONS AND CONTRIBUTION OF THE STUDY .....	3
1.3 OBJECTIVES OF THE STUDY .....	6
1.4 RESEARCH METHODOLOGY .....	8
<b>CHAPTER 2 - LITERATURE REVIEW</b> .....	<b>12</b>
2.1 INTRODUCTION.....	12
2.2 TRADE-OFF THEORY (TARGET CAPITAL THEORY).....	13
2.2.1 Tax advantage and reduction of free cash flow agency costs.....	14
2.2.1.1 Tax advantage of debt.....	14
2.2.1.2 Reduction of free cash flow agency costs.....	15
2.2.2 Costs of debt .....	18
2.2.2.1 Costs of financial distress .....	18
2.2.2.2 The agency costs of debt.....	20
2.2.3 Empirical evidence on determinants of capital structure (static trade-off).....	22
2.2.3.1 Empirical evidence from developed market .....	22
2.2.3.2 Empirical evidence from developing market .....	24
2.2.3.3 Evidence from Jordan .....	26
2.2.4 The empirical evidence on dynamic trade-off (target adjustment) theory .....	28
2.3 PECKING ORDER THEORY .....	36
2.3.1 The critical criticisms of pecking order theory .....	40
2.3.2 Empirical evidence of pecking order theory .....	41
2.4 CONCLUSIONS .....	49
<b>CHAPTER 3 - EMPIRICAL INVESTIGATION OF DETERMINANTS OF CAPITAL STRUCTURE</b> .....	<b>51</b>
3.1 INTRODUCTION.....	51
3.2 DETERMINANTS OF CAPITAL STRUCTURE AND MODEL.....	52
3.2.1 Determinants of Capital Structure and theoretical background and definition.....	52
3.2.1.1 Profitability.....	53
3.2.1.2 Tangibility .....	54
3.2.1.3 The firm's Size .....	55
3.2.1.4 Non-debt tax shields .....	55
3.2.1.5 Growth opportunities .....	56
3.2.1.6 Earning Volatility .....	57
3.2.2 The Model.....	58
3.3 STATISTICAL ANALYSIS .....	59
3.3.1 Descriptive statistics .....	59
3.3.2 Estimation results .....	64
3.4 CONCLUSION.....	69

<b>CHAPTER 4 - EMPIRICAL INVESTIGATIONS OF PECKING ORDER THEORY.....</b>	<b>71</b>
4.1 INTRODUCTION.....	71
4.2 PECKING ORDER MODELS.....	72
4.2.1 The first model specification.....	73
4.2.2 The second model specification.....	75
4.2.3 The third model specification.....	79
4.3 THE ESTIMATION RESULTS OF PECKING ORDER MODELS.....	81
4.3.1 The estimation results of model 4.3.....	81
4.3.1.1 The estimation results of model 4.3 for small and large firms.....	84
4.3.2 The estimation results of model 4.4 and 4.5.....	86
4.3.2.1 The estimation results of model 4.5 for small and large firms.....	88
4.3.3 The estimation results of model 4.6.....	90
4.4 CONCLUSION.....	92
<b>CHAPTER 5 - EMPIRICAL INVESTIGATION OF TARGET ADJUSTMENT THEORY.....</b>	<b>94</b>
5.1 INTRODUCTION.....	94
5.2 TARGET ADJUSTMENT MODELS.....	97
5.2.1 Symmetric adjustment model 5.1.....	97
5.2.2 Asymmetric adjustment models 5.2 and 5.3.....	99
5.2.3 Error Correction model 5.5.....	102
5.3 THE ESTIMATION RESULTS.....	106
5.3.1 The estimation results of symmetric adjustment model 5.1.....	106
5.3.1.1 The estimation results of model 5.1 for small and large firms.....	108
5.3.1.2 The estimation results of symmetric adjustment model 5.1 for surplus and deficit firms.....	110
5.3.2 The estimation results of asymmetric adjustment models 5.2 and 5.3.....	111
5.3.2.1 The results of asymmetric adjustment model 5.2 for small and large firms.....	114
5.3.2.2 The estimation results of asymmetric adjustment model 5.2 for surplus and deficit firms.....	116
5.3.2.3 The estimation results of error correction model 5.5.....	120
5.4 CONCLUSION.....	121
<b>CHAPTER 6 - SUMMARY AND CONCLUSIONS.....</b>	<b>124</b>
6.1 INTRODUCTION.....	124
6.2 FINDINGS AND IMPLICATIONS.....	124
6.3 LIMITATIONS OF THE STUDY.....	128
6.4 RECOMMENDATIONS FOR FURTHER RESEARCH.....	129
<b>REFERENCES.....</b>	<b>131</b>

## LISTS OF TABLES

Table 3.1: The theoretical sign of the proxy variables.....	58
Table 3.2: Correlation Matrix.....	62
Table 3.3: The estimation results of model 3.1 .....	67
Table 4.1: The estimation results of model 4.3 .....	81
Table 4.2 : The estimation results of model 4.3 for small and large firms .....	85
Table 4.3: The estimation results of model 4.4 and 4.5.....	87
Table 4.4: The estimation results of model 4.5 for small and large firms .....	89
Table 4.5: The estimation results of model 4.6 .....	91
Table 5.1: The estimation results of symmetric adjustment model 5.1 .....	107
Table 5.2: The estimation results of symmetric adjustment model 5.1 for small and large firms.....	109
Table 5.3: The estimation results of model 5.1 for surplus and deficit firms .....	111
Table 5.4: The results of asymmetric adjustment models 5.2 and 5.3.....	113
Table 5.5: The estimation results of asymmetric model 5.2 for small and large firms ...	115
Table 5.6: The estimation results of asymmetric model 5.2 for surplus and deficit firms	118
Table 5.7: The estimation results of ECT model 5.5.....	120



# CHAPTER 1 - INTRODUCTION AND OVERVIEW

## 1.1 Introduction

Jordan is a small Arab country in the Middle East region, with a population of 5.3 million and a population growth rate of 2.4%. The majority (62.6%) reside in the central region, while 27.7% and 9.7% of the population reside in the Northern and Western regions respectively. The total area of Jordan is 89.3 thousands sq. km; approximately 7.8% is agricultural land (Department of Statistics, 2005).

After gaining its independence, Jordan was confronted with many problems relating to social and economic development. The lack of financial resources has hindered its efforts and ambitions to achieve a sustainable economic growth and development, increasing its dependency on external income flows in the form of grants from other countries in the region and remittances from Jordanians working, mainly, in rich Arab oil countries. Like other developing countries, Jordan has chosen a state-sponsored route for development with the Jordanian private corporate sector playing a minor role. Therefore, many development banks have been established to meet its investment financing requirements. The considerable role of the Government with its extensive involvement in the financial system during the period of 1960-1990 has adversely impacted the efficiency of the financial system, the allocation of financial resources and has resulted in structural imbalance in all sectors of Jordanian economy (Maghyreh, 2004). This necessitated a comprehensive programme of economic reforms, which aimed to bring about fiscal and monetary stability and structural transformation in the economy.

Therefore, Jordan, since 1990, has been implementing comprehensive economic, social, and structural reform programmes. These programmes aim to improve the efficiency and competitiveness of the economy, to integrate Jordan with the international economy and to create a favourable investment environment. They also paid significant attention to the problems of poverty and unemployment through providing loans to small industries and handicraft professions through specialised financial institutions.

In order to achieve their goals, the Jordanian government put forward a range of policies and procedures which can be summarised as: freeing interest rates, adopting a flexible policy to manage exchange prices, reviewing investment encouragement laws, removing lending limits, increasing the dependence on the private sector and updating the financial regulations to international standards (Al-Otoom, 1996). In 1999, the government's effort to liberalise and increase the openness of the economy was intensified, and yielded significant achievements that were crowned with Jordan's accession to the World Trade Organisation (WTO), and the attainment of free access to the largest consumer market in the world, the United States, through the Qualifying Industrial Zones (QIZ,s) and the Free Trade Agreements (Saket, 2000).

In fact, the entry of the country in the World Trade Organization and the US-Jordan Free Trade Agreement represents new competitive threats for the Jordanian firms. While on the one side, it offers Jordanian firms a chance to compete in the international market, on the other, it also offers the foreign companies a free access to the Jordanian market. For Jordanian firms, competition requires keeping a flow of high quality products and services while reducing costs. This requires Jordanian firms to obtain low cost funds to finance their investment activities to increase their competition in the local and foreign markets. However, Jordanian firms have limited choices of financing sources. The Jordanian banking sector is the main source of financing for the industrial, services and commercial operations. Since the mid 1990s, and as a result of the uncertainties that have overshadowed the regain, however, the Jordanian banks have adopted conservative credit policies which reduce the available funds for financing. At the same time, the barriers that may face the Jordanian companies when seeking funds externally from the Amman Financial Market make it difficult to use this market as a major alternative to the banking sector.<sup>1</sup> This, along with the fact that none of the Jordanian firms have experience in raising money abroad, made the Jordanian government increasingly pay attention to the Amman Financial Market as an important pillar of the economy (Central Bank of Jordan, 2000).

The Amman Financial market was founded in 1976, started operations in 1978 and was renamed Amman Stock Exchange in 1997 in accordance with the security law of 1997. Although it is largely affected by the uncertainty that overshadowed the region, it has

---

<sup>1</sup>According to El-Khouri and Hmedat (1992) these barriers might be classified into two categories. The first category includes general environmental factors such as the economic and political instability which gives rise to capital flight. The second category includes the complicated listed procedures, high issue costs, high transaction costs and investors desire for current dividend income.

witnessed significant developments and qualitative transition. New laws and regulations are set such as the Securities Law of 1997, Companies Law of 1997 and the Transparency Law of 1998. Moreover, since 1997, and in response to the governments' promotional policies for stock market expansion, foreigners are allowed to own up to 100% of the stocks of any listed firms. Consistent with the Government policy of improving its efficiency and making it work in accordance with international standards, the new Electronic Trading System is used.

These changes are aimed at increasing competition, giving transparency and safety for traders and investors by computerizing all selling and buying transactions, matching supply and demand for securities and finally, electronically setting the prices. It is assumed that these qualitative transitions make the market function more efficiently and transparently and signal clearly the price information to outsiders, making these investors rationally willing to discount less. As a result, the Amman Stock Exchange (ASE) has experienced remarkable increases in trading volumes, market capitalization and in the number of corporations listed on the market.

Because the government's efforts to develop the market and improve its efficiency have not been matched by a parallel effort by scholars, the financing practices of Jordanian listed firms on Amman Stock Exchange are still less well-known. Therefore, the general purpose of this study is to extend our knowledge of how Jordanian listed firms set their capital structure and to what extent the financing behaviour of Jordanian firms is consistent with the theoretical explanations, namely the pecking order and trade-off (target adjustment) theories of capital structure.

## **1.2 Motivations and Contribution of the study**

There are three major motivations for the current study:

Firstly, although the capital structure policy is not a new area of research, it remains one of the most interesting and puzzling topics of research. The theories and explanations that have emerged have resulted in an enormous body of theoretical and empirical research. However, no consensus has been reached. Furthermore, the majority of the studies that addressed capital structure mixture have been conducted in the context of developed countries, in particular, USA and UK. There are relatively few studies that have tested the capital structure theories and their explanations using data from

developing countries. This scarcity in research came as a result of low concentration in the last decades on corporate finance as an area of research in developing countries. The main reason for this lack of studies is that countries, such as Jordan, usually choose a state-sponsored route of development with a relatively insignificant role for the private corporate sector (see Parasad *et al.*, 2001). Recently most of the developing countries, including Jordan have implemented comprehensive economic reform programs to move towards the free market economy which influences their capital structure choice and consequently increases the need to address the issue of capital structure choice in these countries.

The puzzling issue of capital structure, besides the lack of research in developing countries in general and on Jordan in particular, motivates the conduct of this study on the financing practices of Jordanian listed firms where answers for many questions are still not clearly developed. The questions are: what are the main determinants of the financing behaviour for the Jordanian companies? And whether the explanatory power of main stream capital structure theories are applicable to the Jordanian capital market?

The existing studies that have used Jordanian market data have been based on small and, in some respect, biased samples, from large firms, making their findings unreliable such that they can then not be generalized.<sup>2</sup> In addition, they have not tested the capital structure theories by using the models that have been proposed and tested in the context of developed countries such as those developed by Frank and Goyal (2003) and Shyam-Sunder and Myers (1999), amongst others.

Secondly, although the theoretical framework of pecking order suggests that financial deficit and surplus affect leverage differently, no attempt has been made to empirically investigate this difference. Addedeji (2002) argues that it is the positive values of funds deficit not the negative values that matter. Therefore, he asserts that including these values could have reduced the effect of deficit values on the change in total debt. In the context of pecking order theory, it is only the internal funds deficit not the surplus that forces firms to raise funds externally.<sup>3</sup> Myers (1994) argues that surplus may be used to

---

<sup>2</sup> To best of the researcher's knowledge, the only prior studies in Jordan context are those that have been conducted by Al-Khouri and Hmedat (1992); Diranyeh (1992) and Al-Hayjneh (2001) (determinants of capital structure). Rawashdeh and Quadah (1997) (pecking order theory) and Maghyereh (2004) (Target adjustment theory). These studies will briefly be discussed in chapter two (literature review chapter).

<sup>3</sup> Under pecking order theory, there is no well-defined optimal debt ratio. Each firm's debt-equity level reflects its cumulative requirements for external finance, while the trade-off theory suggests that there is a target level of debt-equity ratio for each firm, and it will move gradually towards the target level if any deviation from that target exists (Myers, 1984; Myers and Majluf, 1984; and Shyam-Sunder and Myers, 1999).

retire debt or invest on marketable securities or retire equity. Hence, raising debt when a firm has a surplus cash flow is consistent with the free cash flow theory of Jensen (1986) not the pecking order theory. Moreover, firms may be more (less) sensitive to financial deficit than financial surplus, making the impetus of expanding debt for financing higher (lower) than that of retiring debt for soaking up financial surplus (free cash flow).

To best of the researcher's knowledge, nothing is available in literature about what is actually happening when the firms follow the pecking order theory having surplus not deficit. It was this shortage, in fact, that motivated the researcher to carry out this study and fill the gap by developing new models to investigate whether the firms respond differently or similarly to deficit and surplus and whether they are more or less sensitive in expanding debt for financing than in reducing (retiring) debt for absorbing surplus. The models can also investigate how sensitive the regression results are to the way surplus values are treated.

Thirdly, the trade-off (target adjustment) theory of capital structure suggests that firms may not fully adjust their leverage ratio if adjustment is costly. In this context, the decision to adjust leverage is taken when the costs of being away from target are higher than those of moving toward that target (adjustment costs). The extant research testing the dynamic behaviour of the capital structure assumes the costs as well as the benefits of moving back toward the target level of leverage are symmetrical for adjustment from below and above the target leverage ratio. However, these costs and benefits need not be symmetric, making the rates of adjustment vary depending on whether the firm's leverage ratio is above or below its target leverage ratio. Asymmetric adjustment costs and benefits of increasing and reducing leverage make firms experience different rates of downward and upward adjustment.<sup>4</sup> Furthermore, if the adjustment costs constitute a major portion of the total costs of changing leverage, firms with leverage away from their target leverage ratio will adjust their leverage ratio only if they are sufficiently far away from the target (optimal) leverage ratio. This makes the probability of adjustment positively related to the difference between the target and the observed leverage ratio because firms will not make adjustment until the benefits from adjusting leverage

---

<sup>4</sup> It is worth noting that after submitting this thesis on Nov, 2008, new study has been published on Dec, 2008 by Byoun (2008) 'How and when do firms adjust their capital structures toward targets?'. This study examines the capital structure adjustment conditional on the required external capital changes as measured by a financial deficit/surplus. It also investigates the asymmetrical adjustment towards the target leverage ratio. For the comparison purposes, Byoun (2008) will be included in the literature review chapter (Ch.2) and some of its model will be tested and discussed in chapter 5.

outweigh the costs of moving back towards the target level. At large deviation below the target leverage ratio, for example, target reversion requires large debt issuance, reducing the per-unit cost of target reversion compared with the tax savings of an additional unit of debt, and consequently increasing the desire of firms to revert back towards their target level.

The current study tries to fill this gap in the literature by testing the hypothesis of asymmetric adjustment toward the target leverage ratio. For this purpose, symmetric and asymmetric partial adjustment models are used. Asymmetric adjustment models allow for the rates of adjustment to vary depending, firstly, on whether the firms' leverage ratios are below or above their target leverage ratios and, secondly, on whether the deviations from the target leverage ratio are large or small. In addition, it develops a new model to estimate the short run and long run effects of target leverage on actual leverage.

These motivations constitute the main contributions to the current study. Another contribution of this study stems from the investigation of determinants of capital structure of the Jordanian firms listed on ASE over the period 1997-2005. In general, the study is expected to highlight the knowledge of the importance of the Jordanian capital market as one of a developing market. It also helps gain a practical insight into the financing practices of non-financial Jordanian firms. The Jordanian capital market is a market that has been supported by international institutions, it has adopted an advanced trading pattern, and it seeks to be a symbol of the regional stock market. Moreover, extensive efforts have been made to integrate this market into the world market. Therefore, it may provide an ideal ground for examining the most influential theories of capital structure, the pecking order theory and the trade-off theory and their implications for developing countries.

### **1.3 Objectives of the study**

The focus of this study is on the financing behaviour of Jordanian firms listed on Amman Stock Exchange over the period 1997-2005. More precisely, the study aims at:

1. Investigating empirical evidence on the determinants of optimal capital structure for the Jordanian listed firms by using a static model based on previous studies (e.g.,

Rajan and Zingales, 1995; Titman and Weasels, 1988; Booth, *et al.*, 2001; Bevan and Danbolt, 2002, and 2004).

2. Investigating the empirical evidence on the pecking order theory in the Jordanian market as a developing market. The study employs three models to achieve this aim. Firstly, the study uses the models proposed by Shyam-Sunder and Myers (1999) and Frank and Goyal (2003). In their proposed models, the change in total debt level is regressed on the internal funds deficit. Secondly, it extends their work and suggests new models to test whether the suggestion of the pecking order theory that, the financing behaviour may differ depending on whether the firms have a financial surplus or deficit. The models proposed by Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) assume that the pecking order theory is not affected by whether the deficit variable has positive (financial deficit) or negative (financial surplus) values. Adedeji (2002) argues that negative values are not internal funds deficits or requirements for external finance to be covered by issuing debt. In the context of pecking order theory, firms finance their investments from internal funds first, then from debt, and as a last resort from the equity. When firms have surpluses, they are likely to pay back their debt first and then to invest that surpluses in cash or marketable securities and finally, buy back their own equity.

The current study estimates two separate models to test the pecking order theory in the Jordanian market. The dependent variable in the first model is the change in total debt regressed on the internal fund deficits and it is regressed on the internal fund deficits and internal fund surpluses on the second one<sup>5</sup>. Finally, it uses the static model that the current study suggests to investigate determinants of optimal leverage ratio in order to examine the suggestion of pecking order that firms raise external funds only under pressures of an internal funds deficit. In this model, internal funds deficit will be added as additional explanatory variable.

3. Investigating the empirical evidence of trade-off (target adjustment) theory. In addition to the partial adjustment model (Shyam-Sunder and Myers, 1999), the study employs asymmetric adjustment model to examine the hypothesis of asymmetric adjustment costs of increasing and reducing debt. It also uses the Error Correction Mechanism (ECM) to investigate the short and long run effect of target leverage ratio on

---

<sup>5</sup> The current study re-estimates these models with the change in equity issued by each firm as a dependent variable. This investigation examines the prediction of pecking order theory that firms with surplus may use that surplus to pay back their equity.

the actual debt level. To investigate pecking order theory against trade-off theory, this study nests the pecking order model and trade-off model in the same regression. Because the target leverage ratio is unobservable, the current study uses three instruments or proxies for the target: the estimated fitted values from the conventional leverage equation (Ozkan, 2001; Miguel and Pindado 2001, and Flannery and Rangan, 2006), the mean of firm's leverage ratio over the study period (March, 1982 and Shyam-Sunder and Myers, 1999) and the industry mean over the study period (Claggett, 1991; Cai and Ghosh, 2003 and Nuri and Archer, 2001). It is worth noting that all the empirical models will be discussed jointly with the estimation results in the empirical chapters. In what follows, we present the econometrics techniques that the current study uses to test the empirical models of pecking order and trade-off theory. We also present a brief discussion of the source of data collection and sample of the study.

#### **1.4 Research Methodology**

To accomplish the above objectives, the study employs pooled and panel data analysis techniques, where panel data analysis are usually estimated by fixed effects and random effects techniques.<sup>6</sup> In the pooled model, all observations are put together and the regression coefficients describe the overall influence with no specific time or individual aspect. It assumes that the error term captures the differences between the firms (across-sectional units) over the time.

Pooled model:

$$Y_{it} = \alpha_1 + \beta X_{it} + \varepsilon_{it} \quad (1.1)$$

The pooled model is simply estimated by Ordinary Least Square (OLS). However, OLS will be appropriate if no individual (firm) or time-specific effects exist. If they do, the unobserved effects of the unobserved individual and time specific factors on the dependent variable can be accommodated by using one of the panel data techniques (Gujarati, 2003). A panel data technique helps researchers to minimize the problems substantially that arise when there are omitted variable problems such as time and

---

<sup>6</sup> The study uses Gujarati (2003) and Green (2003) to discuss these econometric techniques.



individual-specific variables. It also provides robust parameter estimations rather than time series and/or cross-sectional data. It is usually estimated by fixed effects model and random effects models.

The fixed effect model allows control for unobserved heterogeneity which describes individual specific effects that are not captured by observed variables. The term “fixed effects” is attributed to the idea that although the intercept may differ across individuals (firms), each individual’s intercept does not vary over time; that is, it is time invariant. This model will be estimated by using OLS.

The fixed effects model:

$$Y_{it} = \alpha_i + \beta' X_{it} + \varepsilon_{it} \quad (1.2)$$

Unlike the fixed effects model, the unobserved effects in a random effects model are captured by the error term ( $\varepsilon_{it}$ ) consisting of an individual specific one ( $u_i$ ) and an overall component ( $v_{it}$ ) which is the combined time series and cross-section error.

The random effects model:

$$Y_{it} = (\alpha + u_i) + \beta' X_{it} + \varepsilon_{it} \quad (1.3)$$

$$\varepsilon_{it} = u_i + v_{it} \quad (1.3a)$$

The random effects model will be estimated by the Generalized Least Squares (GLS) technique. This is because the GLS technique takes into account the different correlation structure of the error term in the random effects model (Gujarati, 2003).

The main objective of using three alternative techniques is to find out which technique will produce the best specification for the datasets. To identify the best option, the study uses Breusch and Pagan (1980) Lagrange multiplier (LM) for testing random effects models against pooled OLS model under the null hypothesis that the cross-sectional variance components are zero ( $H_0: \sigma^2 = 0$ ). The significant Lagrange multiplier (LM) test leads to the rejection of the null hypothesis, and suggests that the individual effect is not

equal to zero and that the estimate coefficients obtained from pooled model are not consistent. To discriminate between fixed effects and the random effects model, we use the Hausman test. It tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator.<sup>7</sup> The rejection of the null hypothesis, on the other hand, suggests that fixed effects estimations are more appropriate than random effects estimations.

The data for pooled and panel econometrics techniques is extracted from the firm's annual reports, and from Amman Stock Exchange's publications (The Yearly Shareholding Companies Guide and Amman Stock Exchange Monthly Statistical Bulletins). Data is also readily available in CD format and on the web site of the Amman Stock Exchange<sup>8</sup>. The total number of the companies listed in ASE at the end of year 2005 was 205. Officially, these companies are divided into four main economic sectors; banks sector, insurance sector, services sector and finally industrial sectors. The data set of the study is constructed to cover the period of 1997 to 2005 on annual basis. The reason for the study period selection is to minimise the missing observations for the sample companies.

The sample data is constructed according to the following sample selection criteria;

1. Firms that operate in banking and insurance sectors (financial sectors) are excluded. The reasons for excluding the financial sector are that; firstly, the capital structure of financial firms has special characteristics in comparison with the capital structure of non financial firms; they also have special tax treatment (Lesfer, 1995). Secondly, the financial firms have a higher leverage rate, which may tend to make the analysis results biased (Rajan and Zingals, 1995).
2. All firms engaged in merger or acquisitions during the study period are excluded.
3. All firms with missing data are excluded.
4. All firms that have been liquidated or stopped their operation (whose stocks are desisted in ASE through out the study period) are excluded from the sample.

---

<sup>7</sup> It is worth noting that the random effects estimator is efficient and consistent under the null hypothesis and inconsistent under the alternative hypothesis, and the fixed effects model is consistent under both the null and the alternative hypothesis.

<sup>8</sup> The Company act of 1997 and the modification of 1998 require publicly held companies to prepare and publish their financial reports at least in two daily newspapers and for two weeks continuously.

5. All firms that have been incorporated after year 1997 are excluded.

The application of these criteria excludes 45 financial firms and 46 non-financial firms (22 industrial companies and 24 services companies). Thus, the study is confined to 114 non-financial companies (62 industrial companies and 52 services companies) with data continuously available between 1997 and 2005. This number corresponds to 55.61% of all companies listed in ASE at the end of year 2005 and 71.25% of the total number of non-financial companies listed in ASE at the end of year 2005. In general, the study sample consists of significant proportion of listed companies in the ASE during the nine-year-period 1997- 2005.

In addition to the current chapter, this study encompasses another five chapters. Chapter two presents the theoretical considerations and relevant prior work that provides a rationale for explaining financial policy decisions of firms. Chapter three, four and five discuss the empirical models and the estimation results of the empirical investigations of the determinants of capital structure, pecking order theory and target-off (target adjustment) theory of capital structure. Finally chapter six provides a summary of issues covered in this thesis as well as the theoretical and empirical conclusions and implications. Limitations of the study are presented and areas for further research are suggested.

## CHAPTER 2 - LITERATURE REVIEW

### 2.1 Introduction

The “classic” proposition made by Modigliani and Miller (1958) posits that the firm’s value is independent of its capital structure. They claim that the firm’s value depends upon the profitability of its assets and not on the way in which such assets are financed. The market value of a firm is invariant to whether the firm finances itself through debt and/or equity. The basic argument underlying their statement is that arbitrage transactions preclude the market value of a firm from being altered by a change in a firm’s financial policy for a given profit stream. They demonstrate that, if the firm’s value depends on the way of financing, the perfection of capital markets make such arbitrage transactions feasible. Modigliani and Miller based their argument on the assumption that a rational investor is able to borrow at the same interest rate as firms. In this case investors will have the same financial opportunities as firms, and hence, they can untie firms’ capital structure decisions on the financial markets.

The Modigliani - Miller proposition is based on the assumptions of a perfect capital market in which there are no transaction costs, no information asymmetry (investors have the same information as management about the firm’s future investment opportunities), no bankruptcy costs (debt is risk-free regardless of the amount used), so no firm goes bankrupt, no taxes (no taxes exist either on individuals or companies) and investors can borrow at the same rate as corporations. Finally, management acts on the exclusive behalf of shareholders. These assumptions can be criticised on the grounds that imperfections in capital markets do exist, suggesting that different sources of financing may be relevant to the investment decision of the firm. One of these assumptions is broken down by Modigliani and Miller themselves. In their seminal paper, Modigliani-Miller (1963) who again ignore the bankruptcy and agency costs of debt, argue that debt provides a tax benefit shield and hence, the value of the firm is maximised by using as much debt as possible.

Following their seminal papers in 1958 and 1963, firm financing patterns have therefore attracted a large number of theoretical and empirical research papers. The most influential theories of capital structure are the pecking order theory and trade-off, or

target capital theory. In general, these alternatives are based on examining what happens if Modigliani and Miller's assumptions do not hold: the existence of bankruptcy costs (e.g. Warner 1977), agency costs (e.g. Jensen and Meckling, 1976; Jensen, 1986), signalling and information asymmetry (e.g. Ross, 1977; Myers and Majluf, 1984; Myers, 1984) and the existence of non-debt tax shields (e.g. DeAngelo and Masulis, 1980) have all been examined. In Jordan, where the capital market is imperfect, all of these considerations are relevant and may affect firms' policies in borrowing and issuing equity.

Therefore, the aims of this chapter are to outline the theories and explanations of the capital structures, mainly, the theories which are expected to be relevant in the Jordanian context, review the empirical studies on corporate financing policy and outline some of the gaps in the existing body of knowledge about it. The chapter is structured as follows: Section 2.2 presents the theoretical and empirical literature of trade-off (target adjustment) theory. Section 2.3 presents the theoretical and empirical literature of pecking order theory and section 2.4 provides a summary and some conclusions.

## **2.2 Trade-off theory (Target capital theory)**

In their second seminal paper, Modigliani and Miller (1963) have altered the underlying argument of their classical proposition of capital structure. They incorporate the corporate income tax and contend that the value of the firm, if levered, equals the value of the firm if unlevered plus the value of the generated tax benefit. Modigliani and Miller (1963) as Modigliani and Miller (1958) ignore the agency and bankruptcy costs of debt. To certain limits, the presence of agency and bankruptcy costs of debt may outweigh its tax benefit, suggesting that there is some threshold level of debt, under which the firm's value is maximised. This threshold of debt is generally called the optimal (target) level of capital structure and is defined by the trade-off between costs of debt and its benefits. More precisely, it will be at the point where the marginal benefits of each additional unit of debt equal to its marginal costs. In what follows, we provide a brief discussion of the costs and benefits of debt that derive the optimal capital structure

such as the tax benefits, costs of financial distress (direct and indirect costs) and agency costs of shareholders/managers and shareholders/debt holders conflicts.<sup>9</sup>

## ***2.2.1 Tax advantage and reduction of free cash flow agency costs***

### ***2.2.1.1 Tax advantage of debt***

It has been argued that the corporate profit tax treatment allows for the deduction of interest payments in computing taxable income (Modigliani Miller, 1963). Consequently, using debt decreases a firm's expected tax liability and increases its after-tax cash flow, making profitable firms employ more debt to increase the value of their debt tax shield.<sup>10</sup> However, Taggart (1985) contends that corporate debt enjoys a net tax advantage when corporate tax rates exceed marginal personal tax rates. This violates the earlier Modigliani- Miller conclusion regarding corporate income tax, making corporate tax deductions at least partially offset by additional personal tax liabilities of the acquiring debt holders. Miller (1977) claims that even in a world in which interest payments are fully deductible in computing corporate income taxes, the value of the firm, in equilibrium will still be independent of its capital structure. Miller (1977) concludes that personal income taxes paid by investors in corporate debt just offset the corporate tax shield provided that the firm pays the full statutory tax rate. Miller (1977) concludes that the firm should be indifferent to the level of outstanding debt since there is no optimal level of debt for the firm; it exists only for the whole economy. Hence, the presence of a personal tax rate with corporate income tax induce investors to demand premiums to compensate for the reduction in the net income (Graham, 2003), making the use of debt negatively related to the personal tax rate and positively related to the corporate income rate.

However, the significance of the debt tax shield depends widely on the nature of the tax system applied by each country, whether it allows for loss to be carried forward or loss to be carried back or both. Ashton (1989) and Adedeji (1998) point out that the tax system in UK does not encourage firms to use debt as much the classical tax system does in US. Compared with the UK tax regime, the US tax system allows firms to sustain a loss for the year to carry-back and /or carry-forward such losses. It permits

---

<sup>9</sup> Tong and Green (2005) has argued that the modern version of trade-off theory is based on trade-offs among agency costs.

them to receive a cash refund of prior taxes paid or a tax reduction in the future. Therefore, US companies are expected to depend more heavily on debt to finance their investment opportunities and make quick target reversion when their leverage has deviated from its target level. Since the Jordanian tax system only allows loss to carry forward not loss to carry backwards, Jordanian firms are not expected to gain much tax benefits from debt. The tax advantage of debt financing will not be high for high risk firms where, profitable years with significant tax payments could be affected by a succession of dab years (Booth *et al.*, 2001). Hence, Jordanian firms are expected to use less debt in their capital structure and show a weak desire to adjust their capital structure when they are out of their target level.

Moreover, raising debt for tax considerations may be largely affected by the presence of other tax shields such as depreciations, allowances of research and development expenses and investment tax credits. DeAnglo and Masulis, (1980) argue that firms with tax deductions for depreciation and investment tax credits can consider these deductions as a substitute for the tax shield.<sup>11</sup> They conclude that the positive tax shield substitute suggests that the expected marginal corporate tax advantage decline as leverage is added to the capital structure. Debt is thus more expensive for firms with a high level of non debt tax shield because the marginal tax savings from an additional unit of debt decreases with increasing non-debt tax shields. This is because of the probability that bankruptcy increases with leverage, which makes the marginal benefit low.<sup>12</sup> Hence, firms with a substantial amount of non-debt tax shields will have less incentive to raise debt for tax considerations, implying a negative association between debt and non-debt tax shields.

### ***2.2.1.2 Reduction of free cash flow agency costs.***

It worth noting that the tax advantage of debt is not the sole reason for using debt; this has been suggested by Jensen and Meckling (1976) and Jensen (1986) as a mechanism to mitigate the agency costs of managers-shareholders conflicts. The agency theory of

---

<sup>10</sup> Fama and French (1998) and Panno (2003) provide evidence suggesting that in Modigliani and Miller's (1963) tax model, profitability is the main determinant of leverages, and a positive relationship between profitability and leverage is predicted.

<sup>11</sup> DeAnglo and Masulis, (1980) conclude that the inclusion of non-debt tax shields lead to a unique interior optimal capital structure for each firm under which its value is maximized. DeAnglo and Masulis, (1980) who generalized the Miller (1977) model argue that the existence of non-debt tax shields will be enough to change the leverage irrelevancy theory.

Jensen and Meckling (1976) addresses the incentive problems that could arise due to the separation between ownership and control.<sup>13</sup> This separation may provide them with the incentive to maximize their wealth in a way that may harm stockholders. They may conduct actions that are costly to shareholders, such as consuming excessive perquisites or over-investing in managerially rewarding but unprofitable activities or to overvalue the investment requirements and to take the difference between the dummy value and real value of investment. Gillan and Startz (2003) claim that the separation between ownership and control is not the only factor that gives rise to the agency problems, the diffuse nature of corporate ownership may motivate the agency problem, where no incentive exists for small shareholders to bear the cost of monitoring the management behaviour.<sup>14</sup>

The conflict of interests between managers and shareholders and thereby its costs, will significantly increase when managers have free cash under control. Jensen (1986) addresses the agency problem in his free cash flow theory which is formally modelled by Stulz (1990). Jensen (1986: 323) defines free cash flow as “cash flow in excess of that required funding all projects that have positive net present value when discounted at the relevant cost of capital”. Accordingly, when managers have more cash flow than is needed to fund all of the firm’s available profitable projects, they will have the incentive to invest the excess cash in unprofitable projects (Jensen, 1986). Stulz (1990) calls this cost an over-investment cost of managerial discretion and defines it as “the expected cost to the shareholders that arise because management invest cash flow in excess of that available to fund positive NPV projects in negative NPV projects”. Hence, profitable firms are expected to experience high costs of free cash flow because the probability of having excess cash for consuming more perquisites or investing in less profitable projects will be high. These firms are expected to have more debt to reduce the amount of funds available under management control.

Jensen (1986) points out that since debt commits the firm to pay out cash, it reduces the amount of discretionary funds available to managers to engage in the type of pursuits

---

<sup>12</sup> Kraus-Litzenberger (1973) argues that the present value of the debt tax shield increases at a decreasing rate since the probability of bankruptcy is rising with the increase in debt.

<sup>13</sup> Managers of the Jordanian firms do not have a large percentage of investment. On average, it is not more than 4% (Amman stock exchange, 2005) which may give rise to the agency conflicts between managers and shareholders.

<sup>14</sup> Gillan and Startz (2003) argue that the conflict of interest which is referred to the agency theory is attributed firstly to the heterogeneity of the participants’ preferences and seek to achieve different goals, and secondly to the asymmetric information, where they have imperfect information as to each other’ actions and preferences, taking in consideration that managers are better-informed than stockholders



that managers want but are not in the interests of equity holders. Hence, using debt, without retention of the proceeds of the issue, forces the managers to meet their promise to pay future cash flows to the debt-holders. By doing so, managers give the bondholders the right to take the firm to the bankruptcy court if they do not maintain their commitment to make the interest and principle payments. Here, debt works as a disciplining tool because default allows creditors the option of forcing the firm into liquidation (Harris and Raviv, 1990). Furthermore, Lasfer (1995) argues that debt finance creates a motivation for managers to work harder and make better investment decisions.

However, the benefit of debt in mitigating the agency cost of free cash flow is more effective in firms that generate a substantial amount of free cash flow but have poor investment opportunities, where the probability of investing free cash flow in unprofitable projects is high (Jensen, 1986). While, for rapidly growing firms with large and good investment opportunities but who have no free cash flow, debt will not be effective. It exacerbates the conflict between debt holders and shareholders and thereby its costs. In addition to its role in mitigating the agency cost of free cash flow, debt provides management with the benefit of maintaining control where, a high control benefit induces stockholders to issue debt rather than equity because debt holders have no voting right as equity (Stulz, 1988; Harris and Raviv, 1990). If it is the case, the firm will prefer debt not equity for balancing control considerations, (Baskin, 1989 and Alen, 1993)

In summary, the introduction of debt decreases stockholder-manager agency costs, but as the use of debt increases, stockholders and bondholders agency costs arise. For a large amount of debt, these costs will exceed the stockholder-manager agency costs savings. According to Jensen and Meckling (1976), the trade-off between these costs results in an optimal capital structure. In a traditional tax/bankruptcy trade-off model, the stockholder-manager agency costs savings and stockholders and bondholders agency costs are not considered. Tong and Green (2005) have argued that the modern version of trade-off theory is based on trade-offs among agency costs, implying that value-maximizing firms consider all the costs and benefits of debt when setting their optimal or target capital structure. The following section analyzes the bankruptcy/financial distress and agency costs of debt.

## 2.2.2 *Costs of debt*

As discussed in section (2.2.1), Modigliani and Miller's (1963) tax model suggests that the firm can maximize its value by using as much debt as possible. The underlying assumption behind this suggestion is the perfection of the capital market. However, the existence of bankruptcy and agency costs of debt makes debt not being freely used and forces value-maximizing firms to trade-off the costs and benefits of debt, typically tax savings and the reduction in the agency costs of free cash flow. In this section, we provide a brief discussion of the expected costs of debt such as the costs of financial distress and agency conflicts:

### 2.2.2.1 *Costs of financial distress*

These costs are incurred when the occurrence of default reduces the market value of the firm's assets. It arises when a firm uses too much debt in its capital structure so that it could not meet its financial obligation. According to Warner (1977) and Barclay *et al.* (1995), financial distress has both direct and indirect costs. The direct costs are incurred in bankruptcy and reorganization. These include the legal and administrative costs of the liquidation and the costs of shifting down operations and dissipated of assets. This is because shareholders have little incentive to run a bankrupt firm efficiently which may lead to the firm's assets and overall value being easily dissipated when it goes bankrupt. This effect might also arise prior to the firm going bankrupt; the possibility of bankruptcy may cause shareholders to take on excessively risky projects to expropriate wealth from the firm's bondholders (Cornelli and Felli, 1995).

It is worth noting that bankruptcy is not the cause of decline in the firm's value, it is the result. This argument is supported by Wijst and Thurik (1993) who defined the bankruptcy costs as the difference between the firms operating value and its liquidation value.<sup>15</sup> Hence, one could argue that a reduction in a firm's marginal bankruptcy costs will increase the use of debt financing. As Ficher *et al.* (1989) point out, high-bankruptcy-cost firms should, on average, have narrower debt ranges than firms with relatively low bankruptcy costs. Consistence with this, DeAnglo and Masulis, (1980, p 21) argue that firms that are subject to greater marginal bankruptcy costs will employ

---

<sup>15</sup> It is worth noting that bankruptcy and liquidation are very different events. Bankruptcy is likely to happen when the firm cannot meet debt obligation, whilst the liquidation of the firm's assets will occur only if the market value of the future cash flows generated by the firm is less than opportunity cost of the assets (Jensen and Meckling, 1976, p 341).

less debt. However, Warner (1977) argues that there are “scale economies” regarding bankruptcy costs, in that these costs constitute a larger proportion of the firm’s value as that value decreases. Therefore, they are higher for small firms than for large firms which make large firms less likely to be subject to bankruptcy risk, consequently, able to borrow at more attractive rate.

With respect to the indirect costs of financial distress, they arise from the reluctance to do business with a firm that maybe financially distressed (Brealey and Myers, 2002). These include the costs of losing or retaining customers as well as employees. It also includes the distress costs of the suppliers who are averse to put effort into servicing the firm’s account or demand cash or they may raise inputs (raw material, intermediate goods, and financial capital) prices, remove discounts and demand better terms. Furthermore, debt also has costs associated with the ‘debt overhang’ problem (Myers, 1977). This problem arises when a firm’s outstanding debt is at some risk of default and covenants give current debt priority for repayment which will be at the expense of shareholders because a portion of value created by new investments will go to the creditors through a reduced risk of default on currently outstanding debt. The “Debt overhang” problem becomes more severe when the probability of debt default is significantly high. In this case, firms may be forced to forgo value-maximizing investments and this may result in what is known ‘underinvestment problem (Myers, 1977 and Calomiris, *et al.*, 1994). Based on the previous analysis, firms with high earnings volatility are expected to incur a higher cost of financial distress (Bradley *et al.*,1984), since the possibility of their earnings level dropping below their debt servicing commitments is high, making these firms have less leverage.

In the context of Jordanian market, the nature of Jordanian bankruptcy law makes the costs of bankruptcy high. This law emphasises the role of lenders and puts less emphasis on the firm as an ongoing concern. It is not conducive to the re-organization of firms; in contrast, firms entering bankruptcy are usually liquidated at a higher cost. Moreover, the indirect costs of losing customers or retaining customers are significantly large for the Jordanian firms, where globalization offers the imported goods and services free access to the local market. Therefore, customer retention becomes a difficult task for firms’ going bankruptcy because customers prefer the stable supplier. However, the high rates of unemployment make the cost of losing employees, especially for unskilled, relatively low. Furthermore, there will be a supply side effect as the market will be reluctant to provide capital to those who are financially distressed.

Due to their conservative credit policies, Jordanian banks offer debt to the less risky firms. Hence, it is costly for risky Jordanian firms to raise debt at attractive rate.

### **2.2.2.2 *The agency costs of debt***

As mentioned above, debt exacerbates the conflict between debt holders and shareholders because the debt contract gives shareholders an incentive to invest sub-optimally. Jensen and Meckling (1976) examine agency costs, including incentive effects of debt on investment choices of owner-managers and assert that shareholders can extract value from debt holders by using existing debt funds to over-invest in risky projects. This Shareholders' behaviour creates what is known as the overinvestment problem. According to Jensen and Meckling (1976), it is limited liability that gives shareholders greater value from investing in more risky projects. They profit from the likelihood of larger gains at the expense of larger potential losses. Firm value is reduced and wealth is transferred from creditors to owners. Creditors anticipate the expropriation behaviour of shareholders of transferring wealth and demand a premium for compensation, raising the costs of debt.<sup>16</sup> This cost is known as the agency cost of assets substitution problem which will be more severe for financially distressed firms. On the other hand, if the benefits captured by debt holders reduce the returns to shareholders, an incentive to reject positive net present value projects is created, creating what is known as the underinvestment problem. This is because shareholders are residual claimants to the firm's value after debt is paid and debt holders benefit more from a safe positive net value project than shareholders (Lasfer, 1995).

As with the assets substitution problem, the underinvestment problem is an increasing function of the probability of financial distress/bankruptcy risk, implying that it will be large for highly leveraged firms. Myers (1977) paid attention to debt capacity reserve to avoid the underinvestment problem, especially for growing firms. Myers (1977) argues that the high growth firm should finance its investment opportunities with equity not debt if it wants to be in the position to undertake all positive net present value projects in the future (Titman and Wessels, 1988). Moreover, he points out that the agency costs

---

<sup>16</sup> Jensen and Meckling (1976) define agency costs as "the sum of the monitoring expenditures by the principal, the bonding expenditures by agent, and the residual loss". Residual loss is defined as "the dollar equivalent of the reduction in welfare experienced by the principal due to the divergence between the agent's decisions and those decisions which would maximize the welfare of the principal". While Williamson (1988) defines agency costs as the residual loss of "the reduction in the value of the firm that obtains when the entrepreneur dilutes his ownership"

of the asset substitution problem can be mitigated by issuing short term debt rather than long term debt, since the incentive for substituting assets is lower for short term than for long term debt.

However, the firm's opportunities to engage in asset substitution can be reduced by issuing secured debt. If the debt is collateralised, the borrower will be restrained or limited to using the funds for a specified project which reduces the agency costs of asset substitution and hence, the costs of debt. This suggests that firms with more fixed assets can raise debt at more attractive rates because of the higher liquidation value of collateral assets in the event of financial distress or bankruptcy (Rajan and Zingales, 1995). This might be the reason why firms with more growth opportunities can not raise debt because they represent the expected growth of firm's intangible assets which have no collateral value and decline rapidly in value if bankruptcy or financial distress occurs, shifting firms towards equity financing (Titman and Wessels, 1988) and Rajan and Zingales, 1995).

In summary, previous analysis suggests that trade-offs among the different costs and benefits of debt result in an optimal capital structure where increases in leverage beyond the optimum lead to expected marginal costs which exceed the marginal benefits of debt. While decreases in leverage below the optimum lead to a loss of marginal benefits of debt which exceeds the savings in expected marginal costs. Although the optimal or target capital structure is significantly important under the trade-off theory of capital structure, the costs and benefits of debt become increasingly important when a firm's leverage ratio reverts to the target level. This implies that trade-off theory is not only confirmed by the importance of target capital structure but also by the costs and benefits of leverage itself (Brounen *et al.*, 2005). This might be the reason why many firms use far less debt than theory suggests which implies that the observed leverage ratio may not necessarily be optimal and hence, adjustment of leverage toward the optimal or target level of leverage is required.

However, as Myers (1977) points out, leverage may be costly to adjust because of the adjustment costs (transaction costs).<sup>17</sup> This suggests that the presence of transaction costs may prevent adjustment until the benefits from adjusting leverage outweigh these

---

<sup>17</sup> The transaction costs are the costs of substituting debt for equity or equity for debt. According to Rudebusch and Oliner (1989; 1992), there are two principal components to transactions costs (:the compensation for the dealer placing the issue, and other expenses such as legal, accounting and printing costs, registration fees and taxes).

costs. Therefore, firms must trade off the benefits of moving toward their target leverage ratio with the costs of moving toward that target level (adjustment or transaction costs) before taking the decision to rebalance their observed leverage ratio or not.<sup>18</sup> It is optimal to make adjustment only if the benefits of moving toward (or the costs of being away from) the target level exceed or at least out weigh the costs of moving back to the target.

Previous analysis assumes that the presence of adjustment costs may prevent firms from adjusting leverage ratios toward their target ratios, suggesting that a partial - not full adjustment-toward the target leverage ratio occurs. To the extent that this is the case, a static model of capital structure will not be able to capture the dynamic adjustment in leverage ratio. There is evidence that firms may deviate from their optimal leverage ratio, and then gradually work back to the optimum, suggesting that the observed leverage ratio is not always the optimal. Therefore, the following two sections assess the empirical studies on both static and dynamic trade-off theory to shed light on the factors that might determine the optimal leverage ratio and that might affect the adjustment process.

### ***2.2.3 Empirical evidence on determinants of capital structure (static trade-off)***

The common approach has been to study the determinants of optimal leverage ratio by investigating the relationship between the observed leverage ratio and a set of explanatory variable using a static model. This section will be divided into three sub-sections as follows:

#### ***2.2.3.1 Empirical evidence from developed market***

Using data from US industrial companies, Titman and Wessels (1988) try to extend the empirical work in capital structure theory by estimating the impact of unobservable attributes on the choice of corporate debt ratios. They regress the collateral values of assets, non-debt tax shields, growth, uniqueness of business (measured by the number of product lines and advertising expenditure), industry classification, firm size, volatility of earnings and profitability on three separate measures of short-term, long-term, and

---

<sup>18</sup> The benefits of moving toward the target leverage ratio are generally called the costs of being away from the target.

convertible debt. The study did not provide support for any effect on debt ratios arising from non-debt tax shields, volatility, collateral values of assets and firm growth. However, they find a negative relationship between debt levels and uniqueness of business. Profitability was negatively related to all measures of debt. Finally, short-term debt ratios are found to be negatively related to a firm's size. This final result indicates that small US firms face relatively high transaction costs when long-term debt is issued. Therefore, they argue that transaction costs might be an important determinant of capital structure in US market, particularly for small firms.

In a comparative study, Rajan and Zingales (1995) investigate whether the capital structure in other developed countries is related to factors similar to those influencing the US companies.<sup>19</sup> Tangible assets, market to book ratio, firm size and profitability are suggested as determinants of capital structure in these countries. They find that firms with more collateralised assets are not highly levered. In addition, they found that profitability and market to book ratio are negatively related to leverage. However, they argue that the negative relationship with leverage appeared to be driven by firms with high market to book ratio rather than by firms with low market to book ratio. The study provides no evidence supporting the effect of the firm size on leverage. Finally, the findings were not varied across the G-7 countries so they concluded that capital structure in other countries was affected by factors similar to those that influence the US companies.

Bevan and Danbolt (2002) who extend the work of Rajan and Zingales (1995) tested the determinants of capital structure in the UK non-financial firms by using four measures of financial leverage. They used non-equity liabilities to total assets, total debt to total assets, total debt to capital (where capital is defined as total debt plus common shares with preferred shares), and adjusted debt to adjusted capital.<sup>20</sup> All the measures were regressed on market-to-book value, natural logarithm of sales (size), profitability, and tangibility of assets. They found that determinants of gearing were significantly changed with respect to each measure of debt used. With the same gearing definition as Rajan and Zingales, Bevan and Danbolt (2002) report similar results. However, they provide evidence suggesting that the determinants of gearing established by Rajan and Zingales are dependent on the definition of gearing used.

---

<sup>19</sup> The sample firms of their study are drawn from USA, UK, German, France, Italy and Canada.

<sup>20</sup> Adjusted debt is defined as the book value of total debt less cash and marketable securities, while the adjusted capital is defined as the total debt plus the book value of equity and reserve plus provisions and deferred taxes less intangibles.

In their later paper, Bevan and Danbolt (2004) provide evidence suggesting that the relationship between leverage and its determinants is affected by the methodology used to analyse the sample data, specifically whether it controls for firm and time-specific heterogeneity or not. They found that there have been significant differences in the results of pooled data and panel data analysis. Bevan and Danbolt (2004) as Bevan and Danbolt (2002) use market-to book value, natural logarithm of sales (size), profitability, and tangibility of assets as determinants of capital structure. In addition to the time-invariant and firm specific heterogeneity, the focus was on the variety of long - run and short run debts components rather than on the aggregate measures. They found that large firms use long and short term debt more than small ones. Tangibility is found to be positively related to both short and long-term debt, while profitability is found to be negatively related. However, they find that profitable firms tend to use short-term debt more than less profitable one.

Banerjee *et al.* (2000) use a set of explanatory variables as determinants of optimal capital structure in the UK market, such as variability of earning, tangibility of assets, firm size and profitability, non-debt-tax shield, uniqueness and industry classification. They find that all explanatory variables used as determinants of optimal capital structure were as hypothesised in the UK (signs), except growth, where a limited support is found for a positive effect arising from growth opportunity on leverage. This result implies that little debt is available to finance growth in the UK.

Previous studies suggest a set of explanatory variables as determinants of optimal capital structure in developed countries such as profitability, asset structure, size, non-debt tax shields, growth opportunities and earnings volatility. The findings of these studies were significantly not varied across developed countries, indicating that the capital structure in these countries is affected by similar factors. The reason may be attributed to their institutional similarities. As developing countries have different legal and institutional traditions, the financial decisions in these countries may be different from those of developed ones. In what follows, we present the empirical studies that have been conducted in the context of developed countries.

### **2.2.3.2 Empirical evidence from developing market**

In the context of developing countries, Kunt and Maksimovic (1994) investigate the capital structure in a sample of the largest publicly companies in ten developing



countries; India, Pakistan, Thailand, Malaysia, Zimbabwe, Mexico, Brazil, Turkey, Jordan, and Korea. Kunt and Maksimovic (1994) argue that, despite the difference in the level of financial market development between the US and the sample used in their study, the variables that determine capital structure in the US are also determinants of capital structure in the sample countries. They found variables that are suggested by agency theory explained more of the variation than those suggested by tax-based theory. Moreover, for both short-term and long-term debt in most countries, they found that assets structure, liquidity and industry effects had more explanatory power than firm size, growth and tax effects. Leverage is found to be negatively related to net fixed assets, suggesting that markets for long-term debt do not function effectively in the developing countries.

In similar study, Booth *et al.* (2001) assess whether capital structure theory is portable across developing countries with different institutional structures. The sample firms in their study are from Malaysia, Zimbabwe, Mexico, Brazil, Turkey, Jordan, India, Pakistan, Thailand, and Korea. Booth *et al.* (2001) use three measure of debt ratio; total debt ratio, long-term book debt ratio, and long-term market debt ratio with average tax rate, assets tangibility, business risk, size, profitability, and the market to book ratio as explanatory variables. The study showed that the more profitable the firm, the lower the debt ratio, regardless of how the debt ratio was defined. It also showed that the more the tangible assets, the higher the long-term debt ratio but the smaller the total debt ratio.

Booth *et al.* (2001) conclude that the debt ratio in developing countries seemed to be affected in the same way by the same types of variables that were significant in developed countries. However, they pointed out that the long-term debt ratios of those countries are considerably lower than those of developed countries. This finding may indicate that the agency costs of debt are significantly large in developing countries or markets for long term debt are not effectively functioning in these countries. Finally, Booth *et al.* (2001) argue that their results are in line with Rajan and Zingales (1995) except for the tax and the market-to-book ratio.

In India, as a developing country, Bhaduri (2002) finds that assets structure, growth, uniqueness, firm's size, and cash flows played an important role in determining the optimal capital structure of Indian firms. They find that large size Indian firms depend more on the long-term borrowing, while the small firms depend more on short-term borrowing. Cash flows and uniqueness of firm are found to be negatively related to

leverage. Finally, a positive association appeared between growth factor and leverage (growth is measured by the growth rate in total assets).

In their recent study, Huang and Song (2005) investigate the determinants of capital structure in Chinese market. They find that leverage (long-term debt ratio, total debt ratio, and total liability ratio) decreases with profitability, non-debt tax shield and managerial shareholdings, while it increases with firm size and tangibility. In addition, the tax rate positively affects long-term debt ratio and total debt ratio. Furthermore, they find a negative relationship between leverage and firm growth opportunities. The findings of Huang and Song (2005) are consistent with the findings of Chen (2004) in the same market.

In more recent study conducted in the context of Central and Eastern European countries, Delcours (2007) finds a positive relationship between firms leverage ratios on the one hand, and asset tangibility, non-debt tax shield, and taxes on the other hand. In addition, a negative relationship between leverage ratios and profitability is found. Furthermore, puzzling findings relating to the relationship between firm size and earnings volatility with the leverage ratios are found, as the significant signs change across countries and among the different dependent variables. Finally, Delcours (2007) concludes that the pecking order hypothesis, the trade-off theory, and the agency theory explain the capital structure puzzle only partially in his sample countries.

Previous studies showed that in despite of the difference in the level of financial market development between developed and developing countries, capital structure in developing countries is affected by factors similar to those influencing the capital structure in developed countries. Although Jordan is a developing and Islamic country, its business culture is similar to those of developed ones. Moreover, Jordan, since 1990, has been implementing comprehensive economic reform programs to move toward the free market economy. In what follows, we present the studies that have been conducted using data from the Jordanian market.

### **2.2.3.3 Evidence from Jordan**

Using data from the Jordan market, Al-Khouri and Hmedat (1992) investigate the effect of the earnings variability on capital structure of Jordanian corporations listed in ASE

over the period (1980 – 1988). They use three measures of leverage: long-term debt over total assets, short-term debt over total assets, and short-term debt plus long-debt over total assets. The independent variables are the standard deviation of the earnings variability and the size of the firm. They conclude that the size of the firm is considered to be a significant factor in determining the capital structure of the firm, and an insignificant relationship is found between the earning variability and the financial leverage of the firm. Finally, the type of industry is not considered to be a significant factor in determining the capital structure choice of the firm.

Although their sample are significantly small, Diranyeh (1992) and Al-Hayjneh (2001) provide evidence from the Jordanian market suggesting that optimal capital structure of Jordanian firms is affected by factors similar to those that influence the capital structure in developed and other developing countries. Diranyeh (1992) investigates the determinants of capital structure in a sample of 24 industrial firms. He uses assets collateral ratio, non-debt tax shield, firm's size, earning fluctuations, firm's profitability, firm's growth, and the uniqueness of the firm as explanatory variables. Diranyeh (1992) concludes that a significant relationship appears between capital structure of the firm on one hand, and assets collateral ratio, fluctuation in earnings, firm's profitability, firm's size, and the uniqueness of the firm on the other hand. However, he does not explain why the capital structure of the firm is related to both the non-debt tax shield and the growth of the firm.

Al-Hayjneh (2001) examines the determinants of capital structure in 12 Jordanian industrial firms. He uses assets collateral ratio, non-debt tax shield, financial leverage, uniqueness of the firm, firm's size, operating risk, and ownership of the firm as determinants of capital structure. The findings of this study are in the line with the findings of Diranyeh (1992). Al-Hayjneh (2001) also concludes that Jordanian industrial firms depend on two ways of financing; internal financing from retained earnings, and external financing from long-term debt. However, internal financing had the bigger share in the firms' capital structure which represented 75 % of the firm's capital structure, and only 25 % lifted for long-term debt. These studies can be criticised on the ground of their sample size, which may make results biased toward large firms. However, these studies provide evidence suggesting that the capital structure in the Jordanian market is affected by factors similar to those in developed and other developing countries.

In summary, capital structure in both developed and developing countries (including Jordan) are somehow affected by the same factors. However, they differ in the amount of long term debt used, since developing countries use long run debt less than developed countries, suggesting that the market for long run debt are not effectively functioning in these countries. Furthermore, it suggests that firms in developing countries face a severe assets substitution problem and hence, firms depend heavily in short run debt to avoid this problem. The common approach that the previous studies used in investigating the determinants of optimal capital structure is the static model which examines the relationship between the observed leverage ratio and a set of explanatory variables. The main shortcoming of this model is that the observed leverage ratio may not necessarily be optimal. The observed ratio will be optimal only if no adjustment (or transaction) costs exist because the presence of transaction costs may prevent firms from moving back to their optimal leverage level, making the actual leverage ratio far away from its optimal level. If so, the static model of trade-off theory will be unable to correctly describe the firm's financing behaviour. In what follows, we assess the studies which have addressed the dynamic nature of capital structure in both developed and developing countries.

#### ***2.2.4 The empirical evidence on dynamic trade-off (target adjustment) theory***

Many studies have addressed the dynamic nature of the capital structure of firm and provided evidence in favour of the dynamic trade-off theory that firms adjust toward a target leverage ratio.

Using data from the US market, Jalilvand and Harris (1984) find a significant adjustment coefficient, which they interpret as evidence that firms optimise debt ratios. They report a rate of adjustment of 55.7% per year which suggests that US firms back quickly to their target leverage ratio when their leverage ratios deviate from their target leverage ratio. Furthermore, they find that besides the costs and benefits of target reversion, the firm size, interest rates (the cost of debt itself) and stock price level have a significant impact on the speeds of adjustment toward the target. This finding may provide explanations as to why previous studies reported different rates of adjustment.

Consistent with the finding of Jalilvand and Harris (1984), Flannery and Rangan (2006) provide evidence suggesting that US firms do target a long run capital structure and revert back quickly to that target when their current leverage move away from the

target. They claim that the adjustment rate they found is roughly three times faster than what was reported in the literature, since they report a rate of adjustment of 34.2 %. They argue that this finding suggests that the costs of deviation from the target are significantly important for the US firms, making the benefits of moving back toward the target too important. It also suggests that US companies incur low transaction costs when they raise debt funds. Moreover, they argue that the rapid adjustment toward the target capital structure in the US firms implies that pecking order and timing theories do not dominate most firm debt ratio decisions.

However, using data from the US market, Leary and Roberts (2005) provide evidence suggesting that information asymmetry costs are an important determinant in the financing decision of the US firms that follow a dynamic re-balancing strategy. They find that US firms are less likely to use external capital when they have sufficient internal funds, but are more likely to use it when they have large investment needs. Therefore, they conclude that firms may have target leverage ratio and still prefer internal over external funds. This finding is not consistent with the finding of Flannery and Rangan (2006). However, they find that US firms are more likely to increase (decrease) leverage if their leverage is relatively low (high). Moreover, they find that highly levered firms tend to reduce their book leverage the following year. Leary and Roberts (2005) report a rate of adjustment of 25 % per year. These findings suggest firstly, that leverage adjustment may be different between increasing or reducing leverage: i.e., above-target leverage or below-target leverage; secondly, that adjustment toward the target leverage ratio may take place in a way consistent with the suggestion of pecking order theory which provides another explanation as to why previous studies reported different rates of adjustment.

Consistent with Leary and Roberts (2005), Hovakiman *et al.* (2004) who test the hypothesis that US firms tend to move toward the target debt ratio when they either raise new capital or retire or repurchase existing capital, find that firms who follow the dynamic trade-off theory choose the amount of debt and equity that offset the effects of earnings and losses accumulation on their capital structure. This suggests that adjustment toward the target leverage ratio may be different between financial surplus and deficit. Moreover, Hovakiman *et al.* (2004) conclude that if the target capital structure is the matter, highly profitable firms will be more likely to issue debt rather than equity because these firms are less subject to high bankruptcy risk and consequently, will be able to borrow at more attractive interest rates. Hence, they can

adjust their leverage faster than less profitable firms, indicating that firms may not revert quickly to their target leverage ratio if the costs of debt are significantly large and the adjustment requires an increase in debt level. In addition, they find firms with higher current stock prices (relative to their past stock prices) are more likely to issue equity rather than debt and repurchase debt rather than equity, suggesting that leverage may deviate from the target in response to timing consideration and capital market conditions. This finding is consistent the findings of Baker and Wurgler (2002). Baker and Wurgler (2002) find that low-levered firms tend to be those which raised funds when their valuations were high, and conversely high leverage firms tend to be those which raised funds when their valuations were low. Hence, one can expect that firms will show a weak desire to move back quickly towards target when stock markets experience an increase in stock prices.

In a more recent study conducted in the US market, Huang and Ritter (2007) find that US firms slowly rebalance away the undesired effects of leverage shock. They report a rate of adjustment of 17.0% which indicates that US firms need 3.7 years to remove half of the effects of a shock on their leverage. Moreover, Huang and Ritter (2007) find that US firms finance a large proportion of their deficit with external equity, not debt, which explains the slower rate of adjustment in the US market. This finding suggests that US firms have less incentive to adjust leverage when the cost of equity is relatively lower than that of debt, suggesting that leverage may deviate in response to timing consideration and market conditions.

Several studies have investigated the empirical evidence of static trade-off (target capital theory) in the UK market and other Europe countries. Marsh (1982) provides evidence from the UK market suggesting that UK companies had a target capital structure for both short-term and long-term debts ratios and make their choices of financing instrument accordingly. He found that these companies work to maintain their long-run target debt ratio, although they deviate from the target in the short-run in response to timing considerations and capital market conditions. Marsh (1982) argues that probability of issuing debts and/or equity varies with the deviation from the target level of capital structure. He points out that probability of equity issuance would be high (low) if the firm's capital structure is above (below) its target level. Although he does not empirically test this argument, it implies that UK firms experience both downward and upward adjustment towards their target debt ratio.

In a comparative study, Banerjee *et al.* (2000) test the dynamic model of capital structure to explore the capital structure adjustment process in UK firms compared to those in the US. Banerjee *et al.* (2000) conclude that US firms adjust their leverage faster than UK firms, implying that US leverage will be much closer to its target level. For the UK firms, the adjustment costs are significantly more important, which explains the slow speed of adjustment toward the target level in the UK sample firms compared to US sample firms. However, using data from the UK market, Ozkan (2001) provides evidence suggesting that UK firms have long-run target leverage ratio and adjustment towards their target ratios takes place relatively fast. He reports a rate of adjustment of 44.3% per year which is higher than the rate reported by Banerjee *et al.* (2000). Ozkan (2001) argues that this finding suggests that the costs of being away from the target and the adjustment costs toward the target level are equally important for the UK firms.

In more recent study, Antoniou *et al.* (2008) provide mixed results in countries which follow a market-based financial system and a bank-based financial system. Antoniou *et al.* (2008) have conducted a comparative study between capital market-based systems (USA and UK) and bank based financial systems (France, Germany, and Japan). In all five countries, the results suggest that firms have target leverage ratios and adjust their leverage ratios regularly to maintain a target level. French firms are the fastest in adjusting their leverage (59.3 % per year), while Japanese firms are the slowest (11.1% per year). In Germany, they report a rate of adjustment of 23.6% per year. In the UK and US markets, they report 31.8 and 33.2% respectively. Moreover, they find that in both types of financial system, leverage ratio is found to be positively related to the tangibility and the size of the firm, while it is negatively related to the profitability, growth opportunities and share price performance. Antoniou *et al.* (2008) conclude that there are many factors influencing the capital structure of a firm such as the corporate governance, tax system, borrower-lender relation, and the level of investors' protection.

In Spanish markets, where the financial system is a bank-based financial system, Miguel and Pindado (2001) investigated whether the non-financial quoted Spanish firms have a target and move toward that target. Their results confirm that Spanish firms have a target debt ratio and bear transaction costs when the adjustment toward that target is made. However, the costs of adjustment are lower than the benefits of moving back to the target leverage ratio which encourages firms to adjust their leverage too quickly. These costs are also lower than those of the US firms, due to their higher percentage of private debt. Miguel and Pindado (2001) report a rate of adjustment of 79% per year.

In developing markets, Singh (1994) finds results consistent with those in developed markets (i.e. Baker and Wurgler, 2002 and Huang and Ritter, 2007). He provides evidence suggesting that capital structure in developing countries is largely affected by equity timing considerations and the costs of debt. Singh (1994) investigated how the top hundred largest listed firms in 10 less developed countries (India, Brazil, Mexico, South Korea, Jordan, Pakistan, Thailand, Malaysia, Turkey, and Zimbabwe) financed their investment during the period 1980-1990. He generally finds that firms in these countries rely heavily on external funds and new share issues to finance the growth of their investment. According to Singh (1994), the main reason is that the relative cost of equity capital fell significantly during the 1980s due to the large increase in stock prices. Together, with an increase in the cost of debt, equity issues become relatively more attractive for financing corporate investment. However, he emphasises that these conclusions refer only to large firms in these 10 less developed countries and are unlikely to be valid for smaller firms. This situation may be applicable now to the Jordanian market, where stock prices on ASE have witnessed a considerable increase and Jordanian banks have adopted conservative credit policies. In addition, the internal and external demand for equities rose recently in response to the governments' promotional policies for stock market expansion, since foreigners are allowed to own up to 100% of the stocks of all listed firms.

We did not find that studies in Jordan addressed the issue of dynamic capital structure except that conducted by Maghyereh (2004). Maghyereh (2004) provides evidence suggesting that Jordanian firms adjust their leverage ratio toward their targets very fast. Using a sample of the 36 largest Jordanian firms over the period 1990-2000, Maghyereh (2004) reports a rate of adjustment of 72.8% per year. His study can be criticised on the grounds of sample size and the results may also be biased towards large firms. However, he provides evidence suggesting that Jordanian firms experience relatively low adjustment speed after liberalising the financial system in Jordan, since the estimated adjustment coefficient is lower in 1990-1995 (0.851) than it is in 1995-2000 (0.682). The reasons for this reduction are the removal of restriction on interest rates and the adoption of conservative credit policies by the Jordanian banks.

As seen above, the existing research on dynamic capital structure has provided mixed results on the speed of adjustment toward the target leverage ratio, suggesting that the costs and benefits of target reversion may differ from one country to another. It also suggests that there are other factors affecting the speeds of adjustment such as the firm



size, interest rates (the cost of debt itself) and stock price level. Moreover, some studies predict that adjustment toward the target leverage ratio may vary depending on whether the firm is below or above its target leverage ratio (i.e. Marsh, 1982; Cai and Chosh, 2003 and Leary and Roberts, 2005).

Cai and Chosh (2003) argue that by assuming the goal of the firm is to maximise the value, the firm must adjust its gearing upward when its gearing is below the optimal gearing ratio whilst it must reduce its gearing ratio when gearing is above the optimal ratio. Cai and Ghosh (2003) propose an answer to the question “why does a firm adjust its debt level toward the industry mean when it is above the mean, while it is indifferent to revert to target when it is below that target or mean?” Cai and Ghosh’s explanation is that when a firm’s debt level reaches a significantly high level (above the mean), the large bankruptcy and agency costs of leverage makes the reduction of the debt a meaningful task, while a firm whose debt level is below the average debt level of the industry does not put consideration of debt level as its first priority.

However, these predictions are not empirically tested. In the context of the dynamic trade-off theory, firms trade off the costs and benefits of moving toward their target leverage ratio when they decide to rebalance their capital structure, indicating that the costs and benefits of moving back toward the target are the main determinants of the speed of adjustment. It is worth noting that the costs of being away from target include the tax benefit lost by the firm being below its target level of leverage, and the bankruptcy and agency costs of having above-target leverage.

The extant literature on the dynamic capital structure has assumed that these costs are symmetric. In reality, the significance of these costs may not necessarily be symmetric or identical for firms: i.e., firms with below-target leverage ratio may benefit (tax benefit) from increasing leverage, however it is not as critical that they revert to their target as for those with above-target leverage ratio. This is because of the probability of bankruptcy increases with leverage. It is increasing at an increasing rate as firms move above their target level of leverage, while for those with leverage below their target leverage ratio, the marginal tax savings decline as a firm moves up to match its target level for the same reason.<sup>21</sup> Moreover, leverage expansions may be constrained by the availability of debt at attractive rates and also by borrowing constraints such as bankruptcy and agency risks.

---

<sup>21</sup> The marginal tax savings decline significantly when firms have a substantial amount of non-debt tax shields (see, DeAnglo and Masulis, 1980 and Ross, 1985).

However, the firm will not adjust its leverage until the benefits from engaging in adjustment outweigh the costs of adjustment. The adjustment costs may be different between increasing and reducing leverage, suggesting different speeds of adjustment for leverage above and below the target level of leverage. As Oliner and Rudebusch (1989; 1992) point out, new debt issues require a compensation for the dealer placing the issue, and other expenses such as legal, accounting and printing costs, registration fees and taxes. Firms may be forced to incur significant adjustment (transaction) costs when the adjustment requires an increase in the leverage level. However, these costs are at least less likely to be significant when the firm is reducing its leverage ratio. Oliner and Rudebusch (1989; 1992) find that the transaction costs consumed nearly 14% of the proceeds of small debt issues in the USA. Thus, if the adjustment costs constitute a major portion of the total costs of changing leverage, firms with leverage out of their target will adjust their leverage only if they are sufficiently far away from the target level of leverage, making the probability of adjustment a positive function of the difference between actual leverage ratio and target leverage ratio. This suggests that the rate of adjustment may vary depending on whether the observed or actual leverage ratio is above or below the target leverage ratio, and on whether the deviation from the target is large or small.

Furthermore, Leary and Roberts (2005) find that firms may have a target leverage ratio but still follow the pecking order theory, suggesting that adjustment toward the target leverage ratio may take place in a way consistent with the suggestion of pecking order theory. Pecking order theory suggests that, due to the adverse selection costs, firms prefer internal financing over costly external financing, however, when external financing is needed, they prefer debt funds to equity funds. Hence, firms with financial deficit tend to issue debt rather than issuing equity, while those with financial surplus are expected to retire debt rather than equity to avoid the higher costs of re-issuing equity and to save their debt capacity for future financing requirement. If so, firms are expected to experience different speeds of adjustment depending on whether they have surplus or deficit, i.e. firms with financial deficit tended to increase their leverage, making leverage adjustment for these firms faster than those with financial surplus. Firms with surplus are expected to retire debt and consequently, move away from the target level, increasing the time required to revert to their target.

However, firms with fund surplus may be less subject to the bankruptcy risk and hence, be able to raise debt funds at more attractive rates, implying that firms facing surplus

will be faster than those with financial deficit. This might also suggest that firms with fund surplus or deficit may experience different upward and downward speeds of adjustment: i.e., firms face surplus (deficit) with leverage below (above) the target level are expected to adjust their leverage slower than those with leverage above (below) the target. Most recently, Byoun (2008) examine the capital structure adjustment conditional on the required external capital changes as measured by a financial deficit/surplus. Byoun (2008) provide evidence suggesting that most adjustments occur when firms have above-target debt with a financial surplus or when they have below-target debt with a financial deficit. The adjustment rates for firms with financial deficits are lower than those with financial surplus, suggesting that firms with financial deficit are more risky than firms with financial surplus. Although his results suggest that firms move toward the target capital structure when they face a financial deficit/surplus, adjustment towards the target leverage ratio does not occur in the way consistent with the predictions of pecking-order theory. He finds that surplus firms with above-target debt use all of their financial surpluses to pay off debt, whereas firms with below-target debt retire both debt and equity with their financial surpluses. Hence, firms with financial surpluses experience different adjustment rates for leverage below-and above-target leverage ratios, with higher rates for above-target leverage than for below-target leverage. In contrast, his results suggests that surplus firms with leverage below the target level move away from the target, increasing the time required for firms to revert back towards their target ratios. For comparison purposes, we test the empirical model which is used by Byoun (2008) to test the asymmetric adjustment for surplus and deficit firms.<sup>22</sup>

It is worth noting that the critical assumption in the trade-off theory is that all market participants had homogeneous expectations and had the same information about the firm's value and profitability. This assumption has been violated by Myers and Majulf (1984) and Myers (1984) on their pecking order theory of capital structure. In the context of this theory, there is no well-defined optimal leverage ratio. In what follows, we discuss the theoretical backgrounds and empirical evidence on the pecking order theory of capital structure.

---

<sup>22</sup> This study was published after submitting this thesis on Nov, 5. It is published in the journal of finance on Dec, 18, 2008.

### 2.3 Pecking Order Theory

Pecking order theory predicts that due to the information asymmetry between a firm and outside investors regarding the real value of both current operations and future prospects, external capital (debt and equity) will always be relatively costly compared to internal capital (retained earnings). Myers and Majluf (1984) argue that information asymmetry will lead to a mis-pricing of a firm's equity in the marketplace, causing a loss of wealth for existing shareholders.<sup>23</sup> This is because of the adverse selection problem that arises because managers are more knowledgeable than outsiders (investors). Myers and Majluf (1984) claim that if the firm finances its new project by issuing new securities, these securities will be under-priced. This is because managers cannot credibly convey the quality of their existing assets and available investment opportunities to potential investors. As a result, outsiders may not be able to discriminate between good and bad projects, consequently interpreting the firm's decision to issue new securities as a sign of possible bad news and then pricing new securities accordingly. They will demand a premium to invest, or firm can only issue equity at a discount.

Aware of the resulting dilution of current shareholders' wealth, firms may not issue new equity even for projects with positive net present values, causing what is known 'under-investment problem, therefore, Myers and Majluf (1984) argue that borrowing through debt instruments, especially the less risky ones, helps firms mitigate the inefficiencies in their investment decisions that are caused by the information asymmetry. Compared to equity, debt is likely subject to lower degree of miss-evaluation or adverse selection problem, simply because debt contracts are safer in that they limit the possible ways by which holders could loose.

Since the Jordanian capital market is a small and thin market, information is not readily available to outside investors, which poses too much risk for outsiders. Therefore, it is expected that they will demand a premium on, or under price, new equity or debt issues because they are unable to monitor all aspects of investment projects and managerial behaviour. This will raise the costs of external finance and then induce Jordanian firms to rely on internally generated funds from retained earning rather than external funds,

---

<sup>23</sup> The main assumptions behind their argument are that, managers have better information about the firm's value than potential investors and that managers act in the best interests of existing shareholders.

and raising debt when external funds are needed. Hence, we could expect that the pecking order theory will be more applicable to Jordanian firms.

However, many measures have been taken recently by the Jordanian government to make the market signal the price information to market participants (i.e. Transparency Act of 1998, Companies Act of 1997, Securities Act of 1997 and new Electronic Trading System). Moreover, foreigners are allowed to own up to 100% of the stocks of all listed firms. The government efforts are aimed at increasing competition, transparency and safety for traders and investors. As results, Amman Stock Exchange has witnessed a remarkable increase in the trading volumes, market capitalisations and number of listed corporations. It also witnessed an increase in stock prices. This, together with the increase in interest rates on loans due to the financial liberalisation and the adoption of conservative credit policies in the Jordanian banks, encourages Jordanian firms to go to the stock market for financing. It is worth noting that Jordanian firms have no experience in raising funds externally (outside the country) and the Jordanian bonds market is small and not developed well. This implies that the arguments of Myers (2001) and Myers and Majluf (1984) that firms issue equities when they are overvalued may be applicable to Jordanian firms. According to Myers and Majluf (1984), managers would tend to issue equity only if the firm is overvalued, and debt when its value is undervalued. Moreover, they claim that external equity is issued when the risk of financial distress become significantly high, otherwise, straight debt and hybrid securities are issued at low and moderate risk of financial distress.

Consistent with this argument, Myers (2001) contends that the equity issues occur only when debt is costly, i.e. at a dangerously high debt ratio where managers and investors foresee costs of financial distress. Myers demonstrates that equity issues are spurned by investors if debt is available on fair terms, and in equilibrium only debt is issued. Therefore, he argues that debt has the prior claim on assets and earnings, while equity is the residual claim. In the context of pecking order theory, firms should issue equity when they experience high stocks valuation for two reasons: firstly, the asymmetric information costs to the firm are expected to low when shares are overvalued, secondly, these firms are expected to have higher growth opportunities which induce them to finance their financing needs with equity in order to maintain their borrowing capacity for the future (see, Titman and Wessels, 1988 and Rajan and Zingles, 1995).

Myers (1984) uses Myers and Majluf (1984) to provide a rationale for explaining financial policy decision of firms with what is known a pecking order theory of capital

structure. As described by Myers (1984:581), the pecking order theory suggests that firms first prefer internal sources of finance, and they adjust their target dividend payout ratio to their investment opportunities. If the firms seek external finance, due to generous dividend policies, unpredictable fluctuations in profitability or investment opportunities, firms will choose debt (as the safest instrument), and then hybrid securities such as convertible bonds, and then equity as a last resort. The pecking order theory generally explains why firms might rationally let cash flows determine leverage. This suggests that firms turn to debt funds under pressure of an internal funds shortage. Therefore, the stronger the cash flow relative to investment, the less likely the firms will turn to debt and the more likely the leverage will fall for a given level of equity.

Furthermore, Myers (1984) argues that if internally generated cash flow is greater than desired investment outlays, the firm first pays off debt or invests in cash or marketable securities. This suggests that pecking order theory predicts different financing behaviour for surpluses and deficits firms. This is one of the criticisms to those who test the suggestions of pecking order theory and assume that firms' pecking order is not different for surpluses and deficits.

Previous analysis suggests that firms exhibit a hierarchy of preference with respect to funding resources. As a result, firms will first use cash flow as the cheapest source of finance, then debt finance, and finally outside equity financing as a last resort. The underlying argument behind the prediction of pecking order theory is the information or adverse selection costs. However, there is evidence suggesting that information costs are not the only factor that encourages firms to follow the pecking order theory. Fazzary et al. (1988) who tested the sensitivity of investment to the availability of cash flow, has listed the main sources of costs hierarchy which induce firms to follow the pecking order theory. Beside information costs (has been discussed above), they list transaction costs and agency costs. These elements provide an explanation as to why firms prefer internal funds as the cheapest source of financing over the external ones. In what follows we provide a brief discussion of the transaction costs and agency costs as additional sources for financing hierarchy.

### **1- Transaction costs**

Donaldso (1961) who provides the origin of pecking order theory has attributed the pecking order behaviour to the presence of transaction costs. These costs are usually associated with raising funds externally (debt/equity). According to Kadapakkam *et al.*

(1998), transaction costs involved in the use of external equity or debt result in a “financing hierarchy” in which the cheapest funds are utilised first. There are two principal components to transactions costs (Rudebusch and Oliner, 1989; 1992): the compensation for the dealer placing the issue, and other expenses such as legal, accounting and printing costs, registration fees and taxes. According to Securities and Exchange Commission (SEC) data,<sup>24</sup> the transaction costs consumed nearly 19% of the gross proceeds of small stock issues and about 14% of the proceeds of small debt issues, implying that the transactions costs are especially high for small issues. Consequently, they constitute a significant financing hierarchy for smaller firms. However, Oliner and Rudebusch (1989; 1992) show that these transaction costs became smaller in relative terms with increases in issue size, suggesting that these costs large are lower for large firms than for small firms. This implies that small firms are more likely to follow the pecking order theory.

## **2. Agency costs**

Agency theory addresses incentive and moral hazard problems that could arise due to the separation between ownership and control, creating what is known in finance as shareholder-manager conflict (Jensen and Meckling, 1976). This conflict gives rise to agency costs which may increase the costs of raising funds externally, and consequently increasing the reliance on internally generated funds as a cheapest source of financing.<sup>25</sup> Another kind of conflict arise between manager/shareholder and debt holders due to the use of debt, increasing the cost of external funding and consequently shifting firms towards internally generate funds. These costs are the agency costs of assets substitution problem or underinvestment problem since firms may be forced to forgo some of its profitable investment opportunities, reducing their profitability and thereby its value. Therefore, firms with higher agency costs will tend to depend more heavily on internally generated funds for financing, following what is known in corporate finance theory as the pecking order theory.

---

<sup>24</sup> The Securities and Exchange Commission is the authority who regulates U.S securities market.

<sup>25</sup> These costs are the sum of: (1) monitoring costs by the shareholders to control and observe the manager’s behaviour; (2) bonding costs by the manager to assure the shareholder that he will not take actions to harm the shareholder’s interest or to ensure that the shareholder will be compensated if he does take such actions; and (3) the residual loss which represents the costs resulting from differences in actions between the manager and the shareholder compared to those if the shareholder took the action himself (Jensen and Meckling (1976)).

### ***2.3.1 The critical criticisms of pecking order theory***

It is worth noting that the pecking order theory is criticised on the grounds of its underlying arguments and suggestions. Adedeji (1998) concludes that the suggestion of pecking order theory, that it is only the internal funds shortage that motivates firms to raise funds externally is questioned. This is because it ignores other theories and the effects of institutional factors that might affect the firm's choice of financing instruments such as the level of interest rate, borrower-lender relations and finally, the government intervention. Cull and Xu (2005) argued that sometimes reinvestment of firm's profits in the large scale projects is conditional by its ability to generate funds externally. He concludes that investment is lumpy, since internal and external funds are needed to finance the available profitable projects. Moreover, he argued that the government intervention through the monetary policy during the financial crisis may make the cost of borrowing lower than the cost of internal funds. Consequently, firms use debt before internal funds.

The underlying argument of Myers and Majulf (1984), Myers (1984) that information cost or the adverse selection problem induces firms to follow the pecking order behaviour, has been contradicted by Baskin (1989), Allen (1993) and Adedji (1998). They argue that transaction and information costs are not the only factors that might discourage the use of external financing, in general and for equity in particular. They conclude that control consideration may make firms reluctant to issue equities because of their effects on the existing balance of control, or even to issue debt which might impose the discipline of the capital market on them. Consistent with this, Myers (1984) has contended that firms' reliance on internally generated funds is interpreted by others (i.e. Jensen and Makling, 1976), as the result of the separation of ownerships and control, where managers will be reluctant to raise funds externally to avoid the capital market discipline. Fazzary *et al.* (1988) who tested the sensitivity of investment to the availability of cash flow, provide empirical evidence supporting the above arguments. They list the main sources of costs hierarchy which induce firms to follow the pecking order theory such as transaction costs, agency costs and asymmetric information costs. Fazzary *et al.* (1988) provide evidence suggesting that the investment of US firms is highly sensitive to the availability of cash flow.

Moreover, Fama and French (2005) argue that firms can avoid the information costs or the adverse selection by issuing the equities which are less subject to asymmetric information such as equity issues to employees in their compensation plan or to existing



stock holders. They argue that this kind of issues does not change the ownership structure and then the existing balance of control. Furthermore, it does not involve high costs of asymmetric information. If so, the grip of the information asymmetries approach is broken down because firms can issue equity at a low information cost. Hence, the need for issuing debt to finance new investment projects is reduced.

However, the stock option plans for employees may be issued for considerations other than the information costs. Graham *et al.* (2004) examine the stock option plans for employees as a non-debt tax shield. Their evidence about employees' stock options suggests that options deductions work as important non-debt tax shields and firms tend to substitute option deductions for interest deductions. Moreover, stock option plans for employees are also suggested as techniques to mitigate the conflict between managers and stockholders and encourage managers to work for stockholders interest. This reduces the need for debt as a mechanism for mitigating the agency conflict as it has been suggested by Jensen and Meckling (1976) and Jensen (1986). In the Jordanian context, public shareholding companies are not allowed to issue any class of shares other than common shares (Company act 1997). This implies that equity issues to employees in their compensation plan or to existing stock holders are not allowed.

### **2.3.2 Empirical evidence of pecking order theory**

Several studies have tested the suggestions of pecking order theory by using different models and techniques. Some of these studies have proposed a model suggesting that internal funds deficit is the main determinant of the change in debt level (i.e. Shyam-Sunder and Myers, 1999 and Frank and Goyal, 2003), while the other tested the pecking order theory in terms of its predictions with respect to some of the explanation variables such as profitability, size and growth... etc (i.e. Tong and Green, 2005, Allen, 1993; Baskin, 1989; Adedeji, 1998). These studies interpreted the negative sign of profitability coefficient in leverage equations as evidence supporting pecking order theory. As Baskin (1989) points out, most of the studies over the past fifty years reported a negative relationship between leverage and profitability. The negative relationship is taken as a support for pecking order theory against trade-off theory.

However, Hovakiman *et al.* (2004) claim that the negative relationship between leverage and profitability is not because profitability affects the leverage level, but because of its effect on the deviation of leverage level from the target level. They argue

that the negative relationship between profitability and leverage will persist for firms that follow pecking order because these firms have no incentive to offset the effects of profitability on leverage. In this section, we present literature for the both groups, starting firstly with those who test the pecking order theory on the basis of its prediction regarding profitability, size and growth variables

Using data from the US market, Taggart (1985) examines how the US firms establish their own capital structure. The study findings revealed that debt financing varies constantly with capital expenditure relative to available internal funds, suggesting that debt only is used to accommodate the desired investment level. He finds that capital structure in these firms is determined in response to the need to finance new investment opportunities with available internal funds. Taggart (1985) concludes that the comparative costs of available financing sources induce firms to use internally generated funds as a first choice before turning to raise funds externally. However, he argues that when external funds are needed, firms turn firstly to debt funds before using equity funds. Taggart (1985) attributes this behaviour to the transaction costs as well as to the asymmetric information costs which are usually associated with raising funds externally. Finally, his findings are consistent with the suggestion of pecking order theory which predicts that leverage is negatively related to a firm's profitability.

Consistent with these findings, Baskin (1989) provides evidence supporting the suggestion of pecking order theory. Baskin found that the pecking order theory is a descriptor of corporate finance behaviour in US. He argues that although bankruptcy costs of debt do restrict the firms' ability to borrow, the supply of debt funds is more elastic than that of equity funds. Baskin (1989) takes the positive association between leverage and past growth and the negative association between leverage and past profitability as evidence supporting the pecking order theory. Baskin (1989) attributes the reasons to the hierarchy behaviour in US firms to the transaction costs, information cost, and control considerations.

Following Baskin (1989) in US, Allen (1993) in Australia tests the prediction of pecking order theory that there should be a negative relationship between debt ratios and profitability. The finding of Allen supports this prediction, where a significant negative relationship between leverage and profitability is found. Allen (1993) attributes that to the preference of firm to build its reserve debt capacity by generating funds internally if it was profitable. He argues that in the presence of asymmetric information and the resulting market misvaluation of equity, firms will avoid equity issuance and

turn to debt which is less subject to the adverse selection. According to Allen (1993), the amount of debt needed will be determined as the residual between the desired investment and the supply of retained earnings. He concludes that these findings are consistent with Baskin in US.

Building on Baskin (1989) and Allen (1993), Adedji (1998) provides evidence supporting pecking order theory in the UK market. Adedji (1998) investigates the possible interaction among investment, leverage and dividend payout ratio. The results show that dividend payout ratio had the predicted negative interaction with investment and the expected positive interaction with financial leverage.<sup>26</sup> No significant interaction between leverage and investment is found. However, Adedji (1998) finds that the effect runs only from investment to leverage. This conclusion supports the argument that firms use debt funds only to accommodate the desired investment as it has been argued by Allen (1993) in Australia and Baskin (1989) in the US. Finally, he concludes that the nature of the relationship between leverage either to dividend or to investment is influenced by the way a firm responds to its earnings shortage.

By using the same methodology used in the above study, Tong and Green (2005) test the predictions of pecking order theory using data from the Chinese market. They find a significant negative relationship between leverage and profitability and a significant positive relationship between leverage and past dividend. Tong and Green (2005) argue that their findings support the pecking order theory over trade-off theory.<sup>27</sup> Therefore, they conclude that pecking order theory will be capable of explaining the financing behaviour of Chinese companies, although the sample size was not too large, with 42 firms being included in their study sample. Moreover, they conclude that the conventional model of leverage can explain the financing behaviour in the Chinese market.

Syam – Sunder and Myers (1999) test the pecking order theory and trade-off theory in the US market. For pecking order theory, they regress the firm's net debt issues on its

---

<sup>26</sup> Paying dividend will reduce the amount of internal funds available for financing, implying a negative relationship between dividend pay out and investments. However, firms with more profitable projects may tend to reduce dividend to get enough funds for financing which reduce the need for raising debt. This suggests a negative relationship between dividend pay out and investments and a positive relationship between dividend payout and leverage.

<sup>27</sup> Trade-off theory predicts a positive relationship between leverage and profitability and a negative relationship between leverage and investment opportunities which is contrary to what is predicted by pecking order theory.

net financing deficit. They find that the estimated coefficient on the deficit variable is close to one. Syham – Sunder and Myers (1999) interpret this result as evidence supporting pecking order theory because a shortfall in funds is first met by debt. Furthermore, they find that the power of trade-off theory in explaining new debts issues is better than pecking order theory because when the pecking order model and trade-off model are nested in the same regression, all cases of pecking order model are rejected (they use the net financing deficit as an additional explanatory variable in their trade-off theory model). However, their study is criticised on the ground of its assumption and sample selection criteria.

Chirinko and Singha (2000) argue that the assumption that the coefficient of deficit regressed on the net change in total debt, should be close to one is neither a necessary nor a sufficient condition for the pecking order theory to be valid. Therefore, they question the interpretation of Shyam-Sunder and Myers (1999) regression test. Chirinko and Singha (2000) claim that the slope coefficient could fall well short of unity when the pecking order theory holds and be close to unity when it does not. This is because equity issues may create a degree of positive and negative bias in the Shyam-Sunder and Myers (1999) test. They show that the predicted regression coefficient of deficit is actually 0.74 rather than one for the firms that actually follow the pecking order theory, but they issue an empirically observed amount of equity. This amount of bias is not trivial, but it still leaves the coefficients very far from the magnitudes of slope coefficients that are observed. Furthermore, Chirinko and Singha (2000) explanation implies that finding a coefficient near one would not disprove trade-off theory.

Frank and Goyal (2003) who investigate the pecking order theory in US market, contend that Shyam-Sunder and Myers' study sample is biased towards large firms. They vindicate their criticism on the ground that the pecking order theory appears to perform particularly poorly amongst small firms, for which adverse selection problem of raising external equity might have been expected to be most relevant. Adedeji (2002) points out that the sample selection procedures used in the study of Shyam-Sunder and Myers (1999) could have biased the results toward the pecking order hypothesis. However, Shyam-Sunder and Myers (1999) already pointed out that the bias might exist but they claim that this bias is trivial because the predictions of the pecking order theory are the same for all sizes.

Another criticism of Shyam-Sunder and Myers (1999) and of those who also test the pecking order theory (i.e. Frank and Goyal, 2003; Nuri and Archer, 2001) is that they

assume that pecking order theory pays no attention to the sign of deficit variable. So they use the positive and negative values of deficit in one variable in their regressions. Pecking order theory predicts that firms respond differently to financial surplus and deficit. More specifically, firms tend to expand debt when they have financial deficit and retire debt when they have financial surplus. However, financial surplus may not necessarily be used up to retire debt; in contrast, shareholders may force managers to employ debt to soak up surplus (free cash flow) which suggests that financial surplus and deficit affect the change in debt level similarly, not differently. Moreover, even if they affect the change in total debt differently, the impetus of expanding debt for financing may differ from that of retiring debt for soaking up surplus. As mentioned before, leverage expansions may be constrained by the availability of debt at attractive rates and also by borrowing constraints such as the bankruptcy and agency risks. It is also affected by the stock price level, i.e. when stock prices are overvalued; firms tend to finance their financing requirement by issuing equity, reducing the impetus to raise debt, especially when expanding debt involves higher costs of bankruptcy and assets substitution problems. Hence, including the negative values (surplus amounts) with positive values in the same variable may lower the estimated coefficient of the deficit variable in their regressions. Although Adedeji (2002) does not investigate how sensitive the firms are to their financial surplus and deficit, he provides evidence suggesting that considering the negative values with positive values in the same variable has reduced the estimated coefficient of deficit variable.

Using Shyam-Sunder and Myers (1999), Adedeji (2002) tests the prediction of pecking order theory in the UK market. The result showed that new debt issues did not have a one-to-one relationship with firms financing deficit as pecking order theory suggests where new debt issues financed only 22% of financing deficit. Adedeji (2002) retests the pecking order model by considering only the positive values of financial deficit in the regression and sets the negative values equal to zero (the new variable is named as the adjusted deficit variable). Adedeji (2002) argue that these amounts are not internal funds deficits or requirements for external finance to be covered by issuing debt. The results showed that excluding the negative values (surplus amounts) from the deficit variable increased the estimated coefficient on the deficit variable from 22% to 39%, implying that including negative values can reduce the effect of deficit variable on the dependent variable which is the change in total debt level.

In another study, Frank and Goyal (2003) propose a model to test the pecking order theory on a broad cross-section of publicly traded US firms. The model suggests that the existence of pecking order theory requires new debts issuance to have a one to one relationship with all of the components of the financing deficit. Frank and Goyal (2003) claim that pecking order theory implies that the financing deficit should eliminate the effects of other explanatory variables. They find that the estimated coefficient on the deficit variable is far below one and that equity issues track the financing deficit quite closely while debt did not that so. Moreover, they claim that if the pecking order theory is held, the deficit variable should overwhelm the effects of the other explanatory variables in the conventional leverage equation. However, Frank and Goyal (2003) find that adding the deficit variable to the convention leverage regression does not change the sign and the significance of other explanatory variables, implying that the adverse selection costs is one among other factors affecting the firm's financing behaviour. Finally, French and Goyal conclude that the pecking order theory is more applicable to large firms than small firms, since their sample of large firms provides more support for the pecking order than their small-sample firms.

Using data from UK and Spanish markets, Benito (2003) examines the propensity of a firm to issue debt and equity as a function of its financial characteristics such as cash flow and investment. Benito contended that a higher cash flow firms tend to use low levels of debt while the higher investment level will increase it need for debt funds. The results have revealed that debt is largely responsive to cash flow and investment as pecking order theory suggests in both countries. He found that debt varies negatively with profitability and positively with investment. Although the UK and Spain follow different financial systems (market-based system in UK and bank-base system in Spain), the behaviour of UK and Spain firms is consistent with the existence of a hierarchy of finance. Therefore, Benito (2003) concludes that the results for both countries are in the line with pecking order theory over the trade-off theory.

Using data of small and large US companies, Mayer and Sussman (2003) provide evidence consistent with both trade-off theory and pecking order theory at the same time, they found that large firms fund large investment projects with debt while small firm tend to use equity. They argue that funding large projects shift firms away from their prior levels of leverage which is consistent with the implication of pecking order approach where capital structure responds to their investment financing needs. Mayer and Sussman (2003) found little impact of the previous levels of leverage on a firm's

financing patterns, where firms give the priority to debt over equity when external funds are needed. Furthermore, the profitable large firms prefer debt to equity and increase debt according to their financing requirements. Although Mayer and Sussman (2003) found that new equity issues are generally associated with loss-making small firms, they also found that when both small and large firms encounter losses and debt would take them to the dangerous levels of leverage, issuing equity would be their financing choice. This result is in the line with Myers (2001) who contends that equity issues occur only when debt is costly. Finally they argue that firms revert to their previous levels of leverage in the long run consistent with predictions of static-trade-off-theory. Therefore, Mayer and Sussman (2003) conclude that the combination of trade-off and pecking order theories provide a good description of firms financing behaviour in the short run and longer run dynamics.

In a survey study, Mayer (1990) examines the source of industry finance in eight developed countries<sup>28</sup> and reveals a number of stylised facts regarding corporate financing behaviour, which support the existence of financing hierarchies. He finds: (1) retentions are the dominant source of financing in all countries; (2) the average firm in any of these countries does not raise substantial amounts of financing from securities markets in the form of short term securities, bonds, or equity; (3) small and medium size firms are considerably more reliant on external finance than large firms; and (4) the majority of external financing comes from bank loans in all countries. Mayer found evidence that bank loans are the primary source of external finance for firms in developed countries. He interprets his findings as showing that banks perform a central function in eliminating asymmetric information in financial markets by playing a vital role in collecting and processing information that markets are unable to do or only do so at high cost.

In another survey conducted by Beattie *et al.* (2006) of 831 finance directors in industrial and commercial UK listed firms, they found that 60% of responding directors argued that they follow the financing hierarchy, where internally generated funds through retention are the preferable source of financing, followed by debts. Beattie *et al.* (2006) found that UK companies tend to adopt pecking order approach if the information and transaction costs are significantly large. When internally generated funds become insufficient for financing, the company turns to raise debt funds to meet the finance requirement. Moreover, the survey results showed that investment

---

<sup>28</sup> These countries are Canada, Finland, France, Germany, Italy, Japan, United Kingdom, and USA.

opportunities and dividend pay-out determine the amount of external financing requirement as the pecking order theory suggests. The long term target dividend pay-out is set based on the firm's profitability and growth opportunities so that the need for external financing is minimised. The results also showed that 88% of responding directors agreed that they consider the market response to new issues of debt and equity. This implicitly suggests that the information asymmetry is accepted by respondents as a determinant of capital structure in UK market.

Recent studies have been conducted by Flannery and Rangan (2006) and Huang and Ritter (2007) using the models proposed by Frank and Goyal, 2003 and Shyam-Sunder and Myers (1999) provide evidence suggesting that equity issues track the financing deficit of the US firms quite closely, implying that debt financing does not govern equity financing as pecking order theory predicts. The findings of these studies are consistent with the finding of Frank and Goyal (2003) in the same market. However, these studies find that firms tend to finance a large proportion of their financing deficit by equity when the price of equity is overvalued. This finding supports the view of Myers and Majluf (1984) that firms issue equity when the cost of equity is relatively low. However, they claim that the effects of pecking order considerations on the capital structure are swapped by reversion toward firm specific target leverage.

To the best of the researcher's knowledge, there is no study available and tests the pecking order theory in the Jordanian context by using the models proposed in literatures. The only previous work on the practice of Jordanian firms in financing their capital expenditures was undertaken by Rawashdeh and Quadah (1997). The financing alternatives examined in this study are retained earnings, debt, and external equity. Their results show that insurance companies finance their capital expenditures mostly through internal sources; services companies finance their capital expenditures through debt; while industrial companies use both sources (retained earnings and debt) because retained earnings are not enough to finance all their investment needs. They conclude that this behaviour is consistent with the pecking order theory, ranking the financing alternatives in order: retained earnings, debt and equity issues.



## 2.4 Conclusions

The literature review in this chapter is classified into two groups. The first examines the determinants of optimal capital structure and trade-off (target adjustment) theory, whilst the second examines pecking order theory and also provides the theoretical background of both trade-off (target adjustment) theory and pecking order theory.

The review has raised at least four important points or gaps in literature. First, there are virtually no studies dedicated to test the hypothesis of asymmetric adjustment toward the target leverage ratio. Empirical literature has examined the trade-off theory on the basis of symmetric adjustment costs and benefits. However, as mentioned before, the adjustment costs of increasing and reducing leverage ratio may not necessarily be symmetric. As well the benefits of increasing leverage when firms are below their target leverage ratio may differ from that of reducing leverage when they above their target. An understanding of how firms behave when they have above and below-target leverage ratio is important because it explains why some studies report high rates of adjustment while the other studies report low rates.

Second, empirical studies generally focus on investigating the trade-off theory while they ignore the possibility that leverage adjustment toward the target leverage ratio may occur in the manner proposed by the pecking order theory. An understanding of how firms adjust their leverage when firms have financial surplus or deficit is also important because it helps to determine whether the firms adjust leverage immediately to offset the effects of the accumulation of earnings and losses or for other considerations such as the bankruptcy risks of surplus and deficit

Third, empirical studies generally focus on investigating the pecking order theory when firms face financial deficit only, while they ignore its predictions regarding the firms' financing behaviour when they face financial surplus, not deficit. Moreover, no studies investigate how sensitive firms are to their surplus and deficits or whether they respond to surplus and deficit similarly or differently. An understanding of how firms respond to and how sensitive they are to surplus and deficit is very important too because it helps determine whether the firms respond to surplus in a manner proposed by pecking order theory or agency theory. It also helps determine whether the impetus of reducing leverage when firms have surplus is similar to or different from that of increasing leverage when they have deficit.

Finally, the pecking order theory and target-off theory are widely tested in the context of developed countries, while little evidence is available from developing countries. The current study tries to fill these gaps in literature by testing the pecking order and trade-off theories in the Jordanian context.

## CHAPTER 3- EMPIRICAL INVESTIGATION OF DETERMINANTS OF CAPITAL STRUCTURE

### 3.1 Introduction

In the previous chapter, we presented the theoretical framework and empirical evidence of the most influential theories of capital structure; the pecking order theory and the trade-off (target capital) theory. In general, the existing empirical research on the issue of capital structure choice has analysed the role of firm-specific characteristics that represent taxation, bankruptcy costs, agency costs, information asymmetries. However, the extant empirical research on this field has been restricted to the US and other developed countries, and received little attention in developing countries where capital markets are small, less developed, less competitive and suffering from the lack of compatible regulations and sufficient supervision.<sup>29</sup> Different views (i.e. Mayer, 1990 and Kunt and Maksimovic, 1994) have suggested that the financial decisions in developing countries are somehow different from those of developed ones because of their institutional differences such as the level of transparency and investor protection, besides the bankruptcy and tax laws. In light of this argument, the lessons learned from one business environment cannot be generalised to countries with different legal and institutional framework, increasing the need to address the issue of determination of capital structure in small and less developed counties.

An investigation of the determination of the capital structure choice in developing countries helps determine whether the capital structure choice in these countries is related to factors similar to those influencing the capital structure choice in developed countries. This may also indicate how much more severe the market frictions are in developing countries.<sup>30</sup> Furthermore, while the extant empirical research has focused on the suggestions of the trade-off theory in interpreting the results obtained regarding the determinants of capital structure, an obvious extension to this study is to introduce the possible explanations that might be relevant in the context of pecking order theory,

---

<sup>29</sup> Only in recent years, a few studies have addressed the use of capital structure choice in developing countries, i.e. Booth *et al* (2001); Chen (2004); and Singh (1994)

<sup>30</sup> Although the fact that developed countries have woken up early to asymmetric information and agency problems, there is evidence suggesting that the market frictions still one of the main problems in these countries, although their capital markets are more developed and highly competitive ( see, Fazzari *et al* (1988) and Charton *et al* (2002).

which may provide reasonable explanations as to why the previous empirical studies vary in the variables' signs.

Jordan provides an ideal ground for examining the most influential theories of capital structure, the pecking order theory and the trade-off theory and their implications for developing countries.<sup>31</sup> The Jordanian capital market is has recently adopted an advanced trading pattern. It also seeks to model itself as a regional capital market. Moreover, extensive efforts and measures have been taken to move toward the free market and integrate this market into the world market. As a result, substantial transformation of the institutional set-up within which firms have been operating, has given more flexibility to the Jordanian financial managers in choosing the capital structure of the firm. This adds another motivation to conduct this study. Therefore, this chapter continues the theme of capital structure and investigates the determinants of optimal leverage for Jordanian firms listed on the Amman Stock Exchange (ASE) during the period 1997-2005. The chapter is structured as follows: section 3.2 presents determinants of the capital structure, theoretical background and defines variables. Section 3.3 reports and discusses descriptive statistics, while section 3.4 discusses the estimation results of the empirical models, with a conclusion.

### **3.2 Determinants of Capital structure and Model**

This section is divided into two sections. Section 3.2.1 explains the determinants of capital structure, their background and definitions. Section 3.2.2 presents the empirical model.

#### ***3.2.1 Determinants of Capital Structure and theoretical background and definition***

A substantial amount of research has been carried out on the determinants of capital structure.<sup>32</sup> Most of these empirical studies employ models which involve the regression of the observed leverage ratio against a number of explanatory variables. Typically, the explanatory variables include; profitability, asset structure, size, non-debt tax shields,

---

<sup>31</sup> The previous studies that have conducted a comparative analysis of capital structure choice in developing countries use data from Jordanian market (i.e. Kunt and Maksimovic, 1994; Booth *et al*, 2001; Chen, 2004; and Singh, 1994)

<sup>32</sup> Titman and Wessels (1988); Harris and Raviv (1991); Rajan and Zingales (1995); Bevan and Danbolt (2002, 2004); Chen, 2004; Booth *et al* 2001 and Eriotis, (2007), amongst others.

growth opportunities and earnings volatility.<sup>33</sup> For the purpose of this analysis, this study measure leverage as the total debt divided by total assets. In fact various capital structure theories have not specified which leverage measurement should be used (see, Ragan and Zingales, 1995). However, the vast amount of exact research on the issue of capital structure choice has employed this measure for leverage. In what follows, we explain the theoretical relationship between leverage and the variables that suggested in literature as determinants of the optimal leverage ratio.

### **3.2.1.1 Profitability**

Capital structure theories have different views on the relationship between leverage and profitability. In their seminal paper, Modigliani and Miller (1963) argue that firms generally prefer debt for tax considerations. Profitable firms would, therefore, employ more debt because increased leverage would increase the value of their debt tax shield.<sup>34</sup> In addition to the tax advantage of debt, agency and bankruptcy costs may encourage highly profitable firms to have more debt in their capital structure. This is because highly profitable firms are less likely to be subject to bankruptcy risk because of their increased ability to meet debt repayment obligations. Thus, they will demand more debt to maximise their tax shield at more attractive costs of debt. Moreover, managers of highly profitable firms may have excess cash to consume more perquisites, or to invest in less profitable projects for the firm, but more in their own interests (Jensen and Meckling, 1976 and Jensen, 1986). High debt may reduce the agency costs of free cash flow because the interest burden reduces the amount of funds available under management control. For these considerations, the trade-off theory predicts a positive relationship between leverage and profitability.

However, the pecking order theory of Myers and Majluf (1984) and Myers (1984) predicts the opposite. It predicts a negative association between leverage and profitability because high profitable firms will be able to generate more funds through retained earnings and then have less leverage. Compared with debt and equity, retained

---

<sup>33</sup> Some variables are excluded from this analysis such as R&D expenditures (the data is not available), tax shields ( we tests for the effect of tax shields as one of the main determinants of leverage, but the results provide evidence suggesting that their effect is not statistically significance. Therefore, we use non-debt tax shields in stead of using tax shields.

<sup>34</sup> Fama and French (1998) and Panno (2003) argue that the gain from leverage is surely higher for more profitable firms. So they conclude that in Modigliani and Miller's (1963) tax model, profitability is the main determinant of leverages, and a positive relationship between profitability and leverage is predicted. Modigliani and Miller (1963), however, ignore the agency and bankruptcy costs of debt which may outweigh the tax benefit of debt, and therefore reduce the firms' incentive to generate more debt.

earnings have no adverse selection problem, and hence, they are the cheapest source of finance.<sup>35</sup> However, when outside funds are necessary, firms prefer debt to equity because of lower information costs associated with debt issues. We test these two contradicting predictions by examining the relationship between leverage and the profitability of Jordanian firms. Following Titman and Wessels, (1988); Rajan and Zingales, (1995), we use the ratio of earnings before interest and taxes to the total assets as a measure of profitability.

### **3.2.1.2 Tangibility**

The tangibility of assets represents the effect of the collateral values of assets on the firm's leverage level. The underlying argument behind the use of tangible assets as collateral for debt is the higher liquidation value of these assets in the event of financial distress or bankruptcy (Rajan and Zingales, 1995). The risk of lending to firms with more tangible assets is expected to be low and, hence, lenders will demand a low risk premium. Furthermore, firm's opportunities to engage in asset substitution can be reduced by issuing secured debt. As Jensen and Meckling (1976) and Myers (1977) point out, shareholders of levered firms may have an incentive to invest sub-optimally in order to expropriate wealth from the firm's bondholders which gives rise to conflict between shareholders and debt-holders. If the debt can be collateralised, the borrower is restrained or limited to use the funds for a specified project, reducing the agency costs of asset substitution and hence, the costs of debt. Therefore, the trade-off theory predicts a positive relationship between leverage and the tangibility of assets.

In their asymmetric information approach, Myers and Majluf, (1984) conclude that issuing debt secured by property, avoids the costs associated with issuing shares. This suggests that firms with more collateralised assets (fixed assets) will be able to issue more debt at an attractive rate as debt may be more readily available. This results in a positive association between leverage and tangibility. We test the predictions of the trade-off theory and pecking order theory in the Jordanian market by investigating the relationship between leverage and tangibility. Following Rajan and Zingales (1995) and Bevan and Danbolt, (2004), we use the ratio of fixed assets to the total assets as a measure of tangibility.

---

<sup>35</sup> The adverse selection problem arises when the outside investor fund the "wrong" firm due to the insufficient information about the firm.

### **3.2.1.3    *The firm's Size***

There is considerable empirical evidence that firm size plays a key role in the capital structure decision. The most obvious explanation relies on the bankruptcy costs which are related to the firm size (Warner, 1977). Warner (1977) argues that there are “scale economies” regarding bankruptcy costs, such that these costs constitute a larger proportion of the firm’s value as that value decreases. Consistent with this view, Titman and Wessels (1988) argue that large firms are more diversified and less susceptible to bankruptcy than smaller ones. This suggests that firm size is an inverse proxy of the probability of bankruptcy and, hence, larger firms have higher debt capacity and can borrow at more favourable risk-adjusted interest rates than smaller firms. Consequently, the trade-off theory predicts a positive relationship between leverage and the size of firm.

Size can be regarded as a proxy for information asymmetry between managers and outside investors. Large firms are subject to more news than small firms because the investment community would be more concerned with gathering and providing information about large firms (Kadapakkam *et al.*, 1998). This makes large firms more closely observed by analysts and less subject to information asymmetry than small firms. Thus, they should be more capable of issuing equity which is more sensitive to information asymmetry and have lower debt (Rajan and Zingales, 1995). This suggests a negative association between leverage and the size of firm.

We test these two contradicting predictions of the trade-off and pecking order theories in the Jordanian market by examining the relationship between leverage and the size of firm. Following Titman and Wessels (1988) and Rajan and Zingales (1995), we use the natural logarithm of total assets as proxy for the size of the firms.

### **3.2.1.4    *Non-debt tax shields***

The trade-off theory suggests that the main advantage of borrowing is the tax advantage of interest payment. Therefore, firms that are subject to corporate tax will increase their leverage in order to reduce their tax bill (Modigliani and Miller, 1963). However, firms with other tax shields, such as depreciation and investment tax credit deductions, will have less incentive to increase leverage for tax considerations. This is because these deductions are independent of the way a firm chooses to finance its investments, whether it uses debt or not (Ozkan, 2001). Therefore, firms with tax deductions for

depreciation and investment tax credits can consider these deductions as a substitute for the tax shield. Furthermore, the existence of non-debt tax shields makes leverage more expensive because the marginal tax savings from an additional unit of debt decreases with increasing non-debt tax shields (DeAnglo and Masulis, 1980). This is because of the probability of bankruptcy increases with leverage, which makes the marginal benefit low. Ross (1985) supports this view. To test the prediction of trade-off theory in the Jordanian market, we test the hypothesis that leverage and non-debt tax shields are negatively related. Following Titman and Wessels (1988) and Ozkan (2001), we use the ratio of annual depreciation to total assets as a proxy for non-debt tax shield.<sup>36</sup>

### **3.2.1.5 Growth opportunities**

Growth opportunities represent the expected growth of firm's intangible assets that is created by managerial skills, goodwill and competence. Since these assets have no collateral value and decline rapidly in value if bankruptcy or financial distress occurs, this will lower the ability of firms to raise their debt financing and consequently, going toward equity financing as suggested by Titman and Wessels (1988) and Rajan and Zingales (1995). Furthermore, the agency costs are higher for growing firms because they have more flexibility in choosing their future investments and thus to expropriate wealth from banks and bondholders (Titman and Wessels, 1988). As a result, lenders will demand higher risk premium if the debt is not collateralized, making debt more expensive. For these considerations, the trade-off theory predicts a negative relationship between leverage and growth opportunities.

However, the pecking order theory of Myers and Majluf (1984) and Myers (1984) predicts that leverage and growth are positively related. For growing firms, internal funds may be insufficient to finance their positive investment opportunities and, hence, they are likely to be in need of external funds. According to the pecking order theory, if external funds are required, firms will prefer debt to equity because of lower information costs associated with debt issues. This results in a positive relationship between leverage and growth opportunities. We test the two conflicting predictions of the trade-off theory and pecking order theory by investigating the relationship between leverage and growth opportunities. Following Rajan and Zingales (1995) and Bevan and

---

<sup>36</sup> Ozkan (2001) point out that this proxy for the non-debt tax shield may be taken as a proxy of growth option or tangibility, since firms with high depreciation ratio are expected to have relatively high growth option and more tangible assets. This would imply a positive association between non debt –tax shield and leverage.



Danbolt (2002, 2004), we use the ratio of market-to-book value as a proxy for growth opportunities.

### **3.2.1.6 Earning Volatility**

Firms with high earnings volatility face a risk of the earnings level dropping below their debt servicing commitments, thereby incurring a higher cost of financial distress (Bhaduri, 2002). Accordingly, these firms should reduce their leverage level to avoid the risk of bankruptcy or to rearrange their funds at high cost. Therefore, the trade-off theory predicts a negative relationship between leverage and the volatility of a firm's earnings. The pecking order theory allows the same prediction, but the reasoning is different. In the context of this theory, firms with high earnings volatility try to accumulate cash during good years to avoid under-investment problems in the future (Myers, 1977). As DeAnglo and Masulis (1980) point out, an adverse selection problem is more severe to firms with highly volatile earnings. To avoid adverse selection problem, firms with financial surpluses should retire debt or invest in cash or marketable securities, to preserve their debt capacity for future financing needs or to avoid issuing equities at higher costs (Myers, 1984). This results in a negative association between leverage and earnings volatility.

We test the prediction of both theories in the Jordanian market by examining the relationship between leverage and earnings volatility. Following Titman and Wessels (1988), we use the standard deviation of return on assets as measure of volatility of earnings, where the return on assets for each year is measured by the ratio of earnings before interest and taxes to the total assets.

Table 3.1 summarises the predictions of trade-off theory and pecking order theory for the relationship between leverage and the variables which are suggested as determinants of optimal leverage. As can be seen, pecking order theory and trade-off theory have no common predictions for most of the proxy variables.

**Table 3.1: The theoretical sign of the proxy variables.**

Variables	Trade-off theory	Pecking order theory
Profitability	Positive	Negative
Tangibility	Positive	Positive
Size	Positive	Negative
Non-Debt tax shields	Negative	-
Growth opportunity	Negative	Positive
Volatility	Negative	Negative

\*\*This table is constructed depending on the theoretical discussion of the variables included in model (3.1) as presented in section (3.2.1)

### 3.2.2 *The Model*

We employ the following static model to investigate the determinants of optimal leverage ratio for listed Jordanian firms on the Amman Stock Exchange. In this model, the observed leverage is modelled as a function of various firm-specific factors. The time and industry dummy variables are also included in the model to capture the time- and industry-specific effects on leverage.<sup>37</sup> We test the model using alternative techniques: pooled and panel analysis.<sup>38</sup> Panel data which are usually estimated by fixed and random effects techniques, helps capture the effects of the firm-and time-specific heterogeneities.<sup>39</sup>

---

<sup>37</sup>We test for the industry effect by using industry dummy variable. However, the results show that the estimated coefficient on the industry dummy variable is statistically insignificant, suggesting that Jordanian firms experience the same financing behaviour regardless of the firm's sector. This, besides the small size of services and industrial sample are the reasons for not testing optimal leverage of industrial levels. It is also the reason for not testing the target reversion rates of industry levels in chapter 5.

<sup>38</sup>As Gujarati (2003, p637) points out, panel data give more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency. Moreover, they are better suited to study the dynamics of change.

<sup>39</sup>This is shown clearly in Bevan and Danbolt (2004) who extend their work of 2002 by using pooled and panel data analysis, finding a significant difference between the results for pooled and panel analysis. The reason for this is the effect of the time and firm-specific heterogeneity that is not considered in pooled OLS model. Chen (2004) and Eriotis, *et al.* (2007) find the same difference (pooled and panel techniques are briefly discussed in chapter one-section 1.4).

The model:

$$LEV_{it} = \beta_0 + \beta_1 PRO_{it-1} + \beta_2 TAN_{it-1} + \beta_3 SZ_{it-1} + \beta_4 NDT_{it-1} + \beta_5 GR_{it-1} + \beta_6 VOL_{it-1} + \varepsilon_{it} \quad (3.1)$$

Where  $LEV_{it}$  is the leverage ratio of firm  $i$  in year  $t$  and measured by the ratio of total debt (short term and long term) to total assets.  $PRO_{it}$  (Profitability),  $TAN_{it}$  (Tangibility),  $SZ_{it}$  (Size),  $NDT_{it}$  (Non-debt tax shields),  $GR_{it}$  (Growth),  $VOL_{it}$  (Volatility) are the explanatory variables and as measured in section (3.3.1). Following Tong and Green (2005); Flannery and Rangan (2006) and Bevan and Danbolt (2004), the study uses the one year lag value of each explanatory variable to avoid the causality between leverage and its determinants. The testable null hypothesis under the static model 3.1 ( $H_0$ ) is that all slope coefficients of explanatory variables are jointly equal to zero, while the alternative hypothesis ( $H_1$ ) is at least one slope coefficient (beta) is not equal to zero.

### 3.3 Statistical analysis

This section consists of two subsections where section 3.3.1 shows the descriptive statistics of the variables. Section 3.3.2 shows and discusses the empirical results.

#### 3.3.1 Descriptive statistics

The descriptive statistics are reported for the pooled sample of firms listed on Amman Stock (ASE) over the period of 1997-2005. The study is confined to 114 non-financial (62 industrial companies and 52 services companies) that have been continuously listed on the Amman Stock Exchange (ASE) during the period of study.<sup>40</sup> The data collected was for firms that had published data continuously for at least 9 years and had not changed their financial years (the financial year starts at 1/1 and ends at 31/12). Consequently, if a firm is new or its past information is unavailable, the firm may not have the necessary 9- year period required for this study, it would not appear in the

---

<sup>40</sup> This number corresponds to 55.61% of all companies listed on ASE at the end of year 2005 and 71.25% of all non- financial companies listed at the end of year 2005, making the study sample consists of significant proportion of listed companies in the ASE during the nine-year-period 1997- 2005. This sample will be used later on chapter 4 and 5 for testing pecking order and target adjustment theory.

sample (the criteria that the current study applied to select the study sample are briefly discussed in section 1.4). Hence, 45 financial firms and 46 non-financial firms (22 industrial companies and 24 services companies) are excluded. The data extracted from the firm's annual reports, and from Amman Stock Exchange's publications (The Yearly Shareholding Companies Guide and Amman Stock Exchange Monthly Statistical Bulletins).<sup>41</sup> Table 3.2 reports descriptive information for the full sample of firms used in this study. It contains the mean values and standard deviations and the minimum and maximum values of the key variables used in the study.

The results presented in Table 3.2 show that leverage has a mean value of 0.283 and standard deviation of 0.209. It is interesting to compare the level of leverage in this study with the results reported by some of the studies that have been conducted in the context of developed countries. Rajan and Zingales (1995) report that U.S and German firms have similar mean leverage of around 0.38 and for the UK, Adedeji (1998) reports a mean leverage of 0.38. However, in a more recent time period, Hovakimian *et al.* (2001) and Flannery and Rangan (2006) in the US report a mean leverage of around 0.25 and 0.27 respectively, suggesting that US firms have changed their financing behaviour from debt to equity or retained earnings. The mean leverage in this study is quite similar to what is reported in developed countries.

**Table 3.2 : Descriptive statistics of dependent and explanatory variables**

**N=114 company**

Variables	Mean	Std.Dev	Min	Max
LEV	0.283	0.209	0.008	0.922
PRO	0.089	0.105	-0.587	0.826
TAN	0.325	0.241	0.001	0.902
SZ	16.334	1.202	14.064	20.178
NDT	0.038	0.041	0.012	0.376
GR	1.525	.863	0.653	14.365
VOL	0.031	0.035	0.0034	0.281

**Notes:** Leverage (LEV) is the short and long term debt over total assets. Profitability (PRO): earning before interest and taxes over total assets. Tangibility (TAN): net fixed assets over total asset. Size (SZ): the natural logarithm of total assets. Non-debt tax shields (NDT): depreciation expenses over total assets Growth (GR): the market to book ratio. Volatility (VOL): the standard deviation of earning before interest and taxes.

<sup>41</sup> Data is readily available in the form of CD and on the website of the Amman Stock Exchange. To insure the accuracy of the data, we compared the collected data from the firm's annual reports, and Amman Stock Exchange's publications (The Yearly Shareholding Companies Guide and Amman Stock Exchange Monthly Statistical Bulletins). with those available on CDs and on the website.

It also shows that firms on average faced low profitability where the mean value is amounted to 0.089 with standard deviation of 0.105. The profitability variable shows a high deviation in its observations with minimum value of -0.589 and maximum value of 0.826. These figures are normal results for the sampled firms in the study, where most of the firms in the Jordanian market are largely affected by the political conditions in the Gulf area and Palestine. After Iraq invaded Kuwait in August 1990, Jordan was subjected to isolation by the Arab Gulf States because it refused to join the international alliance opposing Iraq and kept close ties with this country. Consequently, the primary markets of their products are largely affected, resulting in decreasing exports to Gulf country markets (Export and Finance Bank, 2002a). The growth variable, which is measured by the market to book ratio, shows a mean value of 1.525 with standard deviation of 0.863. Tangibility which is measured by total net fixed assets divided by total assets has a mean value of 0.325 with 0.241 standard deviation value.

It is possible that the selected explanatory variables may be correlated, so the chosen proxies may actually measure the effects of several different variables. To address this problem the study tests for the multicollinearity (which is generally referred to the correlation among two or more independent variables). The presence of multicollinearity, makes the estimation and hypothesis testing about individual coefficients in regression not possible (Gujarati, 2003). This is because multicollinearity makes the regression coefficients undefined or unstable and the standard errors for the coefficients wildly inflated, making these coefficients significantly not different from zero. Moreover, variables may be dropped from the regression, not because they have no effects, but because the sample is inadequate to isolate the effect precisely. In other words, it becomes difficult to identify the separate effects of the variables. This result occurs despite possibly high  $R^2$  and highly significant F statistic.<sup>42</sup>

The Variance Inflation Factor (VIF) is a commonly used for assessing multicollinearity problems. It shows the degree to which each independent variable is explained by other independent variables. As a rule of thumb, a VIF greater than 10 indicates the presence of harmful collinearity (Gujarati, 2003). The results of VIF show that the mean VIF for all the variables included in the model is 1.20, since the VIF for all variables are ranged

---

<sup>42</sup> A tip-off of multicollinearity problem is a regression with high  $R^2$  and highly significant F statistic, but virtually no significant *t*-statistics on the individual coefficients. Hence, if *t*-statistics are significant, then even with a high  $R^2$ , we need not worry about multicollinearity (Gujarati, 2003).

between (1.01 – 1.37) which indicates that the model does not suffer from any multicollinearity problem.

**Table 3.2: Correlation Matrix**

Variable	PROF	TANG	SZ	NDTS	GRO	VOL
PRO	1.000					
TAN	0.163 (0.000)	1.000				
SZ	0.097 (0.003)	0.155 (0.000)	1.000			
NDT	-0.325 (0.000)	0.352 (0.000)	-0.047 (0.155)	1.000		
GR	0.079 (0.023)	-0.002 (0.964)	0.026 (0.466)	-0.058 (0.103)	1.000	
VOL	0.388 (0.000)	-0.010 (0.755)	-0.094 (0.005)	-0.109 (0.001)	0.018 (0.622)	1.000

Another technique for detecting multicollinearity is through the use of a correlation matrix. A high correlation between two of the independent variables may indicate the presence of collinearity. However, the problem here is that there is no agreement when correlation is too high. Kennedy (1998) claims that an absolute correlation coefficient of 0.80 or 0.90 is a high correlation. Anderson *et al.* (1999) consider an absolute correlation coefficient high if it exceeds 0.70, whereas Brayman and Cramer (2001) consider independent variables in excess of 0.80 may be suspected of exhibiting multicollinearity. This study uses the correlation matrix to provide some explanation to later study findings regarding the empirical investigation of pecking order and target adjustment theory.

Table 3.3 displays the correlations among the explanatory variables for the full sample. Examination of the correlation matrix indicates that a high level of correlation is not found between any two of the independent variables. Moreover, analysis of correlations shows several observations which are noteworthy. Firstly, there is evidence that larger firms are more profitable, less volatile, exhibit lower growth and have more tangible assets. Secondly, growth firms have fewer tangible assets and exhibit more non-debt tax shields.

In addition to multicollinearity, we test for the validity of other assumptions of regression such as homokedasticity, normality, linearity, no serial correlation.<sup>43</sup> The significance of these assumptions stems from the fact that the failure of data to meet these assumptions may lead to abased estimates of coefficient and standard of error. It may make the p values of t-test and F-test invalid. The study uses many diagnostic tests to verify that data have met the assumptions of regression to avoid any misleading results. Since the pooled data are the combination of both time series and cross sectional data, the presence of heteroskedasticity or non-homogeneity of variance of the regression disturbances is likely (Gujarati, 2003). The study uses Breuch-Pagan test to detect heteroskedasticity problem. The test is based on the use of Ordinary Least Square (OLS) residuals regression under the null hypothesis that the variance of the residuals is homogenous.

As heteroskedasticity tests are more sensitive to the assumption of normality, we firstly test for normality using the Shapiro-Wilk W test. It tests the null hypothesis that the residuals are normally distributed.<sup>44</sup> The Shapiro-Wilk W. test provides evidence against the null hypothesis that the residual is normally distributed, implying that some transformation of the variables may be necessary (log transformation).<sup>45</sup> The transformation has improved the result of normality, since it is found to be statistically insignificant, accepting the null hypothesis that residuals are normally distributed (p-value is 0.154). The result of the Breuch-Pagan test for heteroskedasticity implies that the heteroskedasticity problem does not exist for the sample of this study since the chi-square distribution was not statistically significant (it is 0.43 with the p value of 0.511). Consequently, we accept the null hypothesis that the variance of the residuals is homogenous.

For the regression to be statistically well-defined, it also requires the relationship between the response variable and the predictors to be linear because the presence of non-linear effects may decrease the strength of the relationship.<sup>46</sup> Scatter plots were utilised in this study to assess the degree of linearity and to detect any non-linear pattern

---

<sup>43</sup> The study uses Gujarati (2003) and Green (2003) to discuss these assumptions and to choose the appropriate diagnostic test for each assumption.

<sup>44</sup> Normality of residuals is only required for valid hypothesis testing not to obtain unbiased estimates of the regression coefficients. Moreover, it is for the residuals not for the predictor variables. The regression merely requires that the residuals (errors) be identically and independently distributed.

<sup>45</sup> It is worth noting that the failure to meet regression assumptions may lead to biased estimates of coefficients and especially biased estimates of the standard errors.

<sup>46</sup> The importance of this assumption is that the concept of correlation represents only the linear association between variables and non-linear effects will not be represented in the correlation value (Hair *et al.*, 1998).

in the data (their results are not reported). The scatter plots showed an acceptable degree of linearity, taking into consideration that perfect linearity in behavioural association is not possible. As we test for homogeneity and normality of the residuals, we test for the assumption of no serial correlation of the residuals. This assumption implies that the errors associated with one observation are not correlated with the errors of any other observation. For this purpose, we perform the Durbin-Watson Test (DW) for correlated residuals. The DW statistic requires the residuals to be normally distributed (Stata 9.1 provides the direct estimation of DW values) and tests for residuals correlation under the null hypothesis that there is no serial correlation. The result provides evidence suggesting that there is no serial correlation, since d- statistic is found to be 1.932 which is higher than the upper limits (1.842).

### **3.3.2 Estimation results**

Table 3.4 reports the random effects estimation results for the static model 3.1 that the study has developed to investigate the determinants of capital structure in Jordan. As signified by the significant Lagrange Multiplier (LM) and insignificant Hausman tests, the random effects model (which is generally estimated by The Generalized Least Squares) is found to be the preferred specification. In first step, model 3.1 is run without preserving the time series variation in leverage. In the next one, a dummy variable for each year is added to the model as additional explanatory variables.<sup>47</sup> The results show that the explanatory power of model 3.1 is not significantly improved by including the time dummies. They are found to be statistically insignificant and not different from zero as the Wald test does not reject the null hypothesis that all slope coefficients of time dummies are jointly zero.<sup>48</sup> Compared with the restricted model (without time dummies), the magnitudes and significance of estimated coefficients from unrestricted model are not significantly changed.

The main reason for considering the time dummies is to investigate any change in movement over time. The study period has witnessed a remarkable increase in stock prices, the adoption of conservative credit policies by Jordanian banks, freeing interest rates, adopting a flexible policy to manage exchange prices, removing lending limits,

---

<sup>47</sup> The combined time and firm-specific effects in panel data model minimizes the omitted variables bias arising both from unobservable variables that are constant over time and from unobserved variables that are constant across firms (Gujarati, 2003).



accession to the World Trade Organisation (WTO) and Free Trade Agreements with the USA. These transformations with the measures that have been taken to increase the capital market efficiency (i.e. the transparency act and the new Electronic Trading System) have given more flexibility to the Jordanian financial managers in choosing the capital structure of the firm. As 90% of financial liberalization and privatization was achieved at the end of 1990s, the study reinvestigates model 3.1 with a time dummy which equals one for the period 1997-2000 and zero otherwise, instead of using a dummy for each year. The main reasons for segmenting the sample into sub-samples: (1997-2000) and (2001-2005) is to investigate whether these transformations affect the level of firm's optimal capital structure or the rates of adjustment. The estimated coefficient is found to be positive, but statistically not different from zero which suggests that Jordanian firms' optimal leverage ratio does not change over the study period, implying that these transformations may affect the speed rates of adjustment towards the target leverage ratio. This view seems to be relevant in Jordan where the Jordanian bankruptcy and tax acts have not been changed during the period of this study with regards to changing the firms' incentive to change the levels of their target leverage ratios.

As this study uses panel data to investigate the optimal leverage ratio for the full and two sub- sample periods using dataset contains data on 114 firms with different sizes, it is very possible that the residuals are not independent, causing what is known as the heteroscedasticity problem. To detect the heteroscedasticity problem, the study plots the residuals against the size variables. The results suggest that there might be some outliers and some possible heteroscedasticity. Although Breuch-Pagan test for heteroskedasticity does not provide evidence against the null hypothesis that the null hypothesis that the variance of the residuals is homogenous, we use robust standard errors regression cluster option since it may effectively deal with this problem.<sup>49</sup> The robust regression results show that the coefficients and standard errors are quite similar, and the t-values and *p*-values are also quite similar to those obtained without using this option.

---

<sup>48</sup> The F test between the restricted model (without time dummies) and unrestricted (with time dummies) is found statistically insignificant, suggesting that no time effect exists.

<sup>49</sup> It is worth noting that the failure to meet regression assumptions may lead to biased estimates of coefficients and especially biased estimates of the standard errors. As a robust test, the study uses regression with robust standard errors with a cluster option. It can deal with a collection of minor concerns about failure to meet assumptions, such as minor problems about normality, heteroscedasticity, or some observations that exhibit large residuals, leverage or influence.

The results presented in Table 3.4 show that determinants of optimal capital structure in Jordan are generally similar to those documented in the empirical studies in both developed countries and other developing countries.

### **1. Profitability**

Inconsistent with what has been reported in the majority of the literature, profitability is found to be positively related to leverage and statistically significant at the 1% level. This result supports the prediction of trade-off theory over that of pecking order theory. This finding suggests that high profitable Jordanian firms are less likely to experience bankruptcy costs, consequently enabling them to raise more debt at an attractive rate (Tong and Green 2005; Baskin, 1989). An alternative explanation for this result is that Jordanian firms may have the desire to be at their target leverage ratios. Due to their conservative credit policies, Jordanian banks usually offer debt to less risky firms at lower rates of risk premium. Since high profitable Jordanian firms may be less likely to experience bankruptcy costs, this will increase their ability to reduce the costs of moving toward their target. To the extent that is the case, the past firms' profitability is an important determinant in Jordanian banks decision to grant loans to Jordanian firms.

### **2. Tangibility**

The tangibility of assets is found to be positively related to leverage but statistically insignificant. This result is not consistent with the predictions of trade-off and pecking order theories. However, it may support the view of Kunt and Maksimovic (1994) and Booth *et al.* (2001) that markets for long term debt are not effectively functioning in developing countries. For a sample of 114 non-financial firms, the mean value of long-term debt to total debt is found 8.09 percent. This mean is quite similar to the mean value reported by Booth *et al.* (2001). For a sample of 38 Jordanian firms, he reports a mean value of 11.7%. However, the low level of long term debt may suggest that Jordanian firms face high asset substitution problems, increasing the need to use short term debt to avoid the agency costs of asset substitution (Myers, 1977).

**Table 3.3: The estimation results of model 3.1**

(Dependent variable: Leverage ratio)

Independent variable	TD/TA
Intercept	-4.903 (0.000)
PRO	0.148 (0.000)
TAN	0.042 (0.104)
SZ	0.254 (0.000)
NDT	-0.510 (0.008)
GR	-0.339 (0.000)
VOL	-0.829 (0.000)
DM <sub>year</sub>	YES
R <sup>2</sup>	0.48
P-value	(0.000)
N	912
LM test	1887.88 (0.000)
Hausman test	8.57 (0.199)

**Notes:** All independent variables are the same as defined in Table 3.1 and taken by one year lag. YES /NO refers to the inclusion of variables in the regression. Figures in brackets below the coefficient are the probabilities of significance based on the standard errors which are corrected for heteroskedasticity.

### 3. The firm's size

The size of the firm which is measured by the logarithm of total assets is positively related to leverage and statistically significant at the 1% level. This result is consistent with the findings of Rajan and Zingales (1995) and Bevan and Danbolt (2002, 2004), among others. This finding supports the prediction of the trade-off theory over the pecking order theory and suggests that borrowing capacity for Jordanian firms is significantly limited by their bankruptcy or financial distress risks.<sup>50</sup> It also supports the view that larger firms may be more diversified and fail less often. As large Jordanian

<sup>50</sup> The prediction of trade-off theory denotes that larger firms might be less susceptible to financial distress and therefore more able to generate debt at more attractive interest rates (Titman and wessels, 1988).

firms are diversified in their product markets (Gulf markets, Iraq, Palestine, among others), their risk to face financial distress is expected to be low, where the failure of one market can be compensated by another. To the extent that this is the case, this finding implies that the cost of bankruptcy or financial distress is one of the main determinants of the leverage ratio for the Jordanian listed firms.

#### **4. Non-debt tax shields**

Consistent with the prediction of the trade-off theory, non-debt tax shields are found to be negatively related to leverage and statistically significant at the 5 % level. Similar evidence is reported by Ozkan (2001); Banerjee, *et al.* (2000) and Flannery and Rangan (2006). The inverse relationship supports the view that the existence of non-debt tax shields, such as depreciation, reduces the importance of the fiscal advantage of debt and consequently, reducing the need to raise debt for tax consideration. This view seems to be relevant in the Jordanian market where the Jordanian tax law prevents firms from making more tax benefit on debt. It does not allow loss carry backs and hence, it is not important for risky Jordanian firms or for firms that experience losses (Adjusted income tax law, No14. 1995). For these firms, the marginal savings from an additional unit of debt will be low. As the probability of bankruptcy increases with debt, these savings will also significantly be declined in the presence of non-debt tax shield, making debt too expensive. This might be the reason why Jordanian firms depend on other tax shields, such as depreciation, to reduce their tax bill.<sup>51</sup>

#### **5. Growth opportunities**

The market-to-book ratio, which is used as a proxy for firm's growth opportunities, is negatively and significantly related to leverage at the 1% level.<sup>52</sup> This finding supports the view that the agency and financial distress costs are significantly high for high growth firms. This view seems to be relevant in the Jordanian context where there is evidence suggesting that growing Jordanian firms have fewer tangible assets and hence, banks will demand higher risk premiums in their loans.<sup>53</sup> The higher rates are likely to

---

<sup>51</sup> According to Adedeji (1998), this kind of tax system may encourage firms to equity more than debt.

<sup>52</sup> It is not worth noting that we use the growth rate of total assets as an alternative proxy for growth opportunities. The result shows a positive association between leverage and the growth rate of total assets and is in line with those who use this proxy for growth opportunities, i.e. Titman and wessels (1988); Rajan and Zingales (1995) and Chen (2004). The reason for this difference may be attributed to the fact that growth rate of total assets may also reflect the growth in tangible assets, providing better collateral for lenders. This might provide an explanation as to why the previous empirical studies vary in the variables' signs.

<sup>53</sup> Analysis of correlation in this study shows a negative correlation between growth opportunities and tangibility.

deter growth Jordanian firms from borrowing, pushing them toward equity financing as Titman and Wessels (1988) and Rajan and Zingales (1995) point out. An alternative explanation for this finding is that increases in stock prices in the recent years on ASE have reduced the cost of equity capital, encouraging Jordanian firms to go to the stock market for financing. This is because firms with higher market valuation can issue equity at lower costs of information asymmetries, saving their borrowing capacity for the future financing requirements (Kayham and Titman, 2007). This supports the view of Baker and Wurgler (2002) that at higher market-book ratio, equity market is strongly favourable for increasing funds externally.

### **7. Volatility of earnings**

The results show a significant negative relationship between leverage and the volatility of earnings. This finding is in line with the predictions of the trade-off theory and the findings Banerjee *et al.* (2000) and Miguil and Pindado (2000). This finding indicates that the earning volatility of Jordanian firms exerts a negative impact on their ability to issue debt. This supports the view that firms with high earnings volatility carry the risk of bankruptcy or financial distress, reducing their desire to raise debt. This view seems to be relevant in Jordan where the Jordanian bankruptcy law emphasises on the role of lenders, while it puts less emphasis on the firm as an ongoing concern. The law is not conducive to re-organisation of firms; in contrast, firms entering bankruptcy are usually liquidated. Furthermore, Jordanian banks are the main source of financing for Jordanian firms and their credits need to be repaid or renewed on a regular basis. As the obligatory bankruptcy in Jordan occurs if the firm cannot pay its obligation, firms with high earnings volatility may carry the risk of bankruptcy or rearrange the funds at a high cost. For these considerations, Jordanian firms may keep their leverage ratio low to avoid the bankruptcy risk.

### **3.4 Conclusion**

This chapter of the study extends the empirical work on capital structure on the context of developing countries by using Jordanian firm-level data. A static model has been developed to explain how the optimal capital structure of Jordanian firms is determined. In addition to the pooled data model, the panel data which are usually estimated using either fixed or random effect techniques are used and the random effects specification is found to be the preferred model.

The estimated static model indicates that the financing decisions of the Jordanian firms can be explained by the determinants suggested by the typical corporate finance models. The empirical results suggest that firm size, profitability and tangibility are positively related to leverage, while volatility of earnings, growth opportunities and non-debt tax shields are negatively related to leverage. These results mean that there would appear to be significant constraints on the supply of debt to Jordanian firms such as the bankruptcy and agency costs, indicating that the borrowing capacity of Jordanian firms is mainly affected by the expected risks of their bankruptcy as well as the expected costs of assets substitution problems (the agency costs of debt). Accordingly, we can hypothesise that the relatively low leverage of Jordanian firms is due to the nature of Jordanian bankruptcy law (the mean value of leverage is 0.283). This law emphasises on the role of lenders and put less emphasise on the firm as an ongoing concern. It is not conducive to re-organization of firms; in contrast, firms entering bankruptcy are usually liquidated at higher costs. Thus to avoid bankruptcy, Jordanian firms may keep their leverage ratio low. Moreover, the presence of tax deduction for depreciation makes debt financing for Jordanian firms too expensive, providing no incentives for them to raise debt for tax considerations and pushing them toward internally generated funds (retained earnings) or equity funds for financing. In light of above results, we can also hypothesise that the low mean value of leverage is due to the deficiency of the effective means to mitigate the agency conflicts.

This conclusion suggests that the estimation coefficients on the variables of profitability, firm size, and tangibility, volatility of earnings, growth opportunities and non-debt tax shields are largely consistent with the explanations of trade-off theory not the pecking order theory.

## **CHAPTER 4 - EMPIRICAL INVESTIGATIONS OF PECKING ORDER THEORY**

### **4.1 Introduction**

Chapter three has presented the empirical evidence on the determinants of capital structure for the Jordanian listed firms during the period 1997-2005. It tested the predictions of both pecking order theory and trade-off theory with respect to each of the explanatory variables used in the static model (3.1). However, the new models of pecking order theory such as those proposed by Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) assume that firms raised debt only under pressure of an internal funds deficit, implying that the pecking order theory is a competitor to the conventional leverage regression. If so, the financing deficit variable should obscure the effects of other explanatory variables. In the context of pecking order theory, firms prefer internal funds to external funds for the transactions and information costs which are associated with raising funds externally. However, when external funds are needed, they prefer debt to equity which is rarely issued, because equity issues are more likely subject to a higher degree of market mis-valuation when compared with debt issues. In case of funds surplus not deficit, pecking order theory predicts that firms will use up surplus to pay off debt, or invest in cash or marketable securities in order to save their debt capacity or to avoid the higher costs of reissuing equity. These predictions suggest that firms respond to surplus and deficit differently, i.e. increasing debt when they have a deficit and retiring debt or investing in cash or marketable securities when they have a surplus. However, the pecking order theory ignores the potential effects of other market frictions such as the bankruptcy costs and agency costs of free cash and debt, besides ignoring other institutional factors that might affect the firm's choice of financing, instruments such as the level of interest rate, borrower-lender relations, tax system, and the government intervention (Adedeji, 1998).

To the best of the researcher's knowledge, the previous studies that have tested the pecking order theory ignored the possibility that firms may respond to financial surplus and deficit, similarly not differently, if the agency costs of free cash flow are significantly large and the shareholders are strongly enough to force managers to take

on debt to soak up free cash flow (surplus).<sup>54</sup> Furthermore, they ignored, even if the firms respond to surplus and deficit differently, the possibility that firms may be more or less sensitive in increasing debt to finance deficit than in retiring (reducing) debt to save their debt capacity. An investigation of these issues is very important in obtaining accurate evidence on the pecking order theory, because if firms are more sensitive in reducing leverage to absorb surplus than in increasing leverage to finance deficit, the less than one slope coefficient from models such as those proposed by Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) cannot be interpreted as evidence contradicting the pecking order theory. Similarly, if the effects of surplus and deficit on the change in total debt level are symmetric rather than asymmetric, the unity slope coefficient reported by Shyam-Sunder and Myers (1999) may fall short of unity when the surplus values are excluded from the deficit variable (these arguments will be discussed further in the model development sections).

The present chapter continues the theme of testing the pecking order theory and considers the potential symmetric effects of financial surplus and financial deficit on the change in total debt level using data from the Jordanian market. It also considers the potential difference in the firm's sensitivity to financial deficit and surplus when their effects on the change in total debt are different. The chapter is structured as follows: Section 4.2 explains the models employed to investigate the pecking order theory. Section 4.3 discusses the results of estimating models. Section 4.4 is a conclusion.

## **4.2 Pecking order models**

This study adopts three models to test the pecking order theory in the Jordanian market. All the models are tested using three alternative econometric techniques: Pooled OLS, fixed effects and random effects approaches. Lagrange Multiplier (LM) and Hausman tests are used to identify which of the three alternative techniques will be the preferred specification for dataset. The following three sub-sections offer a brief discussion of the empirical models used in this study to investigate the pecking order theory.

---

<sup>54</sup> For example, Shyam-Sunder and Myers (1999), Nuri and Archer (2001), Adedeji (2002), and Frank and Goyal (2003)



#### 4.2.1 *The first model specification*

In the context of pecking order theory, the need for external funds arises when there is an imbalance between internal cash flow, net of dividends, and real investment opportunities (Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003). Hence, firms whose investment opportunities exhaust internally generated funds will turn to the capital market to raise funds externally through debt and/or equity. According to Frank and Goyal (2003), the total amount of debt issued and/or equity issued from one year to another year must be equal to the total deficit at the end of the year as given by the following equation:

$$\Delta D_{it} + \Delta E_{it} = DEF_{it} \quad (4.1)$$

where  $\Delta D_{it}$  is the net debt issued by firm  $i$  in year  $t$ ,  $\Delta E_{it}$  is the net equity issued by firm  $i$  in year  $t$ <sup>55</sup>,  $DEF_{it}$  is the internal funds deficits of firm  $i$  at year  $t$  and calculated as follows:

$$DEF_{it} = DIVD_{it} + I_{it} + \Delta WC_{it} - CF_{it} \quad (4.2)$$

where  $DIVD_{it}$  is the cash dividend payments of firm  $i$  in year  $t$ ,  $I_{it}$  is the net investment (capital expenditures) of firm  $i$  in year  $t$  and calculated as the difference between fixed assets at  $t-1$  and  $t$  for each firm.  $\Delta WC_{it}$  is the change of working capital for firm  $i$  in year  $t$ . It is calculated as the difference between working capital at  $t-1$  and  $t$  for each firm while the working capital (WC) is calculated as the difference between current assets (CA) and current liabilities (CL).  $CF_{it}$  is the operating cash flow after interest and taxes for firm  $i$  in year  $t$ .<sup>56</sup>

---

<sup>55</sup>  $\Delta E_{it}$  equals sale of common stock minus stock repurchases from year  $t$  to year  $t+1$ .

<sup>56</sup> This definition of Cash Flow (CF) excludes taxes and interest payments which may magnify the amount of fund deficit and increase the need for leverage to finance that deficit. This implies that no reverse causality between leverage and deficit exists. In other words, leverage does not influence the deficit.

For firms following the pecking order theory, Shyam-Sunder and Myers (1999), Adedeji (2002) and Frank and Goyal (2003) argue that new debt issues should have a one-to-one relationship with firm's financing deficit.<sup>57</sup> This implies that the financing deficit should be financed entirely by debt and hence,  $\Delta TE_{it}$  will be zero. In other words,  $\Delta TD_{it}$  should equal  $DEF_{it}$ . By scaling  $\Delta TD_{it}$  and  $DEF_{it}$  by total assets as a precaution against heteroskedasticity and a method of controlling for differences in firm size, the above argument can statistically be formalized as:<sup>58</sup>

$$\Delta TDA_{it} = \alpha_0 + \alpha_1 DEFA_{it} + \varepsilon_{it} \quad (4.3)$$

Where,  $\alpha_0$  and  $\alpha_1$  are the coefficients to be estimated,  $\Delta TDA_{it}$  is the change in total debt of firm  $i$  between year  $t$  and year  $t+1$  scaled by total assets,  $DEFA_{it}$  is the internal funds deficits of firm  $i$  at year  $t$  scaled by total asset, and  $\varepsilon_{it}$  is the error term with usual properties; uncorrelated with itself, uncorrelated with the explanatory variables ( $DEFA_{it}$ ), homoscedastic and normally distributed.

Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) contend that if the pecking order theory holds, the intercept should equal zero ( $\alpha_0=0$ ), and the coefficient on  $DEFA$  variable should be one ( $\alpha_1 =1$ ). This is the case where the financing deficit has the dollar-for-dollar impact on corporate debt. While if the coefficient of the deficit variable is less than one, equity with debt are used to finance the firm's financing deficit. Follow Shyam-Sunder and Myers (1999), Nuri and Archer (2001), Adedeji (2002), and Frank and Goyal (2003), the study tests the hypothesis that the slope coefficient of deficit variable is equal one and the intercept is equal to zero.

It is important to mention one major limitation of model 4.3. The  $DEFA$  coefficient obtained from model 4.3 does not indicate whether the effects of financial deficit and surplus on the change in total debt are symmetric or asymmetric or whether the impetus

---

<sup>57</sup> One-to-one relationship exists for firms whose leverage falls below their debt capacity. According to Myers and Majluf (1984), when the costs of financial distress are serious, the firm considers issuing equity for financing or to pay down debt rather than issuing debt.

<sup>58</sup> Frank and Goyal (2003) claim that pecking order theory does not require any scaling for variables. However, they argue that scaling is most often justified as a method of controlling for differences in firm size. In an algebraic equality if the right-hand-side and left hand side are divided by the same value, the equality remains intact.

of increasing debt when firms have financial deficit is similar to or differing from that of retiring debt when they have a financial surplus. As noted in the introduction, the possibility of having symmetric effects or having asymmetric responses to financial deficit and surplus may result in slope coefficient differs from that obtained using model 4.3. To test for these, we modified model 4.3 using the interaction dummy form model. In addition, we develop a model that allows for the *DEFA* coefficient to vary depending on whether the firms have financial deficit or financial surplus. These models are briefly discussed in the following section.

#### **4.2.2 The second model specification**

It has been argued that in pecking order theory, no attention is given to the sign of deficits (positive or negative) (Nuri and Archer, 2001). Moreover, Shyam-Sunder and Myers (1999) claim that the simple pecking order's predictions do not depend on the sign of  $DEFA_{it}$ . In principle, the firm could become a net lender if surplus funds persist; therefore, they used the positive and negative values of funds deficit in their study.

Based on the definition of the financial deficit variable in equation (4.2), a positive value of  $DEFA_{it}$  implies that a firm has a deficit and that external funds should be raised through debt first and then equity as a last resort, whilst the negative value of  $DEFA_{it}$  indicates that it has a surplus (free cash flow) that can be used to retire debt, invest in cash or marketable securities. If the surplus persists, it may gradually increase its target pay-out ratio or retire equity (Myers, 1984:581). This suggests that the firm does not issue or retire outside equity first and then debt, due to the higher costs of issuing outside equity. As a result, the pecking order theory predicts that surplus firms will first retire debt and then invest in cash and marketable securities, finally increasing target pay-out ratio or retiring equity. While for deficit firms, it predicts that they will first issue debt and then equity as last resort. If so the pecking order theory would predict that the coefficients on the surplus and deficit should be different but positive. The difference between the two coefficients depends on how sensitive the firms are to their financial surplus and deficit, i.e. if firms are more sensitive in retiring debt (reduce) to save their debt capacity and avoid the higher costs of issuing equity than in increasing debt to finance their deficit, the coefficient on surplus variable should be higher than that of deficit variable. If so, including the surplus values with deficit values

in model 4.3 will reduce the effects of deficit values on the change in total debt level. Adedeji (2002) asserts that considering the surplus amounts in Shyam-Sunder and Myers (1999) regression would have reduced the influence of financing deficit variable on new debt issues. Adedeji vindicates his argument on the basis that the negative values of  $DEFA_{it}$  are not internal financial deficits or requirements for external finance to be covered by issuing debt. However, he points out that it would be difficult to estimate by how much they affect the regression results when they are considered in regression.

It is important to note that the suggestion of pecking order theory as well the view of Adedeji (2002) ignores the agency costs of free cash flow that might exist due to the separation between ownership and management.<sup>59</sup> According to Jensen and Meckling (1967) and Jensen (1986), when managers of the firm have more cash flow than is needed to fund all of the firm's available profitable projects there is an incentive for them to invest the excess cash in unprofitable projects (over investment problem), causing a conflict of interest between shareholders and managers of the firm. Debt is suggested as a mechanism to mitigate this conflict and thereby the agency costs of free cash flow (financial surplus). To the extent that this is the case, combining the surplus and deficit values in the same variable as in model 4.3 will reduce the magnitude of the estimated coefficient on deficit variable as firms with surpluses take on debt rather than retiring debt which creates spurious evidence on the pecking order theory.

To address the above issues, we develop two models to investigate how sensitive the firms are to their financial deficits and financial surpluses, how sensitive the regression results are to how surplus values are treated and to test the hypothesis of symmetric effects of financial deficit and surplus on the change in total debt. For the purpose of the first model specification, we introduce two dummy variables as additional explanatory variables with  $DEFA_{it}$ :  $D_{it}^{Def}$  is a dummy variable which equals one for the positive financial deficits ( $DEFA_{it} > 0$ ) and zero otherwise ( $DEFA_{it} < 0$ ) and the interaction dummy term variable which is constructed by multiplying  $D_{it}^{Def}$  by  $DEFA_{it}$ . This form is known as the interaction dummy form. The two dummy variables in this model are used to differentiating between the intercept and slope coefficients of the surpluses and deficits (see, Gujarati, 2003:308). Consider the following model:

$$\Delta TDA_{it} = \beta_0 + \beta_1 DEFA_{it} + \beta_2 D_{it}^{Def} + \beta_3 (D_{it}^{Def} * DEFA_{it}) + \varepsilon_{it} \quad (4.4)$$

where  $\Delta TDA_{it}$  and  $DEFA_{it}$  are defined the same as in model 4.3,  $B_0 = \alpha_0$  and  $B_1 = \alpha_1$  are the same as in model 4.3.  $B_2$  is the differential intercept coefficient and measures the potential difference in the intercept for firms with financial deficit and firms with surplus.  $B_3$  is the differential slope coefficient and measures by how much the slope coefficient of the financial deficit differs from that of the financial surplus. Accordingly, for deficit firms, the intercept will be  $(B_0 + B_2)$ , while the slope coefficient will be  $(B_1 + B_3)$ . This can be written as:

For deficit firms ( $D_{it}^{Def} = 1$ ):

$$\Delta TDA_{it} = (\beta_0 + B_2) + (\beta_1 + \beta_3) DEFA_{it} + \varepsilon_{it} \quad (4.4a)$$

While for surplus firms ( $D_{it}^{Def} = 0$ ):

$$\Delta TDA_{it} = \beta_0 + \beta_1 DEFA_{it} + \varepsilon_{it} \quad (4.4b)$$

Based on the definition of interaction dummy term, the significant positive (negative)  $\beta_3$  suggests that the impetus of firms to expand debt when they face financial deficits is higher (lower) than that of retiring (reducing) debt when they face financial surpluses, while the insignificant  $B_3$  implies that the motion of firms are not different. Similarly, a significant differential intercept coefficient  $B_1$  suggests that the two regressions (surplus and deficit regressions) have different intercept and vice versa. Restricted Least Squares

---

<sup>59</sup> Jensen (1986: 323) defines free cash flow as “cash flow in excess of that required for funding all projects that have positive net present value when discounted at the relevant cost of capital”

F-test is employed to test the null hypothesis that  $\beta_2 = \beta_3 = 0$ .<sup>60</sup> A significant F-test leads to the rejection of the null hypothesis.

It is important to mention one major limitation of model 4.4. It does not allow for testing the individual null hypotheses  $\beta_1 + \beta_3 = 1$ , which is required for the pecking order to hold, and the joint test  $\beta_1 = (\beta_1 + \beta_3)$ . Therefore, we propose a new model allowing for testing the hypothesis of symmetric as well as asymmetric effects of financial deficit and financial surplus on the change in total debt level. In this model, a distinction between positive financial deficit and negative financial deficit (surplus) is being made to whether the financial deficit is positive ( $DEFA_{it} > 0$ ) or negative ( $DEFA_{it} < 0$ ). As a result, the deficit variable is divided into two variables; the positive deficit variable ( $PDEFA_{it}^{Def}$ ) and the negative deficit (surplus) variable ( $NDEFA_{it}^{Sur}$ ), as follows:

$$PDEFA_{it}^{Def} = DEFA_{it} \text{ if } DEFA_{it} > 0, \text{ and zero otherwise.}$$

$$PDEFA_{it}^{Sur} = DEFA_{it} \text{ if } DEFA_{it} < 0, \text{ and zero otherwise.}$$

By substituting  $PDEFA_{it}^{Def}$  and  $NDEFA_{it}^{Sur}$  for  $DEFA_{it}$ , model 4.3 can be rewritten as:

$$\Delta TDA_{it} = \varphi_0 + \varphi_1 PDEFA_{it}^{Def} + \varphi_2 NDEFA_{it}^{Sur} + \varepsilon_{it} \quad (4.5)$$

This specification allows for the pecking order coefficients to vary depending on whether the firm has a financial deficit or surplus. It also allows for testing the individual null hypotheses  $\varphi_1 = 0$  and  $\varphi_2 = 0$ , and the joint test  $\varphi_1 = \varphi_2$ . Recalling

---

<sup>60</sup> F-test is made between the restricted and unrestricted models; the unrestricted model contains  $D_{it}^{Def}$  and  $D_{it}^{Def} * DEFA_{it}$  dummy variables as additional explanatory variables with  $DEFA_{it}$  variable and the restricted model contains only  $DEFA_{it}$  variable as explanatory variable. And calculated as follows:

$F = (R_u^2 - R_r^2) / k$  divided by  $(1 - R_u^2) / (n - k)$ , where,  $K$  is the number of regressors in the unrestricted model.  $R_u^2$  and  $R_r^2$  are the explanatory power of unrestricted and restricted models respectively.

that  $\varphi_1 = 1$ ,  $\varphi_2 > 0$  is required for the pecking order to hold, while  $\varphi_2 < 0$  implies that firms respond to their financial surplus by expanding debt, not by retiring debt as the pecking order theory suggests, indicating that shareholders are strong enough to force managers to raise debt to reduce the amount of free cash available under management control. Wald test is employed to test the null hypotheses individually and jointly. The null hypothesis can be rejected if the Wald test is found to be statistically significant.

As this study also compares the pecking order models between small and large firms, the Chow test is employed to investigate whether the two sample regressions are different or not. This test differentiates between the two sample regressions under the null hypothesis that they are statistically the same (i.e., no structural change or break). The two sample regressions are different, if the calculated F value exceeds the critical value at the chosen level of significance; otherwise, the two regressions can be considered similar.<sup>61</sup> The underlying assumption behind this test is that the variances of the two samples are the same. The null hypothesis in the variance test is that there is no difference between the variances.<sup>62</sup> If the test's results reject the null hypothesis, then the variances are different and we cannot proceed to calculate the Chow test (Gujarati, 2003:297).

#### ***4.2.3 The third model specification***

Although models 4.3 and 4.4 are used to empirically investigate pecking order theory, they ignore all variables that might affect the willingness of suppliers to supply debt to firms (Adedeji, 2002). These models take in consideration only the demand side and the effect of raising external funds especially equity funds, on the wealth of existing stockholders. Frank and Goyal (2003) claim that if the pecking order theory holds, the financing deficit should obscure the effects of other explanatory variables such as tax, growth opportunities, size and tangible assets. According to Adedeji (2002), the best way to test pecking order theory against the trade-off theory is to add the deficit variable as one of the explanatory variables in the conventional leverage regression. Consequently, if the suggestion of pecking order theory is correct, the deficit variable should wipe out the effects of the other explanatory variables in the conventional leverage regressions. If it does not, then firms take other variables into consideration

---

<sup>61</sup> Chow test:  $F = (RSS_R - RSS_{UR})/K$  divided by  $(RSS_{UR}) / (n_1 + n_2 - k)$ , where  $RSS_R$  is the restricted residual sum of square,  $RSS_{UR}$  is the unrestricted residual sum of square ( $RSS_S + RSS_L$ ),  $k$  and  $(n_1 + n_2 - 2k)$  are the degree of freedom in the numerator and denominator, respectively.

<sup>62</sup> The variance test is  $F = \sigma_1^2 / \sigma_2^2$ .

when setting their leverage. However, Frank and Goyal (2003) argue that conventional leverage regression explains only the level of leverage not the change in leverage level (as the pecking order theory explains). Therefore, in addition to the conventional leverage regression, they use the conventional leverage specification in the first differences.<sup>63</sup> Regardless of the specification used, the findings of Frank and Goyal (2003) and Adedeji (2002) have revealed that the financing deficit is one factor among many that firms trade off when funding their investment. Inconsistent with their findings, Shyam-Sunder and Myers (1999) find that nesting the pecking order model and target-off model leads to the rejection of the pecking order model.

Therefore, for the purposes of the third model specification, this study considers the static model 3.1 developed in chapter three to investigate the main determinants of optimal leverage in Jordan. The deficit variable ( $DEF_{it}$ ) is added as one of the explanatory variables in that model (3.1).

$$LEV_{it} = f(PROF_{it-1}, TANG_{it-1}, SZ_{it-1}, LIQ_{it-1}, NDTS_{it-1}, VOLT_{it-1}, GRO_{it-1}, DEF_{it-1})$$

(4.6)

Individuals:  $i = 1, \dots, 114$ ; time:  $t = 1, \dots, 9$ . All explanatory variables are included in the regression with a one-year lag and are the same variables that have been suggested in model (3.1) as determinants of optimal leverage which is defined as the ratio of total debt to total assets<sup>64</sup>. These explanatory variables are  $PROF_{it}$  (Profitability),  $TANG_{it}$  (Tangibility),  $SZ_{it}$  (Size),  $NDTS_{it}$  (Non-debt tax shields),  $LIQ_{it}$  (Liquidity),  $GRTH_{it}$  (Growth),  $VOL_{it}$  (Volatility) with internal fund deficits ( $DEF_{it}$ ) added as new explanatory variables.

According to Myers and Majluf (1984), if the costs of financial distress are ignored, the firm funds real investment by issuing the safest security it can.<sup>65</sup> However, when the costs of financial distress are severe, the firm considers issuing equity for financing or to pay off debt. This implies that as long as the firm does not reach its maximum debt

<sup>63</sup> However, Frank and Goyal (2003) argue that conventional leverage specification in the first differences may result in lower  $R^2$ , less accuracy and may bias the estimated coefficients toward zero.

<sup>64</sup> All the explanatory variables in model (4.6) except  $DEF_{it,t}$  are briefly discussed in chapter three which investigates the empirical evidence on the determinants of capital structure for Jordanian firms.

<sup>65</sup> Here, 'safe' means not affected by any revelation of managers' inside information'. In practice, this means that firms which can issue investment-grade debt will do so rather than issue equity.



capacity, it will demand more debt to meet its financing requirements. This suggests a positive association between the leverage ratio and the funds deficits.

### 4.3 The estimation results of pecking order models

#### 4.3.1 The estimation results of model 4.3

The results presented in Table 4.1 suggest that the model with random effects is found to be the preferred specification, since the Hausman test is insignificant and the hypothesis that no firm-specific effects exist is rejected (as signified by the significant Lagrange multiplier test). The model is also significant overall as the null hypothesis that all slope coefficients are jointly zero is rejected at the 1% level.

**Table 4.1: The estimation results of model 4.3**

(Dependent variable: the change in total debt,  $\Delta TDA_{it}$ )

Independent variable	1997-2005	1997-2000	2001-2005
Intercept	-4.970 (0.000)	-5.254 (0.000)	-4.307 (0.000)
DEF	0.417 (0.000)	0.439 (0.000)	0.357 (0.000)
DM <sub>year</sub>	YES	YES	YES
R <sup>2</sup>	0.20	0.25	0.18
P-value	(0.000)	(0.000)	(0.000)
N	912	342	456
LM Test	116.17 (0.000)	77.63 (0.000)	112.92 (0.000)
Hausman Test	11.24 (0.116)	8.03 (0.264)	13.76 (0.112)

**Notes:** The dependent variable is the net debt issued in year  $t$  scaled by total assets. DEF: the firm's internal funds deficits and defined as  $DEF = (D_{it} + I_{it} + \Delta WC_{it}) - C_{it}$  divided by total assets. YES /NO refers to the inclusion of variables in the regression. Figures in brackets and in bold below the coefficient are the probabilities of significance based on the standard errors which are corrected for heteroskedasticity

The results provide no support for the pecking order theory in Jordan. Although the estimated coefficient on the deficit ( $DEF$ ) variable is positive and statistically

significant at the 1% level, the slope coefficient is statistically different from one. Moreover, the intercept ( $\alpha_0$ ) is also found to be statistically significant, suggesting that other sources of external financing are used with debt to finance a firm's funds deficit. Consequently, the proposed hypotheses that  $\alpha_0 = 0$  and  $\alpha_1 = 1$  are soundly rejected. This finding suggests that debt financing does not dominate equity financing. In contrast, equity issues track the financing quite closely, while debt does not do so.<sup>66</sup>

Although the financial system in Jordan is a bank-based financial system, the finding of this study is in line with those of studies of market based financial systems<sup>67</sup>. Adedeji (2002) finds that debt finances only around 20% of the financing deficit in the UK while equity finances more of the deficit. Nuri and Archer (2001) receive the similar results using data from the UK and other European countries. Frank and Goyal (2003) conclude that equity issues are a significant component of external finance in the US and net equity issues are generally larger than net debt issues. This finding is also consistent with the finding of Singh (1994) in 10 developing countries<sup>68</sup>. Singh (1994) provides evidence suggesting that firms in these countries rely heavily on external funds and particularly on new shares issues on the stock market to finance their investment.

This finding may be attributed firstly to the large increases in stock prices in recent years on ASE which made equity issues relatively more attractive for financing corporate investment in the Jordanian market. The demand for equities rose in response to the Jordanian government's promotional policies for stock market expansion. Since 1997, foreigners have been allowed to own up to 100% of the stock of all listed companies. Moreover, many measures have been taken to make the market signal price information to the market participants, increasing market efficiency. These measures have increased the attractiveness of using new equity to finance deficits because, once market efficiency increases, investors are rationally willing to pay more for stock. The finding may also be explained by the relatively high interest rates on credit facilities granted by Jordanian banks. The relatively costly access to that credit made Jordanian

---

<sup>66</sup> This study tests the effect of internal funds deficits (DEF) on equity issues by using the following model:

$\Delta EA_{it} = \beta_0 + \beta_1 DEF_{it} + u_{it}$ , where  $\Delta EA_{it}$ : is the net equity issued in year  $t$  divided by total assets. The estimated coefficient on DEF variable is 0.587 and statistically significant at the 1% level, indicating that equity levels are more sensitive to change in cash flow balance.

<sup>67</sup> Although Jordan is one of the Islamic countries, the business culture in Jordan is not dominated by Islamic values or Islamic Laws. Overall, it is similar to that in western countries.

<sup>68</sup> Singh (1994) investigated how the top hundred largest listed firms in 10 less developed countries (India, Brazil, Mexico, South Korea, Jordan, Pakistan, Thailand, Malaysia, Turkey, and Zimbabwe) financed their investment during the period 1980-1990.

firms rely more heavily on shareholders' capital. The adoption of conservative credit policies in Jordanian banks since the end of 1990s and the removal of restrictions on interest rates on lending and deposits increased the cost of borrowing and deterred these companies from obtaining debt financing (Jordanian Central Bank, 2005).

Consistent with this, the mean value of debt- to-equity ratio in the dataset is lower in 2001-2005 (0.239) than it is in 1997-2000 (0.397). This reduction suggests that the use of equity has increased since 2001 on account of debt financing. However, it may also mean that both equity and debt financing have increased, but equity has increased more than debt. Therefore, as a robust test, we divide the sample period into two, 1997–2000 and 2001–2005. The distinction between the two periods is made by the time dummy variable ( $D_{it}^{time}$ ) which equals one for the observations in 2001–2005, and zero otherwise (i.e., for observations in 1997–2000). The Chow test is found to be significant (the calculated F value exceeds the critical value at the 1% level), suggesting that the two periods regressions are different, and thereby the financing behaviour of the Jordanian firms.

The results presented in Table 4.1 show that the estimated coefficient for deficit variable has declined from 0.439 for the period 1997-2000 to 0.357 for the period 2001-2005, indicating that the readiness of Jordanian firms to use debt for financing has declined in the period 2001-2005. For the two periods, the estimated coefficients are statistically significant, but statistically different from one, suggesting that debt and equity are used to finance their financial deficit, with equity being higher than debt.<sup>69</sup> These findings support the view that increases in stock prices have encouraged Jordanian firms to go to the stock market for financing and also that the cost of debt has increased due to conservative credit policy and removal of restrictions on deposit and lending interest rates. Furthermore, it supports the view of Baker and Wurgler (2002) that higher market valuation makes the equity market more attractive for financing.<sup>70</sup> Consistent with this, we provide evidence, in chapter three, suggesting that leverage is negatively related to the growth opportunities (measured as the ratio of market value to book value).

---

<sup>69</sup> The Wald test regarding the null hypotheses that  $\alpha_0 = 0$  and  $\alpha_1 = 1$  are statistically significant at the 1% level.

<sup>70</sup> Baker and Wurgler (2002) find that low-levered firm tends to be that raised funds when its valuations are high, and conversely high leverage firm tend to be those that raised funds when its valuations are low.

#### 4.3.1.1 *The estimation results of model 4.3 for small and large firms*

It has been argued that the pecking order theory approach is particularly relevant for small firms, since the cost of external equity may be higher for small firms than for large ones for a number of reasons related to transaction, adverse selection costs, and control considerations (Chittenden *et al.*, 1996). This is also consistent with the view of Frank and Goyal (2003) that pecking order theory should perform better in small firms than large ones, because equity issuance of small firms is subject to high adverse selection. Large firms are more closely observed by analysts and tend to provide more information to outside investors than smaller firms do. So, they should be more capable of issuing information-ally more sensitive equity and have lower debt (Rajan and Zingales 1995).

Jordan *et al.* (1998) support the view that small firms adopt a pecking order approach when funding their activities. They claim that owners of small companies who are reluctant to give up control are, in general, willing to finance expansion first through internal funds, then through debt, and finally via equity. In addition to the adverse selection costs and control consideration, transactions costs are especially high for small firms because of their small issuances of debt or /and equity (Rudebusch and Oliner, 1989; 1992). Therefore, one can expect that small firms are more likely to follow the pecking order theory because of difficult in accessing external financing sources. However, Frank and Goyal (2003) find the opposite. Their sample of large firms provides more support for the pecking order theory than their small-firm sample.

For the purpose of this analysis, we divide the sample firms into two sub-sample groups; small firms and large firms. Firms with logarithm of total assets above the median are classified as large firms ( $D_{it}^{Size} = 1$ ), while those with logarithm of total assets below the median are small firms ( $D_{it}^{Size} = 0$ ). This classification will be adopted in testing for the size effect under all models in the study. The pecking order theory predicts that leverage and size is negatively related (see, section 3.2.1.3), suggesting that small firms tend to use debt more than large firms. However, the results presented in Table 4.2 provide no supports for this suggestion. For small firms, the estimated coefficient on the deficit variable is 0.322 compared to 0.469 for large companies, indicating that small Jordanian firms use debt lower than large firms. The two estimates are found to be statistically different from each other. The F value is calculated to be 26.25 which is greater than the critical value at the 1% level, and hence, the null

hypothesis that the two sample (small and large firms) regressions are the same is soundly rejected. However, the results generally provide no support for the pecking order theory for either small or large companies. For both groups, the estimated coefficients on the deficit variable are statistically significant, but significantly different from one, suggesting that small and large Jordanian firms use debt as well as equity to finance their internal funds deficit.<sup>71</sup>

**Table 4.2 : The estimation results of model 4.3 for small and large firms**

Dependent variable: the change in total debt,  $\Delta TDA_{it}$

Independent variable	Small firms	Large firms
Intercept	-6.093 (0.000)	-4.010 (0.000)
DEF	0.322 (0.000)	0.469 (0.000)
DM <sub>year</sub>	YES	YES
R <sup>2</sup>	0.17	0.24
P-value	(0.000)	(0.000)
N	456	456
LM Test	89.63 (0.000)	141.92 (0.000)
Hausman Test	7.23 (0.275)	15.96 (0.102)

Consistent with this, the mean leverage ratio is higher for large Jordanian firms (0.321) than it is for small Jordanian firms (0.199). This finding may be attributed to the fact that Jordanian banks usually offer debt to high quality (less risky) firms. From the lender's point of view, small Jordanian firms are more risky, so their cost of debt is expected to be high. There is evidence suggesting that small Jordanian firms are less profitable, highly volatile, and have high growth opportunities with fewer tangible assets (see, analysis of correlation in section 3.3.1). As a result, they are more likely to experience bankruptcy costs, and consequently deterring them from raising more debt at an attractive rate. Increases in stock prices along with the conservative credit policies of the Jordanian banks induce small companies to rely on equity funds more than debt

<sup>71</sup> The Wald test regarding the null hypothesis that  $\alpha_1 = 1$  is found to be 166.52 and 173.25 for small and large firms respectively (significant at the 1% level), and hence the null hypothesis that  $\alpha_1 = 1$  is soundly rejected.

funds to finance their internal funds deficit.<sup>72</sup> In fact, the financial liberalization that Jordan has been following since 1990 has helped remove the barriers that restrict small companies' access to capital market.

#### 4.3.2 *The estimation results of model 4.4 and 4.5*

Model 4.4 investigates whether the impetus of increasing debt when the firm has a deficit is similar to that of retiring (reducing) debt when it has a surplus. The model with random effects is found to be the preferred specification for the dataset. As Hausman (insignificant) and Lagrange Multiplier (significant) tests suggest. Overall, the model is found to be significant and the null hypothesis that all coefficients are jointly zero is soundly rejected.

The results presented in Table 4.3 show that the estimated coefficients on the deficit variable and the positive interaction dummy variable ( $D_{it}^{Def} * DEFA_{it}$ ) are statistically significant at the 1% and 5% level respectively. The intercept differential coefficient is found to be statistically insignificant; suggesting that the difference in the slope coefficients is the only source of the difference between the two regressions. This difference is found to be statistically significant as the significant Restricted Least Squares F-test suggests (the calculated F value exceeds the critical value at the 5% level). This finding suggests that Jordanian firms are less sensitive in expanding debt to meet their financing requirements than in retiring debt to absorb surpluses. The negative differential slope coefficient (-0.126) indicates that the slope coefficient of the positive deficit variable is lower than that of financial by 0.126. As calculated from equation 4.5a ( $D_{it}^{Def} = 1$ ), the coefficient on the positive deficit variable is 0.493 (0.619-0.126) compared to 0.619 on the negative surplus variable. However, the computed coefficient on positive deficit variable (0.493) is higher than that obtained from model 4.3 when the surplus and deficit values are considered in the same variable (0.417), suggesting that including the surplus values in model 4.3 has reduced the effect of deficit values on the change in total debt level. This finding supports the view of Adedeji (2002) that including funds surpluses could reduce the effect of the deficit variable on the dependent variable. These results are strongly supported by the results obtained from

---

<sup>72</sup> For small firms, the estimation results of regressing  $\Delta E/TA_{it}$  on  $DEF/TA_{it}$  ( $\Delta E/TA_{it}$  is the net equity issued in year  $t$  divided by total assets ( $\Delta E/TA_{it} = \beta_0 + \beta_1 DEF/TA_{it} + u_{it}$ )) suggests that these firms use equity than debt. The estimated coefficient ( $\beta_1$ ) is 0.64 and significant at the 5% level.

model 4.5 which is used in this study to test for the hypothesis of symmetric effect of financial surplus and deficit variable.

**Table 4.3: The estimation results of model 4.4 and 4.5**

Dependent variable: the change in total debt,  $\Delta TDA_{it}$

Independent variable	Model 4.4	Model 4.5
Intercept	-4.505 (0.000)	-4.505 (0.000)
DEF	0.619 (0.000)	-
D <sup>Def</sup>	0.226 (0.648)	-
D <sup>def</sup> * DEF	-0.126 (0.030)	-
<i>PDEF</i> <sup>Def</sup>	-	0.482 (0.000)
<i>NDEF</i> <sup>Sur</sup>	-	0.591 (0.000)
D <sub>year</sub>	YES	YES
R <sup>2</sup>	0.32	0.35
P-value	(0.000)	(0.000)
N	912	912
LM Test	97.34 (0.000)	86.74 (0.000)
Hausman Test	2.31 (0.520)	1.97 (0.423)

**Notes:** DEF: the same as in Table 4.1. D<sup>Def</sup>: a dummy variable which equals one for  $DEFA_{it} > 0$  and zero otherwise. D<sup>Def</sup> \* DEF<sub>it</sub>: the interaction dummy variable. *PDEF*<sup>Def</sup> is the positive financial deficit.

*NDEF*<sup>Sur</sup> is the negative financial deficit. YES /NO refers to the inclusion of variables in the regression. Figures in brackets and in bold below the coefficient are the probabilities of significance based on the standard errors which are corrected for heteroskedasticity.

As can be seen from Table 4.3, the estimated coefficients on the positive financial deficit variable (*PDEF*<sub>it</sub><sup>Def</sup>) and negative financial deficit variables (*NDEF*<sub>it</sub><sup>Sur</sup>) are significantly positive at the 1% level, but higher for surplus variable (0.591) than for positive deficit variable (0.482). Moreover, the Wald test rejects the null hypothesis that the coefficients of *PDEF*<sub>it</sub><sup>Def</sup> and *NDEF*<sub>it</sub><sup>Sur</sup> ( $\phi_1 = \phi_2$ ) are not different, since it is found to be statistically significant at the 1% level. Again the results suggest that the

willingness of Jordanian firms to expand debt when they face financial deficits is lower than that of retiring (reducing) debt when they face financial surpluses, indicating also that the effects of the financial surplus and deficits on the change in total debt level are different or asymmetric. The statistically significantly positive slope coefficient on surplus variable suggests that Jordanian firms tend to use up their financial surplus to retire their debt, indicating that shareholders are very weak and hence, don't force managers to take on debt to soak up free cash flow (Financial surplus). To the extent that this is the case, these findings imply that the bankruptcy and agency costs of debt are very critical in the Jordanian market; therefore, Jordanian firms tend to maintain their debt level low and retire debt to save their debt capacity for future needs. Although the exclusion of negative values (surplus) has increased the magnitude of the estimated coefficient on  $PDEF_{it}^{Def}$  variable, it remains statistically different from one, suggesting that debt financing does not dominate equity financing. Similarly, the estimated coefficient on  $NDEF_{it}^{Sur}$  is found to be statistically significantly different from one (For both coefficients, the Wald test is found to be statistically significant at the 1% level). As Jordanian firms do not use financial surplus to retire equity, the non-unity coefficient on the surplus variable suggests that besides retiring debt, Jordanian firms tend to invest their financial surplus in cash or marketable securities which can be liquidated later when the need for funds arises.<sup>73</sup>

Overall, the finding of this study does not support the argument of Shyam-Sunder and Myers (1999) and Nuri and Archer, (2001) that support for pecking order theory is not affected by the sign of deficit variable. In light of this finding, we have to be careful in interpreting the results obtained from model 4.3. Although the effects of financial surplus and deficit are found to be asymmetric, it does not mean that these effects might not be symmetric when the shareholders are strong enough to force managers to create debt to reduce the amount of free cash available under their control. Hence, the unity slope coefficient may not necessarily mean that the pecking order theory is held because it could fall short of unity if the effects of financial surplus and deficit are symmetric.

#### **4.3.2.1 The estimation results of model 4.5 for small and large firms**

In this section, we test the hypothesis of asymmetric effects of financial surplus and deficit on the change in debt level for small and large firms to investigate whether they

---

<sup>73</sup> For all sample firms, stock repurchases are found zero.



are different or not. More precisely, we investigate, if they are different, whether the impetus of increasing debt to finance deficit and that of retiring debt to absorb surplus are higher/lower for large firms than for small firms. As in section 4.3.1.1, the sample firms are divided into two; small and large firms. The Chow test regarding the null hypothesis that small and large firms' regressions are not different is found to be statistically significant (the calculated F-value exceeds the critical value at the 5% level), suggesting that the two regression are different and consequently, implying that the financing behaviour of small and large firms is different.

**Table 4.4: The estimation results of model 4.5 for small and large firms**

Dependent variable: the change in total debt, $\Delta TDA_{it}$		
Independent variable	Large firms	Small Firms
Intercept	-5.433 (0.000)	-3.536 (0.000)
$PDEF^{Def}$	0.421 (0.000)	0.592 (0.000)
$NDEF^{Sur}$	0.589 (0.005)	0.648 (0.010)
D <sub>year</sub>	YES	YES
R <sup>2</sup>	0.42	0.27
P-value	(0.000)	(0.000)
N	456	456
LM Test	91.37 (0.000)	91.37 (0.000)
Hausman Test	2.01 (0.570)	2.01 (0.570)

Moreover, for both sized groups, the results presented in Table 4.5 support the hypothesis that the effects of financial deficit and surplus are asymmetric or different, where the estimated coefficients on the surplus ( $NDEF_{it}^{Sur}$ ) and deficit ( $PDEF_{it}^{Def}$ ) variables are positive and statistically significant, suggesting that Jordanian firms tend to expand debt when they have deficit and retire debt when they have financial surplus. However, the estimated coefficients are lower for  $PDEF_{it}^{Def}$  (0.421 and 0.592) for small and large firms respectively) than for  $NDEF_{it}^{Sur}$  (0.569 and 0.648), implying that small and large Jordanian firms are less sensitive in increasing debt for financing than in

reducing debt for soaking up surplus.<sup>74</sup> However, as cleared, small Jordanian firms are less sensitive than large ones in increasing debt to finance their positive financial deficit and retiring debt to soak up surplus. When the estimated coefficients are individually tested, the null hypotheses,  $\varphi_1 = 1$  and  $\varphi_2 = 1$  are soundly rejected, suggesting that the slope coefficients for both variables are statistically different from one (the Wald test is found to be statistically significant at the 1% level for both size groups), indicating that small and large Jordanian firms use both debt and equity to finance their deficit, but equity issues track the financing deficit quite closely in small firms. While, the less than one slope coefficient on surplus variable indicates that besides retiring debt, small and large Jordanian firms tend to invest their financial surplus in cash or marketable securities. However, small firms tend to invest in cash and marketable securities more than large firms do, suggesting that these firms face difficulties in raising debt funds from banks.

#### **4.3.3 The estimation results of model 4.6**

The main objective of developing model 4.6 is to test for the prediction of pecking order theory that firms tend to raise debt only under pressure of an internal funds deficit. If so, the deficit variable should wipe out the effects of the other explanatory variables in the conventional leverage regressions. The only difference between model 3.1 and the model under investigation is that, the deficit variable ( $DEF_{it}$ ) is added as an additional explanatory variable in model (4.6). Model (3.1) is the static model that the study has developed to investigate the determinants of capital structure of Jordanian firms listed on the ASE.

The Variance Inflation Factor (VIF) which is used to test for multicollinearity indicates that the model does not suffer from any multicollinearity problem. The VIF for all variables are ranged between 1.05 – 1.42 with average amounted to 1.21. As the significant Lagrange Multiplier (LM) and insignificant Hausman tests suggests, the model with random effects is the preferred specification.

---

<sup>74</sup> The null hypothesis that  $\varphi_1 = \varphi_2$  is soundly rejected (for both size groups, the Wald test is found to be statistically significant at the 1% level).

**Table 4.5: The estimation results of model 4.6**

(Dependent variable: Leverage (TD/TA))

Independent variables	Full Sample
Intercept	-4.827 (0.000)
PRO	0.148 (0.000)
TAN	-0.021 (0.623)
SZ	0.261 (0.005)
NDT	-0.502 (0.035)
GR	-0.29 (0.005)
VOL	-0.792 (0.000)
DEF	0.184 (0.003)
DM <sub>year</sub>	YES
R <sup>2</sup>	0.53
P-value	(0.000)
N	912
LM test	1267.91 (0.000)
Hausman test	13.32 (0.602)

**Notes:** All independent variables are taken by one year lag and defined the same as in the model 3.1 DEF: the firm's internal funds deficits and defined as  $DEF = (D_{it} + I_{it} + \Delta WC_{it}) - C_{it}$ . YES /NO refers to the inclusion of variables in the regression. Figures in brackets and in bold below the coefficient are the probabilities of significance based on the standard errors which are corrected for heteroskedasticity.

The results presented in Table 4.6 reveal that adding the deficit variable does not change the magnitude, sign and significance of the estimated coefficients of model 3.1. The variables which are found to be statistically significant in model 3.1 are found to be significant in model 4.7 and have the same signs, with no change in the significance of the variables which have been found statistically insignificant in model 3.1. Furthermore, the results show that the deficit variable is positively related to leverage and statistically significant at the 1% level. Consequently, adding the deficit variable to model 3.1 does not overwhelm the effect of other explanatory variables on leverage as

the pecking order theory suggests. Moreover, it improves the explanatory power only slightly. This finding suggests that a funds deficit is just one factor among many that firms trade off when funding their investment.<sup>75</sup> The finding is in the line with Frank and Goyal (2003) for the USA, and Adedeji (2002) for the UK.

#### **4.4 Conclusion**

This chapter has tested the pecking order theory using data from the Jordanian market. While the extant research has tested the pecking order theory without investigating whether the firms respond to their financial deficit and surplus differently or similarly, or whether they are more or less sensitive in increasing to finance deficit than in retiring debt to save debt capacity, an obvious extension to this study is to test firstly, for the hypothesis of symmetric impact of financial deficit and surplus on the change in total debt level; and secondly, for the possibility that the impetus of expanding debt is differing from that of retiring debt. We have tested for these by estimating two empirical models designed to capture symmetric impact of financial deficit and surplus on debt, besides the ones that have been used in literature for the comparison purposes.

A number of interesting insights have been found. Firstly, of the three models considered, the estimated coefficient on the deficit variable is statistically significantly which suggests that internally generated funds by Jordanian firms are not sufficient to meet their financing requirement, implying that external funds are needed. The finding of less than one slope coefficient means that Jordanian firms use debt as well as equity for financing; with equity issues follow the financing deficit quite strictly. Secondly and importantly, the estimated models support the prediction of pecking order theory that financial deficit and surplus affect the change in total debt differently. However, Jordanian firms are more sensitive in retiring debt to save their debt capacity than in expanding debt to finance deficit. This finding suggest that there would appear to be significant constraints on the supply of loans to Jordanian firms such as the bankruptcy and agency costs of debt. The finding of asymmetric impact of surplus and deficit on debt indicates that the agency costs of free cash flow are low or the shareholders are very weak and hence, do not force managers to employ debt to soak up surplus (free cash flow). However, the hypothesis of symmetric impact may not be rejected in the market where the agency costs of free cash flow are significantly large and shareholders

---

<sup>75</sup> We run the conventional leverage regression in first differences and reach to the same conclusion.

(i.e. large institutional shareholders) are strong enough to force managers to raise debt to take up surplus. Another interesting results obtained is that splitting the values of deficit variable into surplus and deficit values has increased the estimated slope coefficient of the deficit variable when compared with that obtained when the two values are considered in the same variable, suggesting that including the surplus values would reduce the impact of deficit variable in the pecking order model.

Contrary to many other countries, the empirical result of this study does not support the pecking order theory in the Jordanian market. This finding may be attributed firstly, to the fact that investors in the Jordanian market prefer dividend payments, making the supply of internally generated funds from retained earnings inelastic. This is because the taxation system encourages cash payments of dividends. Secondly, the increase in interest rates on loans due to the financial liberalization and the adoption of conservative credit policies by the Jordanian banks force Jordanian firms, in general, and the small ones, in particular, to finance their investment opportunities by equity. This along with the remarkable increase in the stock prices on ASE during the study made equity financing less expensive than debt financing, encouraging Jordanian firms to go to the stock market for financing. It is worth noting that when stocks are overvalued, the asymmetric information costs to the firm are expected to be low which may encourage firms to maintain their borrowing capacity for the future by using equity funds for financing.

## CHAPTER 5 - EMPIRICAL INVESTIGATION OF TARGET ADJUSTMENT THEORY

### 5.1 Introduction

Chapter four has presented the empirical investigation on the pecking order theory for 114 non-financial Jordanian firms listed in Amman Stock Exchange. The results have revealed that equity tracks the financing deficit more than debt, implying that equity is not the last resort as the pecking order theory predicts. Furthermore, the results have revealed that financial surplus and deficit have affected leverage differently. This finding is consistent with the pecking order theory that firms tend to expand debt if they face deficit and retire debt if they have surplus. However, the results showed that Jordanian firms are more sensitive in using up surplus for retiring debt than in expanding debt for meeting their financing requirements.

The other competing theory is the trade off theory, or the target adjustment theory.<sup>76</sup> This theory suggests that there is an optimal (target) level of leverage under which the firm's value is maximized, implying that if the firm's leverage level deviates from its target, it will move gradually towards its target leverage by substituting debt for equity or equity for debt until the target level is reached and the firm's value is maximized. However, target reversion depends on the costs of adjusting leverage (adjustment costs) as well as on the costs of being far from the target level (the benefits of moving back towards the target level). In general, the presence of transaction costs may prevent leverage adjustment until the benefits from adjusting leverage outweigh these costs. Previous studies have investigated the target adjustment theory with the assumption that the adjustment costs of increasing and reducing leverage are symmetrical.<sup>77</sup> Moreover, they have also assumed that the benefits of moving back towards the target leverage ratio by the firm being below its target leverage level are similar to those of being above the target level. If these assumptions are not valid, the adjustment rates may vary

---

<sup>76</sup> Trade-off theory is also called the target adjustment theory of capital structure. As the analysis in this chapter is focusing on the target level that a firm is trying to reach, we use the target adjustment concept instead of the trade-off concept.

<sup>77</sup> For example: Syham – Surder and Myers (1999); Banerjee *et al.* (2000); Ozkan (2001); Miguel and Pindado (2001); Mira and Gracia (2002); Hovakiman *et al.* (2001, 2004); Cai and Chosh (2003); Leary and Roberts (2005); Flannery and Rangan (2006) and Antoniou *et al.* (2008), amongst others.

depending on whether the leverage is below or above its target level. As well as this, if the adjustment costs constitute a major portion of the total costs of changing leverage level, firms with leverage away from its target leverage ratio will alter their leverage ratios only if they are sufficiently far away from the target leverage ratio, making the rates of adjustment vary depending on whether the deviations from the target leverage ratio are significantly large or small. The key question here: is the dynamic adjustment of leverage symmetric or asymmetric?

As mentioned in chapter two (the literature review), leverage expansion may be constrained by the costs associated with increasing leverage (the bankruptcy and agency costs), and also by the availability of debt at an attractive rate. In addition, it may be affected by other market frictions such as transaction costs and taxes. Hence, firms may be forced to incur significant adjustment costs in the form of the diversion of financial resources to revert back to the target.<sup>78</sup> When the firm is scaling down its level of leverage however, such adjustment costs either simply do not arise or they are less likely to be significant. Although leverage expansion may create tax benefits, the marginal tax savings of any additional unit of debt decreases as leverage goes up because of the probability of bankruptcy increases with leverage. The bankruptcy of debt become more critical as a firm moves above its target leverage level because at leverage above its target, these costs will be much higher than its benefits. If so, the incentive for reducing leverage when firms are above their target leverage ratios will be higher than that for increasing leverage when they are below their target ratios, suggesting different rates of adjustment for above-and below-target leverage ratios.

As large firms are expected to have large investment projects and consequently large issues of debt or /and equity, adjustment costs will be proportionally small for larger firms than for small firms, implying that larger firms should adjust to the desired capital structure more readily than smaller firms. Larger firms may also find it easier to access capital by issuing equity or debt, possibly because more information is available about them. Another important point is missed in literature that firms may have a target leverage ratio but follow the pecking order theory, suggesting that the adjustment may take place in a way consistent with the pecking order theory. Hovakiman *et al.* (2004)

---

<sup>78</sup> Adjustment costs are the costs of switching from debt to equity and equity to debt. According to Olinear and Rudebusch (1989 and 1992) these costs are the compensation for the dealer placing the issue, and other expenses such as legal, accounting and printing costs, registration fees and taxes.

and Leary and Roberts (2005) conclude that firms may set their own target leverage ratio, but prefer internal funds to external, and debt funds to equity funds.<sup>79</sup> If so, the rates of adjustment may vary depending on whether the firms have financial surplus or deficit, with higher rates for deficit than for surplus. Firms with fund deficit tend to increase their leverage which makes leverage adjustment much faster than those with fund surplus, whilst firms with fund surplus are expected to retire debt and then move away from the target level, increasing the size of deviation and then the time required moving back towards their target.<sup>80</sup> However, if the bankruptcy and agents costs of debt are very critical, firms with surplus are expected to adjust their leverage faster than those with deficit. This might also suggest that firms with financial surplus or deficit may experience different rates of upward and downward adjustment: i.e., firms face surplus (deficit) with leverage below (above) the target level are expected to adjust their leverage slower than those with leverage above (below) the target (these arguments will be discussed further in sections 5.3.1.2 and 5.3.2.2).

These gaps in literature, besides the lack of research in developing countries in general and Jordan in particular, motivated the researcher to carry out this study to investigate the financing practices of Jordanian listed firms where many issues, like those discussed above, are still not clearly developed. As mentioned in chapter two, the movement of the Jordanian economy towards the free market economy may provide opportunities for Jordanian firms to optimally determine their leverage and move toward their target level if any deviation from that target exists. Therefore, this chapter investigates the empirical evidence on the target adjustment theory in the Jordanian market. The chapter is structured as follows: section 5.2 discusses the empirical models that this study uses to investigate the target adjustment theory, such as symmetric and asymmetric partial adjustment models and the error correction model. Sections 5.3 and 5.4 present and discuss the estimation results. Finally, section 5.5 is a conclusion.

---

<sup>79</sup>However, Hovakiman *et al.* (2004) and Leary and Roberts (2005) have not investigated whether the rates of adjustment are different between surplus and deficit.

<sup>80</sup> However, Cai and Ghosh (2003) point out that if the optimization hypothesis is true, there should be more firms adjusting their capital structure toward the optimal point to maximize the firm's value instead of moving away from the mean. Cai and Ghosh (2003, p 21) argue that therefore, the number of times a firm adjusted its capital structure toward the optimal capital structure (N), is greater than the number of times a firm's capital structure moved away from the optimal capital structure during n periods (M).



## 5.2 Target adjustment models

To investigate whether the Jordanian listed firms have targeted leverage ratio and moved gradually toward their target ratios when their leverage deviates from their target, symmetric as well as asymmetric partial adjustment models are adopted and tested. Contrary to a symmetric model, an asymmetric adjustment model tests the hypothesis of asymmetric adjustment costs of increasing and reducing leverage. In addition, we use the error correction model to investigate the short and long term effects of target leverage ratio on the actual leverage ratio. All the models employed are estimated using different methodologies, namely pooled OLS, fixed effects and random effects methods. The following three sub-sections offer a brief discussion of the empirical models used in this study to investigate the target adjustment theory in the Jordanian market.

### 5.2.1 *Symmetric adjustment model 5.1*

Target adjustment theory assumes that firms optimally balance the costs of debt, i.e. distress risk and bankruptcy frictions, with the benefits, typically tax savings. Firms are expected to move toward their target leverage and conduct their marginal financing accordingly, although timing their transactions due to costs of adjustment.<sup>81</sup> According to Myers (1984) and Flannery and Rangan (2006), the presence of adjustment costs may restrict the firms' ability to revert back to their target capital structure immediately, suggesting the occurrence of partial adjustment toward the target level. The partial adjustment mechanism allows for the firms' observed leverage ratio not always being equal to their target level. This mechanism suggests that firms make leverage adjustment if the costs of being away from the target leverage ratio are higher than those of moving toward the target; otherwise it is not rational for these firms to make leverage adjustments, because the adjustment costs will be large enough to cancel out the benefits of moving toward the target level. However, it assumes that adjustment towards the target occurs at symmetrical rates. No distinction is being made between the below-target leverage ratio and the above-target leverage ratio, suggesting that the adjustment costs as well as the benefits of increasing and reducing leverage are symmetrical. As

---

<sup>81</sup> Adjustment costs are the costs of switching from debt to equity and equity to debt. According to Oliner and Rudebusch (1989 and 1992) these costs are the compensation for the dealer placing the issue, and other expenses such as legal, accounting and printing costs, registration fees and taxes.

one of the main objectives of this chapter is to test the hypothesis of asymmetric adjustment as well as the symmetric adjustment toward the target leverage ratio, we refer to the current model as the symmetric adjustment model.

For the purpose of this model, we construct the  $TRAC_{it}$  variable to measure how far the actual leverage ratio deviates from the target leverage ratio. The  $TRAC_{it}$  variable is defined as the difference between a firm's target leverage ratio at year t and the actual leverage ratio at year t-1 ( $LEV_{it}^* - LEV_{it-1}$ ). This variable is used in the model to predict whether the Jordanian firms are moving towards their target leverage ratios. As the target leverage ratio ( $LEV_{it}^*$ ) is unobservable, we use the estimated fitted values from conventional leverage regression as a proxy for the target leverage ratio.<sup>82</sup> To test the pecking order theory against the target adjustment theory,  $DEF_{it}$  variable is included in the model as an additional regressor and is defined as the same in model 4.4.<sup>83</sup>

Based on the discussion above, we can formalise the symmetric (partial) adjustment model as:

$$\Delta LEV_{it} = \lambda_0 + \lambda_1 TRAC_{it} + \lambda_2 DEF_{it} + \varepsilon_{it} \quad (5.1)$$

where  $\lambda_1$  is the adjustment coefficient that captures the desired extent of adjustment to the target leverage ratio. The hypothesis in Shyam-Sunder and Myers (1999) is  $0 < \lambda_1 < 1$ , indicating partial adjustment towards the target, but implying positive adjustment costs. Consequently, a significant coefficient on the  $TRAC_{it}$  variable  $\lambda_1$  would suggest that firms have a target leverage ratio and adjust their leverage to match their target ratio. As the adjustment coefficient  $\lambda_1$  is inversely related to the adjustment costs, the low adjustment coefficient would suggest that firms face large adjustment

---

<sup>82</sup> Literature suggests three proxies for the target leverage ratio; the fitted values estimated from conventional leverage regression, the mean of the firm's leverage ratio over the study period and the industry mean over the study period. The fitted values, which are used as proxy for the target leverage ratio in this study, are estimated from the static model (3.1) in chapter 3. We tested all the models by using the other alternative proxies for target leverage ratio, but their results are not reported. However, the estimation results gave roughly the same magnitudes of coefficients, signs and significance.

<sup>83</sup> Shyam-Sunder and Myers (1999) find that nesting the pecking order and target adjustment models in the same regression leads to the rejection of the pecking order model. The partial adjustment model in Shyam-Sunder and Myers (1999) is  $LEV_{it} - LEV_{it-1} = \lambda(LEV_{it}^* - LEV_{it-1})$

costs and consequently move slowly toward their target. It is worth noting that the target adjustment theory does not require the estimated coefficient on the deficit variable to be statistically not different from zero to hold, but a significant coefficient would indicate that the deficit variable is simply one of the factors that influence the firm's capital structure. Model 5.1 assumes that  $\lambda_1$  is symmetrical for leverage above and below the target leverage ratio, suggesting that the costs of being away from the target leverage ratio and the costs of moving toward that target are not different for below and above the target leverage ratio. If this is not so, firms may experience different rates of leverage adjustment depending on whether they are below-or above-target leverage ratio. For the purpose of this analysis, we develop the asymmetric adjustment model which is briefly discussed in the following section.

### ***5.2.2 Asymmetric adjustment models 5.2 and 5.3***

Adjustment toward the target leverage ratio may differ depending on whether the actual leverage ratio is above or below its long run equilibrium level. Cai and Ghosh (2003:p21) argue that by assuming that the goal of the firm is to maximise the value of the firm, firms with capital structure away from its optimal capital structure will try to "correct" it. This suggests that when a firm's gearing is below the optimal (target) gearing ratio, the firm adjusts its gearing upward, whilst the firm adjusts its gearing ratio downward when gearing is above the target gearing ratio. Cai and Ghosh (2003, p 28) propose an answer to the question that why does a firm adjust its debt level toward the industry mean when it is above the mean, while it is indifferent when the debt level is below the mean? Their explanation is that when a firm's debt level reaches a significantly high level, the high costs of leverage makes the reduction of the debt is a meaningful task, while a firm where its debt level is below the average debt level of the industry, does not put consideration of debt level as its first priority. This suggests that downward adjustment occurs at a faster rate than upward adjustment, implying that the benefits of reducing leverage (the reduction in bankruptcy and agency costs) are greater than those of increasing leverage (tax savings). Firms with below-target leverage ratio may benefit from increasing leverage with tax benefits; however, it is not as critical that they revert to their target as for those with above-target leverage ratio because of the bankruptcy costs which reduce the marginal tax savings of debt.

However, this might not be the only explanation as to why firms adjust above-target leverage ratio faster than below-target leverage ratio. Another explanation for the quick downward adjustment could be the adjustment costs of increasing leverage are greater than those associated with debt reduction. Therefore, the asymmetric adjustment model has been developed to allow for the rate of adjustment to vary depending on whether the firm's leverage ratio is below or above the target leverage ratio. The underlying assumption behind this model is that the adjustment costs and benefits of increasing and reducing leverage are not symmetrical.

Based on the definition of the  $TRAC_{it}$  ( $LEV_{it}^* - LEV_{it-1}$ ) variable,  $TRAC_{it} > 0$  indicates that the firm's leverage ratio is below its target ratio, while  $TRAC_{it} < 0$  indicates that its leverage ratio is above the target ratio. For the purpose of the asymmetric adjustment model, we split the values of the  $TRAC_{it}$  variable and construct the  $TRAC_{it}^{below}$  and  $TRAC_{it}^{above}$  variables as follows:

$$TRAC_{it}^{below} = TRAC_{it} \text{ if } LEV_{it}^* - LEV_{it-1} > 0 \text{ and zero otherwise.}$$

$$TRAC_{it}^{above} = TRAC_{it} \text{ if } LEV_{it}^* - LEV_{it-1} < 0 \text{ and zero otherwise.}$$

By substituting  $TRAC_{it}^{below}$  and  $TRAC_{it}^{above}$  for the  $TRAC_{it}$  variable in model 5.1, this model can be rewritten as

$$\Delta LEV_{it} = \gamma_0 + \gamma_1 TRAC_{it}^{below} + \gamma_2 TRAC_{it}^{above} + \gamma_3 DEF_{it} + \varepsilon_{it} \quad (5.2)$$

This specification allows for the rate of adjustment to vary depending on whether the leverage is above or below its target leverage ratio. It also allows for testing the individual null hypotheses  $\gamma_1 = 0$  and  $\gamma_2 = 0$ , and the joint test  $\gamma_1 = \gamma_2$ , bearing in mind that  $\gamma_1 > 0$ ,  $\gamma_2 > 0$  is required for convergence. Hence, the two adjustment coefficients,  $\gamma_1$  and  $\gamma_2$ , capture the size of the response of leverage ratio when it is, below and above its target level respectively. If the adjustment costs of increasing leverage are higher

than those of reducing leverage,  $\gamma_1$  will be lower than  $\gamma_2$ , suggesting that the adjustment speed for leverage below the target ratio is slower than that of the above target leverage ratio, and vice versa. It also suggests that the costs of being above the target leverage are higher than those of being below the target level.

As the costs of being away from the target ratio (the bankruptcy and agency costs for the above-target leverage ratio and the tax benefits reduction for the below-target leverage) are rising at an increasing rate as firms move above or below their target leverage ratio, firms with higher deviations from the target are expected to be more sensitive in adjusting leverage than those with lower deviations. This assumption, along with the adjustment costs which may depend on the size of deviation from the target leverage ratio, makes the adjustment rates vary depending on the size of disequilibrium, that is, whether the deviation is large or small. To investigate this, we develop a model using the threshold level for leverage below and above the target leverage ratio. The model will be able to capture two types of asymmetric adjustment. It allows firstly for the adjustment coefficients to vary depending on whether the firm's leverage ratio is below or above the target leverage ratio which is the same as in model 5.2; and secondly, for these adjustment coefficients to vary depending on whether the deviations from the target are large or small. For the purpose of this analysis, we split the values of the  $TRAC_{it}^{below}$  and  $TRAC_{it}^{above}$  variables according to the mean value of each variable as follows:<sup>84</sup>

For  $TRAC_{it}^{below}$

$$TRAC_{it}^{belowC-} = TRAC_{it}^{below} \text{ if } TRAC_{it}^{below} < \text{mean}, TARC_{it}^{belowC-} = 0, \text{ otherwise}$$

$$TRAC_{it}^{belowC+} = TRAC_{it}^{below} \text{ if } TRAC_{it}^{below} > \text{mean}, TARC_{it}^{belowC+} = 0, \text{ otherwise}$$

---

<sup>84</sup> The result showed that TRAC variable is normally distributed which makes the mean value is good measure of the threshold. However, the study used the median as another measure, but there results are not reported.

For  $TRAC_{it}^{above}$ <sup>85</sup>

$$TRAC_{it}^{aboveC-} = TRAC_{it}^{above} \text{ if } TRAC_{it}^{above} > \text{mean}, TRAC_{it}^{aboveC-} = 0, \text{ otherwise}$$

$$TRAC_{it}^{aboveC+} = TRAC_{it}^{above} \text{ if } TRAC_{it}^{above} < \text{mean}, TRAC_{it}^{aboveC+} = 0, \text{ otherwise}$$

By substituting  $TRAC_{it}^{belowC-}$ ,  $TRAC_{it}^{belowC+}$ ,  $TRAC_{it}^{aboveC-}$  and  $TRAC_{it}^{aboveC+}$  for the  $TRAC_{it}^{below}$  and  $TRAC_{it}^{above}$  variables in model 5.2, this model can be rewritten as:

$$\Delta TDA_{it} = \psi_0 + \psi_1 TRAC_{it}^{belowC-} + \psi_2 TRAC_{it}^{belowC+} + \psi_3 TRAC_{it}^{aboveC-} + \psi_4 TRAC_{it}^{aboveC+} + \varepsilon_{it} \quad (5.3)$$

This specification allows for both asymmetries and threshold points, beyond which leverage becomes more sensitive to deviations from its targets, i.e. firms may become less sensitive in adjusting leverage ratio when the deviation from the target level is small, while they are more sensitive in adjusting leverage when their leverage ratios exceed or fall below the thresholds, implying that the costs of being away from the target are higher for large deviations than small deviations.

### 5.2.3 Error Correction model 5.5

The error Correction Mechanism (ECM) is generally referred to what is known in literature as Granger Representative Theorem (Gujarati, 2003). The current study adopts the ECM to investigate whether target leverage ratio has any long-run effect on the current leverage ratio. The single-equation error correction model is adopted to develop the regression model which is used in this study to investigate the target adjustment theory of capital structure. This single-equation model can be explained by the following equation:

---

<sup>85</sup> As the negative values of the TRAC variable indicates that leverage is above the target level, the large negative values indicates that leverage is above its threshold level. The negative and positive signs of C subscript indicate that leverage is below and above the thresholds respectively.

$$\Delta LEV_{it} = \alpha_0 - \alpha_1(LEV_{it-1} - \beta_1 LEV_{it-1}^*) + \beta_0 \Delta LEV_{it}^* + \varepsilon_{it} \quad (5.4)$$

It is worth noting that co-integration between these time series ( $LEV_{it}$  and  $LEV_{it}^*$ ) is required for ECM to provide non-spurious regression. However, it also requires these series to be individually integrated; that is, they both are I (1) or they individually contain a unit root. In general, if the linear combination of non-stationary random variables results in a stationary series then the combined variables can be described as co-integrated (Granger, 1983). According to Gujarati (2003) and Keele and Boef (2004), the error correction mechanism is the preferred method for the estimation when two integrated time series are co-integrated since the error correction mechanism can be properly derived from the properties of integrated time series.<sup>86</sup> Based on this argument,  $LEV_{it}$  and  $LEV_{it}^*$  will be co-integrated if they have a long-term, or equilibrium, relationship between them. Their long run relationship is the equilibrium to which the actual leverage ratio converges over time, and the error term can be interpreted as the disequilibrium error or the distance that the actual leverage ratio is out or away of equilibrium at time t. According to, Keele and Boef (2004), if the variables are co-integrated, the model can yield both the long-run relations among variables and the short-run adjustment dynamics towards the long-run target leverage ratio.

Hence ECM requires the estimation of long relationship and short run dynamics of the variables under considerations. The long run relationship between  $LEV_{it}$  and  $LEV_{it}^*$  ( $\beta_1$ ) can be estimated by regressing  $LEV_{it}$  on  $LEV_{it}^*$  as follows:

$$LEV_{it} = \beta_1 LEV_{it}^* + \varepsilon_{it} \quad (5.4a)$$

The coefficient of  $LEV_{it}^*$  on the co-integration regression (5.4a) reflects the equilibrium effect of the target leverage ratio on the actual (existing) leverage ratio, often referred to as the long run effect. The error term  $\varepsilon_{it}$  can be calculated from

---

<sup>86</sup> The study uses the random walk without drift to test for the unit root as the following :  $Y_{it} = \rho Y_{it-1} + \varepsilon_{it}$  where,  $-1 \leq \rho \leq 1$

equation (5.4a) ( $\varepsilon_{it} = LEV_{it} - \beta LEV_{it}^*$ ). This residual will be used to test whether the variables are co-integrated.

For short run dynamic adjustment, the single-equation error correction model is adopted to develop the regression model which is used in this study to investigate the target adjustment theory of capital structure. This single-equation model can be explained by the following equation:

$$\Delta LEV_{it} = \alpha_0 - \alpha_1 (LEV_{it-1} - \beta_1 LEV_{it-1}^*) + \beta_0 \Delta LEV_{it}^* + \varepsilon_{it} \quad (5.4)$$

Where  $\Delta LEV_{it} = (LEV_{it} - LEV_{it-1})$  is the net change in leverage,  $(LEV_{it-1} - \beta_1 LEV_{it-1}^*)$  represents the Error Correction Term, which is renamed later as ECT it-1. It reflects the degree to which the actual leverage and long-run leverage ratio (target one) are outside of their equilibrium in the previous time period. As in the partial adjustment model, re-equilibration in the error correction model is not immediate, but occurs over future time periods (Keele and Boef, 2004). This suggests that at equilibrium  $(LEV_{it-1} - \beta_1 LEV_{it-1}^*) = 0$ . But in the short run, disequilibrium exists, this term  $(LEV_{it-1} - \beta_1 LEV_{it-1}^* \neq 0)$  is non-zero, and  $\alpha_1$  measures the speed of adjustment of the current leverage ratio.  $\Delta LEV_{it}^*$  is the change in target itself and its coefficient  $\beta_0$  reflects the contemporaneous or short-run effect of the target leverage ratio on the actual leverage ratio.

Based on the previous analysis,  $LEV_{it}$  and  $LEV_{it}^*$  are co-integrated of order I (1,1) if and only if an ECM exists. Before empirically testing the ECM, we therefore test for the existence of a co-integrating relationship between  $LEV_{it}$  and  $LEV_{it}^*$ . For this purpose, we use the Dickey-fuller test (DF tests hereafter) for the existence of a unit root in the residual or error term obtained from the co-integration regression (5.4a) as follows:

$$\Delta u_t = -\varphi u_{t-1} + \varepsilon_t \quad (5.4b)$$



The DF tests the null hypothesis that the residuals are I(1) (the variables are not co-integrated) against a I(0) alternative. The rejection of null hypothesis suggests that the residual or error term is stationary; that is, it is I(0), implying that  $LEV_{it}$  and  $LEV_{it}^*$  variables are co-integrated (Gujarati, 2003) and consequently, the regression model is not spurious. The t-statistic for the estimated coefficient  $\varphi$  from equation (5.4b) provides an indication regarding the co-integration for the two variables. However, the t-statistic or F-statistic, however; cannot be referred to the critical values in the standard t table or F table. As it does not have the usual t distribution, Dickey and Fuller have tabulated these critical values. Gujarati (2003) has supplied a clearer DF critical values table in Appendix D- table D.7, pp 976. The estimation result of equation 5.4b has showed that  $\varphi$  has the correct negative sign with a t-statistic of -3.274. Compared with the 1% Dickey-fuller critical  $\tau$  value (which is -2.58 for a number of observations more than 500), it is found to be much more negative than (-2.58). Hence, the residuals or the error terms obtained from co-integration regression are stationary (the residuals are I(0)), implying that  $LEV_{it}$  and  $LEV_{it}^*$  variables are co-integrated. Granger's Representation Theorem (Granger, 1983) has shown that whenever co-integration exists between non-stationary series there must be an ECM maintaining it. Therefore, this finding suggests that there exists an error correction mechanism, implying that the actual leverage ratio reverts back to the long run target leverage ratio adjusts.

To simply specify the empirical ECM (5.4), we substitute  $ECT_{it-1}$  for  $(LEV_{it-1} - \beta_1 LEV_{it-1}^*)$  and adding the  $DEF_{it}$  variable as an additional explanatory variable. Therefore, model 5.4 can be written as:

$$\Delta LEV_{it} = \psi_0 - \psi_1 ECT_{it-1} + \psi_2 \Delta LEV_{it}^* + \psi_3 DEF_{it} + \varepsilon_{it} \quad (5.5)$$

where  $ECT_{it-1}$  is the error correction term that captures the long-run relationship between the actual leverage ratio and long-run target leverage ratio. Therefore,  $\psi_1$  is the error correction rate, while  $\psi_2$  measures the short run effect of the target leverage ratio on the actual leverage. The statistically insignificant  $\psi_2$  suggests that the short run effect does not exist, while the insignificant  $\psi_1$  suggests that error correcting behaviour does not occur.

### 5.3 The estimation results

This section consists of three sub-sections, offering the results of investigating the target adjustment models: the symmetric and asymmetric partial adjustment model and the error correction model. Furthermore, they offer the results of comparing the target adjustment models between small and large firms as well as surplus and deficit firms.

#### 5.3.1 *The estimation results of symmetric adjustment model 5.1*

Table 5.1 reports the random effects estimation results for the partial adjustment model. As signified by the significant Lagrange Multiplier (LM) and insignificant Hausman tests, the model with random effects is the preferred specification. The results strongly support the target adjustment theory over the pecking order theory. The coefficient on the deficit variable is significantly positive but statistically different from one, suggesting that Jordanian firms use debt and equity to finance their financial deficit, with equity higher than debt. Moreover, the estimated coefficient is quite similar to that obtained from model 4.3 in chapter four (0.417) suggesting that nesting the pecking order and target adjustment models in the same regression does not affect the magnitude and the significance of deficit variable. This finding is not consistent with the finding of Shyam-Sunder and Myers (1999) that the trade-off theory is more powered than the pecking order theory when they are jointly tested. They find that coefficients of the target adjustment model remain statistically significant, while the pecking order model is rejected.

With respect to the TRAC coefficient estimates, it is found to be statistically significant, suggesting that Jordanian firms have a target leverage ratio and move gradually toward that target if any deviation exists. However, the results indicate that Jordanian firms adjust their actual leverage much more slowly. The estimated coefficients on the TRAC variable are 0.213, suggesting that 21.3% of the deviation from the target level can be eliminated within a year. Under the assumption that the speed of adjustment is constant, these results indicate that Jordanian firms need 2.91 years to adjust half of the deviation of their actual leverage ratios.<sup>87</sup> Overall, these results are lower than those reported in other countries. Shyam and Myers (1999) and Flannery and Rangan (2006) report 0.59

---

<sup>87</sup> The study uses the following formula to calculate the time required to eliminate half of the deviation of the actual leverage ratio from the target one:  $\ln(1/2) / \ln(1 - \text{TRAC}_{\text{coefficient}})$ .

and 0.34 in the US respectively, while in the UK, Ozkan (2001) reports 0.57. For Spanish data, Miguel and Pindado (2001) report 0.79.

**Table 5.1: The estimation results of symmetric adjustment model 5.1**

(Dependent variable: the change in total debt/total asset)

Independent variable	Full sample period 1997-2005	1997-2000	2001-2005
Intercept	-3.571 (0.000)	-4.245 (0.000)	-3.541 (0.000)
TRAC	0.213 (0.000)	0.246 (0.020)	0.178 (0.033)
DEF	0.402 (0.000)	0.451 (0.000)	0.364 (0.003)
DM <sub>year</sub>	YES	YES	YES
R <sup>2</sup>	0.26	0.29	0.24
P-value	(0.000)	(0.000)	(0.000)
N	912	432	456
LM Test	167.37 (0.000)	85.32 (0.000)	75.03 (0.000)
Hausman Test	15.38 (0.166)	1.98 (0.324)	3.21 (0.456)

**Note:** TRAC is the partial adjustment variable and is used to measure the speed of adjustment. The TRAC variable is defined as  $LEV_t^* - LEV_{t-1}$ . Deficits variable is the same as defined in model 4.2. DM<sub>year</sub> is the time dummy variables. Figures in brackets are the probabilities of significance based on the standard errors which are corrected for heteroskedasticity.

As the speed coefficient ( $\lambda_1$ ) is inversely proportional to transaction costs, the relatively low coefficient suggests that Jordanian firms have relatively large transaction costs when they borrow from banks, leading to higher agency costs between shareholders and creditors. This might be possible for Jordanian firms because these firms rely less heavily on banks to raise long term debt. As firms trade off the costs of being away from the target level with those of moving toward that target to rebalance their leverage ratio leverage, the low adjustment coefficient also indicates that these costs are much higher than those of staying away from the target. The low costs of being away from the target leverage ratio may be attributed to the Jordanian tax system which does not provide Jordanian firms with more tax advantage on debt. It just allows loss to carry forward, not carry back and accordingly, it is not important when firms experience losses. This finding may also be explained by the high costs of debt itself. Together with

the fall in the relative costs of equity capital due to the increases in stock prices recently on the ASE, it has reduced the impetus of Jordanian firms to make a fast adjustment toward their target leverage ratios.

The time dummy variables, which are included in model 5.1 to capture the unobservable time specific effects, are statistically significant, suggesting that there is a change in movement over time. To investigate this movement, we divide the sample period into two, 1997–2000 and 2001–2005. The distinction between the two periods is made by using the time dummy variable ( $D_{it}^{time}$ ) which equals one for the observations in 2001–2005, and zero otherwise (i.e., for observations in 1997–2000). The Chow test (the calculated F value exceeds the critical value at the 1% level) suggests that there is a structural break, and hence the two periods regressions are different. For the two periods, the random effects estimation results (as presented in Table 5.1) indicate that Jordanian firms have target leverage ratio, but adjustment toward that target occurs slowly. However, this adjustment is slower in 2001-2005 ( 0.178) than it is in 1997-2000 (0.246 ), supporting the view that increases in the stock prices, as well as the costs of debt, made Jordanian firms less sensitive in adjusting leverage when the adjustment requires an increase in the leverage level. In what follows, we compare the target adjustment model between small and large Jordanian firms.

### ***5.3.1.1 The estimation results of model 5.1 for small and large firms***

In this section, we investigate whether the leverage adjustment speed is different between small and large firms. We hypothesize that large Jordanian firms adjust their actual leverage ratio faster than small firms. The underlying argument behind this hypothesis is that costs of issuing debt or/and equity are much higher for small firms than large firms, and thereby the transaction costs are also (Titman and Wessels, 1988). Consistent with this view, Rudebusch and Oliner (1989, 1992) argue that transaction costs of issuing both debt and equity are higher for small firms than for large firms (Rudebusch and Oliner, 1989; 1992). Compared to large firms, small size firms are expected to have small investment projects and consequently have small issues of debt or/and equity which maximizes their transaction costs. Moreover, they are more likely to be subject to the bankruptcy costs (Titman and Wessels, 1988).

To the extent that this is the case, small firms are expected to be slower than large ones when the adjustment requires an increase in leverage level because the costs of

adjusting leverage will be large enough to reduce their incentive to revert quickly to their target level of leverage ratio.

**Table 5.2: The estimation results of symmetric adjustment model 5.1 for small and large firms**

Dependent variable: the change in total debt/total asset

Independent variable	Large firms	Small firms
Intercept	-4.298 (0.001)	-2.456 (0.000)
TRAC	0.166 (0.005)	0.287 (0.000)
DEF	0.319 (0.000)	0.476 (0.000)
DM <sub>year</sub>	YES	YES
R <sup>2</sup>	0.25	0.28
P-value	(0.000)	(0.000)
N	456	456
LM Test	77.17 (0.000)	101.54 (0.000)
Hausman Test	1.91 (0.210)	2.77 (0.372)

The results presented in Table 5.2 support the proposed hypothesis that small firms are slower than large firms in adjusting their leverage ratio toward the target ratio. The Chow test rejects the null hypothesis  $\lambda_{Small} = \lambda_{Large}$ , since the calculated F value exceeds the critical value at the 5% level. For small firms, the results show that the estimated coefficient on *TRAC* variable is 0.166, compared to 0.287 for large firms. All coefficients are statistically significant. This finding supports the view that transaction costs are higher for small firm than for large ones, implying that small firms are slower when the adjustment requires an increase in leverage level. Another possible explanation for this low adjustment speed could be that for small firms, the cost of being off target is relatively low compared to the cost of adjusting leverage. This is somehow reasonable because small Jordanian firms are less profitable and highly earnings volatile, suggesting that they are more risky (see analysis of correlation in chapter three). As the Jordanian tax system is relatively less important for high risk firms, these firms gain low tax advantage on debt, making the cost of being away from the target level relatively low. In what follows, we investigate whether the Jordanian

firms have different adjustment speed depending on whether they face financial deficit and surplus.

### **5.3.1.2    *The estimation results of symmetric adjustment model 5.1 for surplus and deficit firms***

In this section, we investigate whether the adjustment occurs in a manner consistent with the pecking order theory. Hovakimian, *et al.* (2004) provides evidence suggesting that firms have a target leverage ratio but also prefer internal financing over costly external financing. This implies that firms may make adjustments in a manner consistent with the prediction of the pecking order theory. The pecking order theory suggests that, due to the adverse selection costs, firms prefer internal financing over costly external ones, while if external financing is needed, firms prefer debt funds to equity funds. Accordingly, firms with financial deficits tend to issue debt rather than issuing equity, while those with financial surpluses are expected to retire debt rather than equity to avoid the higher costs of re-issuing equity and to save their debt capacity for future financing requirements. If so, firms with financial deficits are expected to adjust their leverage faster than those with financial surpluses.

Contrary to this argument, firms with financial surplus may likely be less subject to the risk of bankruptcy or financial distress, reducing the cost of capital and consequently raising debt at more attractive rates. If so, these firms will be faster than those with financial deficit when the adjustment requires an increase in the leverage level. Therefore, we examine these two conflicting arguments by testing the hypothesis that leverage adjustment speed is different between financial surpluses and deficits. For this purpose, we divide the sample firms into two; firms with financial surplus and those with financial deficit.

The results presented in Table 5.3 show that the estimated adjustment coefficients are higher for surplus firms (0.360) than those for deficit firms (0.141). This difference is statistically significant as the null hypothesis that the two regressions are not different is soundly rejected (the calculated F value exceeds the critical value at the 1% level). These results generally suggest that surplus Jordanian firms are significantly faster than deficit ones when the adjustment requires an increase in the leverage level, supporting the view that they are less risky than deficit ones. This finding does not support the hypothesis that firms make their leverage adjustment in a way proposed by the pecking

order theory. However, the results obtained from the symmetric adjustment model should be carefully interpreted. If the adjustment costs of increasing and reducing leverage are not symmetrical, the estimated coefficient on the TRAC variable may be higher/lower depending on whether the adjustment cost of increasing leverage is lower/higher than those of reducing leverage. The hypothesis of asymmetric adjustment costs will be examined in the following section.

**Table 5.3: The estimation results of model 5.1 for surplus and deficit firms**  
Dependent variable: the change in total debt/total asset

Independent variable	Deficit Firms	Surplus Firms
Intercept	-5.357 (0.000)	-5.614 (0.000)
TRAC	0.141 (0.036)	0.360 (0.000)
DM <sub>year</sub>	YES	YES
R <sup>2</sup>	0.09	0.20
P-value	(0.000)	(0.000)
N	516	396
LM Test	124.17 (0.000)	166.77 (0.000)
Hausman Test	2.13 (0.310)	2.56 (0.351)

**Note:** TRAC is the partial adjustment variable and is used to measure the speed of adjustment. The TRAC variable is defined as  $LEV^*_t - LEV_{t-1}$ . DM<sub>year</sub> is the time dummy variables and included in the regression to control for the time effect. YES /NO refers to the inclusion of variables in the regression. Figures in brackets below the coefficient are the probabilities of significance based on the standard errors which are heteroskedasticity-robust.

### 5.3.2 The estimation results of asymmetric adjustment models 5.2 and 5.3.

The asymmetric partial adjustment model examines the hypothesis of asymmetric adjustment costs for increasing and reducing leverage by considering the situations of leverage below and above the target level. The results presented in Table 5.5 shows that the estimated adjustment coefficients  $\gamma_1$  and  $\gamma_2$  are statistically significant, but they are statistically significantly different as the null hypothesis that  $\gamma_1 = \gamma_2$  is soundly

rejected.<sup>88</sup> However, the adjustment coefficient is higher for leverage above its target ratio (0.314) than for leverage below its target (0.151), suggesting that the adjustment costs of increasing leverage are higher than those of reducing it. It also suggests that the costs of being above the target level are higher than those of being below the target. This finding provides an answer to the question raised by Cai and Ghosh (2003, p 28) “why does a firm adjust its debt level toward the industry mean when it is above the mean, while it is indifferent when the debt level is below the mean?”.

Overall, these findings suggest that Jordanian firms are more sensitive in reducing leverage than in increasing leverage when their leverage ratios are out of their target ratios, implying that the benefit of reducing leverage (the reduction in bankruptcy and agency costs) is higher than that of increasing it (tax savings). Consequently, they are slower when the adjustment requires an increase in leverage level than a reduction in leverage level. Based on the assumption that the adjustment is constant over time, these results suggest that the time required for upward adjustment (increasing leverage) is approximately twice the time required for downward adjustment (reducing leverage). On average, Jordanian firms need 3.9 years to eliminate half of the divergence from their target leverage level when they are below the target level compared to 1.9 years when they above the target level.

A possible explanation for this finding is that the bankruptcy and agency costs are rising at an increasing rate as leverage moves up, reducing the marginal tax savings and consequently making firms less sensitive in increasing leverage to match its target. These costs become more critical as a firm moves above its target leverage ratios, making firms more sensitive in reducing leverage to avoid the bankruptcy risks. Together, with the finding above that the adjustment costs of increasing leverage are higher than those of reducing leverage, this makes target adjustment (reversion) faster for leverage above its target ratio than for leverage below its target ratio. This also makes leverage adjustment more sensitive to the size of deviations (small or large) from the target level, regardless of being below or above the target, i.e. firms with large deviations below their target leverage ratios have low leverage and consequently incur low costs of bankruptcy. Hence, these firms may benefit (tax savings) from increasing leverage. However, these savings become significantly lower when a firm increases its leverage ratio to the point close to its target, making the firm less sensitive to

---

<sup>88</sup> The Wald test regarding the null hypothesis that  $\gamma_1 = \gamma_2$  is found to be statistically significant at the 1% level (15.69 with a p- value of 0.000)



eliminating the small divergence from its target level. The random effects estimation for model 5.3 provides results supporting this hypothesis.

**Table 5.4: The results of asymmetric adjustment models 5.2 and 5.3**

Dependent variable: the change in total debt/total asset		
Independent variable	Model 5.2	Model 5.3
	1	2
Intercept	-3.494 (0.003)	-2.348 (0.000)
$TRAC^{below}$	0.151 (0.000)	-
$TRAC^{above}$	0.314 (0.000)	-
$TRAC_{it}^{belowC-}$	-	0.060 (0.405)
$TRAC_{it}^{belowC+}$	-	0.179 (0.008)
$TRAC_{it}^{aboveC-}$	-	0.236 (0.000)
$TRAC_{it}^{aboveC+}$	-	0.374 (0.000)
DEF	0.379 (0.000)	0.409 (0.005)
DM <sub>year</sub>	YES	YES
R <sup>2</sup>	0.29	0.42
P-value	(0.000)	(0.000)
N	912	912
LM Test	70.89 (0.000)	214.25 (0.000)
Hausman Test	14.10 (0.197)	1.87 (0.875)

**Note:**  $TRAC^{below}$  and  $TRAC^{above}$  are the below-and above-target leverage ratio. DEF is the deficit variable and is defined the same as in model 4.4. DM<sub>year</sub> is the time dummy variables. Figures in brackets below the coefficient are the probabilities of significance based on the standard error which are corrected for heteroskedasticity.

As mentioned in section 5.2.2, model 5.3 allows the rates of adjustment to vary depending firstly, on whether the leverage is above or below the target level; and secondly on whether the deviations (above and below) from the target level are large or small. The results of estimating model 5.3 are reported in column 2 of Table 5.5. Again the results support the asymmetric adjustment, and suggest that leverage adjustment (target reversion) is faster for leverage above its target level than for leverage below its target. Furthermore, the results support quicker leverage adjustment for large deviations

than for small deviations, with smaller below-target leverage deviations exhibiting greater persistence. This difference is statistically significant as the null hypotheses  $\psi_1^{belowC^-} = \psi_2^{belowC^+}$  and  $\psi_1^{aboveC^-} = \psi_2^{aboveC^+}$  is soundly rejected. The estimated coefficient on the  $TRAC_{it}^{belowC^-}$  variable is found to be statistically insignificant, while it is statistically significant for the  $TRAC_{it}^{aboveC^-}$  variable, suggesting that no leverage adjustment takes place when there are small below-target leverage deviations (the null hypothesis that  $\psi_1^{belowC^-} = 0$  cannot be rejected). In this case, adjustment may be delayed by the presence of high transaction costs and the low benefit of increasing leverage because the probability of bankruptcy increases with leverage. This might be the reason as to why firms with leverage above their target level are more sensitive in reducing leverage, with quicker adjustment for large deviations. The estimated coefficients on the  $TRAC_{it}^{aboveC^-}$  and  $TRAC_{it}^{aboveC^+}$  variables are 0.236 and 0.374 respectively. These results suggest that the costs of having and keeping leverage above its target are critical for the Jordanian firms.

In what follows, we test the hypothesis of asymmetric adjustment costs for small and large firms to investigate whether the adjustment occurs at different rates for large and small firms when they have leverage above or below their long run target leverage ratio.

### **5.3.2.1 The results of asymmetric adjustment model 5.2 for small and large firms**

In the previous section, we have provided evidence suggesting that adjustment costs of increasing leverage are higher than those of reducing leverage. Moreover, the estimation results of the adjustment speed for small and large size groups in section 5.3.1.1 provide evidence suggesting that the adjustment costs for small Jordanian firms are higher than those for large ones. This along with the fact that there are economies of scale in bankruptcy (Warner, 1977) makes the adjustment costs differential between increasing and reducing leverage level likely to be different for large firms than for small ones.<sup>89</sup> Based on the view of Warner (1977), small firms may have a weak desire to make leverage adjustment when the adjustment requires an increase in the leverage level, while they will be highly sensitive in reducing leverage when the adjustment requires a reduction in the leverage level. This is because of the higher costs of having and

---

<sup>89</sup> In chapter three, we provided evidence suggesting that borrowing capacity for Jordanian firms is significantly limited by their bankruptcy risk, where leverage ratio is found to be positively related to a firm's size.

keeping above-target leverage (bankruptcy and agency costs) for small firms than for large firms. Therefore, we firstly hypothesize that for both size groups, the adjustment costs of increasing and reducing leverage are not symmetrical, with costs being higher for increasing than reducing leverage. Secondly, we hypothesize that small Jordanian firms with leverage below/above the target level are slower/faster than large ones when the adjustment requires an increase/reduction in the leverage level.

**Table 5.5: The estimation results of asymmetric model 5.2 for small and large firms**

Dependent variable: the change in total debt/total asset

Independent variable	Small Firms	Large Firms
Intercept	-4.274 (0.000)	-2.874 (0.000)
$TRAC^{below}$	0.094 (0.090)	0.191 (0.005)
$TRAC^{above}$	0.251 (0.003)	0.304 (0.000)
DEF	0.329 (0.000)	0.479 (0.000)
DM <sub>year</sub>	YES	YES
R <sup>2</sup>	0.27	0.37
P-value	(0.000)	(0.000)
N	456	456
LM Test	79.55 (0.000)	71.43 (0.000)
Hausman Test	1.91 (0.309)	3.36 (0.466)

The results presented in Table 5.6 support the proposed hypotheses. For both size groups, the results show that the adjustment costs of increasing leverage are higher than those for reducing leverage. This finding supports the proposed hypothesis that upward adjustment costs are higher than downward adjustment costs. Moreover, it also suggests that the cost of having and keeping leverage above the target level are much higher than those of having leverage below the target level. This finding is signified by the rejection of the null hypothesis that  $\gamma_1 = \gamma_2$ , since the Wald test is found to be statistically significant at the 5% level for small and large firms. Therefore, Jordanian firms are expected to have a downward adjustment faster than their upward adjustment. However, the results suggest that small and large Jordanian firms have different

adjustment costs for increasing and reducing leverage and consequently, have different speeds of adjustment. This difference is found to be statistically significant where the Chow test suggests the rejection of the null hypothesis that the two (small and large firms) regressions are not different (the calculated F value is found to be greater than the critical value at the 1% level).

For small firms, the estimated coefficients on the  $TRAC_{it}^{below}(\gamma_1)$  and  $TRAC_{it}^{above}(\gamma_2)$  are 0.094 and 0.251 compared to 0.191 and 0.304 for large firms. All coefficients are statistically significant at the 1% level except for small firms,  $\gamma_1$  is found to be statistically marginally significant, suggesting that small firms have very weak impetus to make adjustment when it requires an increase in leverage level. For small firms, this finding suggests that the costs of moving towards the target level are significantly large which supports the view that costs of bankruptcy, as well as transaction costs are high. Moreover, it implies that costs of having and keeping leverage below the target level are relatively not large. However, for the estimated coefficient on the  $TRAC_{it}^{above}(\gamma_2)$  the difference between small and large firms is not noticeably large, indicating that the costs of having leverage above the target level are too significant for small as well as large firms. This, together with the lower adjustment costs for reducing leverage, makes small and large Jordanian firms show a relatively strong desire to make adjustment when it requires a reduction in the leverage level. In the following section, we test the hypothesis of asymmetric adjustment costs for firms with financial surpluses and deficits.

### ***5.3.2.2 The estimation results of asymmetric adjustment model 5.2 for surplus and deficit firms***

In this section, we test the hypothesis of asymmetric adjustment costs of increasing and reducing leverage level for surplus and deficit firms. As previously mentioned, there is evidence that firms have target leverage ratios but also prefer internal funds over external funds (Hovakimian *et. al.*, 2004). So one can expect that firms make leverage adjustment toward their target depending on whether they have surpluses or deficits. According to Myers and Majluf (1984), borrowing through debt instruments, especially the less risky ones, helps firms avoid the adverse selection costs of issuing equity. Therefore, firms which have fund deficits tend to raise debt, while those with surpluses are expected to retire debt to save their debt capacity for future financing requirements.

If so, leverage adjustment for firms with deficits is faster than those with surpluses. This might also suggest that firms with fund surpluses or deficits may experience different upward and downward adjustment speeds: i.e., firms facing surpluses (deficits) with leverage below (above) the target level are expected to adjust their leverage slower than those with leverage above (below) the target. In this case, leverage adjustment occurs in a way consistent with the prediction of the pecking order theory, where the dominant factor in a firm's decision to increase or reduce leverage is the adverse selection costs.<sup>90</sup> This manner of leverage adjustment ignores the adjustment costs of moving towards the target level, which are expected to be different between increasing and reducing leverage. It also ignores the costs of financial distress or bankruptcy, which are rising at increasing rates as firms move above their target leverage ratio. Although firms with leverage below the target may benefit from an increase in leverage, it is not as critical for them to correct the divergence of a below-target leverage ratio as an above-target leverage ratio. This, together with the fact that firms with financial surpluses are expected to be less subject to the risks of financial distress or bankruptcy, makes adjustment costs differential for increasing and reducing leverage level likely to be higher for firms with deficits than for with surpluses. Based on the previous evidence that firms with financial surpluses are faster when the adjustment requires an increase in the leverage level, we hypothesise that upward and downward adjustments occur at different rates for surplus and deficit firms. More precisely, we hypothesise that firms with deficits with leverage below the target level are slower than those with surplus, while they are faster than surplus firms when they are above their target leverage ratio.

The results presented in Table 5.7 show that surplus and deficit sample groups experience different adjustment costs. The results show that upward adjustments for firms with surpluses are faster than those with internal fund deficits. The estimated coefficient on  $TRAC_{it}^{below}$  is higher for firms with surpluses (0.283) than those with deficits (0.085), suggesting that they are faster than deficit ones when the adjustment requires an increase in the leverage level. This finding supports the proposed hypothesis that surplus firms are less likely to experience bankruptcy costs, indicating that they will be able to raise leverage at more attractive rates.

---

<sup>90</sup> The current study provides evidence in chapter four suggesting that adverse selection costs are only one of many factors that firms take into account when making financing decision.

**Table 5.6: The estimation results of asymmetric model 5.2 for surplus and deficit firms**

Dependent variable: the change in total debt/total asset

Independent variable	Deficit Firms	Surplus Firms
Intercept	-5.781 (0.001)	-6.783 (0.000)
$TRAC_{it}^{below}$	0.085 (0.065)	0.283 (0.000)
$TRAC_{it}^{above}$	0.207 (0.040)	0.233 (0.000)
DM <sub>year</sub>	YES	YES
R <sup>2</sup>	0.21	0.30
P-value	(0.000)	(0.000)
N	516	396
LM Test	271.95 (0.000)	275.03 (0.000)
Hausman Test	1.69 (0.998)	2.43 (0.992)

For leverage ratio above the target ratio, the estimated coefficient on  $TRAC_{it}^{above}$  is higher for firms with surplus (0.233) than those with deficit (0.207), indicating that they are faster when the adjustment requires the reduction in leverage level. The results generally suggest that for leverage below and above the target leverage ratio, the adjustment costs of increasing and reducing leverage are higher for deficit firms than for surplus firms. The difference is statistically significant as the Chow test suggests (the calculated F value exceeds the critical value at the 5% level). Furthermore, for surplus and deficit firms the Wald test rejects the null hypothesis that  $\gamma_1 = \gamma_2$  at the 1% level, suggesting that the adjustment costs of increasing and reducing leverage is different. However, for deficit firms, the results support proposed hypothesis that adjustment costs of increasing leverage are larger than those of reducing leverage, while for surplus firms they are not, where the estimated coefficient is found to be larger for  $TRAC_{it}^{below}$  than for  $TRAC_{it}^{above}$ . These results suggest that firms with surplus make upward leverage adjustment faster than their downward leverage adjustment, indicating that adjustment costs of increasing leverage level are lower than those of reducing leverage level. However, this might not be the case. These firms might benefit greatly from increasing leverage when they are below the target leverage ratio, while it is not critical for them to move back toward the target level if the costs of keeping above-target leverage are not significantly large. As analysis of correlation suggests, surplus Jordanian firms are

highly profitable firms with more tangible assets and hence they are less likely to experience bankruptcy and agency costs. Moreover, they are expected to gain more tax benefit on debt than deficit firms do.<sup>91</sup> This finding may also suggest that large Jordanian firms are making adjustment in a way consistent with the pecking order theory, while small firms are not.

This paragraph discusses the estimation results of model 5 in Byoun (2008).<sup>92</sup> Byoun (2008) used this model to examine the capital structure adjustment conditional on the required external capital changes as measured by a financial deficit/surplus.  $D_{it}^{surplus}$  is found to be statistically significant, suggesting that firms tend to change leverage to move back to their target leverage, while  $D_{it}^{deficit}$  was marginally significant with a positive sign, implying that increasing leverage is restricted by the probability of bankruptcy risk. For  $TDE_{it}D_{it}^{above}$  and  $TDE_{it}D_{it}^{below}$  with surplus, the results show that they are statistically significant, with the coefficient higher for below–target leverage ratio than for above–target leverage ratio, suggesting that Jordanian firms with a surplus are less likely to be subject to a high bankruptcy risk, and consequently are able to raise debt at more attractive interest rates compared with deficit firms. This finding is somehow different from what is reported by Byoun (2008) who finds that firms with surplus retain above-target leverage even if they use their surpluses to retire debt. For  $TDE_{it}D_{it}^{above}$  and  $TDE_{it}D_{it}^{below}$  with surplus, the estimated coefficients are 0.213 and 0.291 respectively compared with 0.301 and 0.089 for the same variables in Byoun (2008) respectively. While for  $TDE_{it}D_{it}^{above}$  and  $TDE_{it}D_{it}^{below}$  with surplus, the coefficients on the two variables are found to be 0.102 and 0.219 respectively which are not consistent with what is reported by Byoun. The results obtained from model 5 in Byoun (2008) are not significantly different from those obtained from estimating model 5.2, suggesting that the findings of testing the hypothesis of asymmetric adjustment for

<sup>91</sup> Analysis of correlation shows a positive correlation between the  $NDEF_{it}^{Sur}$  variable and profitability (0.201) and between  $NDEF_{it}^{Sur}$  and tangibility (0.089).

<sup>92</sup> The model:

$$\Delta D_{it} / A_{it} = (\beta_1 D_{it}^{surplus} + \beta_2 D_{it}^{deficit}) + (\beta_3 D_{it}^{surplus} + \beta_4 D_{it}^{deficit}) TDE_{it} D_{it}^{above} + (\beta_5 D_{it}^{surplus} + \beta_6 D_{it}^{deficit}) TDE_{it} D_{it}^{below} + \varepsilon_{it}$$

where  $\Delta D_{it} / A_{it}$  is the leverage ratio,  $TDE_{it} D_{it}^{above}$  is the above-target leverage ratio,  $TDE_{it} D_{it}^{below}$  is the below-target leverage ratio,  $D_{it}^{surplus}$  and  $D_{it}^{deficit}$  are dummy variables for surplus and deficit financial funds respectively, while  $D_{it}^{above}$  and  $D_{it}^{below}$  are dummy variables for leverage above and below its target leverage ratio respectively.

below-and above-target leverage for firms with surplus and deficit are not affected by the methodology used .

### 5.3.2.3 The estimation results of error correction model 5.5

The error correction model allows for the estimation of both short run and long run effects of long run target leverage ratio on the actual leverage ratio. Table 5.7 presents the random effects estimation results for the Error Correction Term model. The significant Lagrange Multiplier (LM) and insignificant Hausman tests suggest that the model with random effects is the preferred specification. The coefficients estimate of error correction term (ECT) suggests that Jordanian firms have long run target leverage ratio and these firms change their actual leverage ratio relative to the long-run target level of leverage. However, the small magnitude of error correction rate indicates that Jordanian firms correct the divergence of their actual leverage ratios from the long run target level slowly. The estimated coefficient on ECT is 0.231 and statistically significant at the 1% level, indicating that one fourth of the divergence is eliminated in the following period.

**Table 5.7: The estimation results of ECT model 5.5**

Dependent variable: the change in total debt/total asset					
Independent variable	Full sample	Small firms	Large firms	Deficit firms	Surplus Firms
Intercept	-4.926 (0.000)	-3.001 (0.000)	-5.540 (0.000)	-3.895 (0.000)	-4.635 (0.000)
ECT	-0.231 (0.000)	-0.175 (0.060)	-0.297 (0.005)	-0.086 (0.090)	-0.370 (0.020)
$\Delta LEV_{it}^*$	0.108 (0.245)	0.009 (0.116)	0.094 (0.065)	0.042 (0.145)	-0.142 (0.033)
DEF	0.407 (0.000)	0.325 (0.000)	0.462 (0.000)	-	-
DM <sub>year</sub>	YES	YES	YES	YES	YES
R <sup>2</sup>	0.22	0.18	0.24	0.19	0.26
P-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	912	456	456	516	396
LM Test	266.93 (0.000)	226.15 (0.000)	212.03 (0.000)	165.91 (0.000)	188.03 (0.000)
Hausman Test	6.05 (0.811)	1.69 (0.998)	2.43 (0.992)	6.52 (0.771)	1.43 (0.999)

**Note:** Deficits variable is defined as  $DEF = (D_{it} + I_{it} + \Delta WC_{it}) - C_{it}$ . ECT is the error correction term and defined as  $LEV_{t-1} - LEV_{t-1}^*$ .  $\Delta LEV_{it}^*$  is the change in target leverage ratio. DM<sub>year</sub> is the time dummy variables Figures in brackets below the coefficient are the probabilities of significance based on the standard error which are corrected for heteroskedasticity.



Although the magnitude of the estimated coefficients obtained from the error correction term model are relatively larger than those obtained from the partial adjustment model, the explanatory power of the partial symmetric adjustment model is higher than that of the error correction model. The results show that the estimated coefficient on  $\Delta LEV_{it}^*$  (which is used in model 5.5 to capture the short run effect) is not statistically significant, suggesting that there are no short run effects of the target leverage on the actual leverage. However, the results of comparing this model between small and large firms and between surplus and deficit firms show that the estimated coefficient on  $\Delta LEV_{it}^*$  is significant only for large and surplus firms, indicating that these firms experience short run adjustment, although it is not large.

#### **5.4 Conclusion**

This chapter has considered the potential effects of asymmetric adjustment costs on leverage adjustment and tested for these by estimating a number of symmetric and asymmetric partial adjustment models. It has also considered the potential long run and short run effects of the target leverage ratio on leverage adjustments. A number of interesting insights into the dynamic behaviour of leverage have been uncovered in Jordan and even in developed countries.

Firstly, the empirical sections estimated a statistically significantly low adjustment coefficient which suggests that leverage adjustment is slower for Jordanian firms than those in other countries. The finding of lower adjustment rates means that there would be significant constraints restricting the Jordanian firms from making faster adjustment toward their target when this adjustment requires an increase of leverage level, such as the transaction costs, bankruptcy costs and borrowing costs. Secondly and importantly, the two models considered are strongly supportive of the proposition that the adjustment costs are different between increasing and reducing leverage, and that the adjustment costs associated with an increase (expansion) in the leverage level are greater than those associated with a reduction in the leverage level. They are also supportive of the proposition that the costs of being above the target leverage ratio are higher than those of being below the target ratio, implying that the benefit of reducing leverage (the reduction on bankruptcy and agency costs) are greater than those of increasing leverage (the tax savings). These give rise to relatively slow upward adjustment when the

adjustment requires an increase in the leverage level. Conversely, in a downturn, adjustment is faster and this mitigates the probability of firms going bankrupt.

Thirdly, the estimated results support the belief that there are thresholds levels for both above and below target leverage ratio beyond which adjustment become more sensitive to the size of deviations: large deviations from the target leverage appear to be associated with faster adjustment when compared with small deviations from the target leverage ratios. Indeed, with a small interval below the target leverage ratio the adjustment is not significantly different from zero, which suggests that the marginal tax savings from debt become significantly lower when a firm expands leverage to the point approximately closed to the target. Fourthly, the results of comparing the target adjustment models between small and large firms support the hypothesis of asymmetric adjustment costs of increasing and reducing leverage, with higher adjustment costs associated with an expansion in the leverage level rather than a reduction in the level. Moreover, the two models considered support the view that the adjustment costs for small firms are higher than for large firms, suggesting that they are slower when the adjustment requires an expansion in the leverage level. However, both groups firms experience quicker downward adjustment, this is faster for large firms, when they are above their target leverage ratio which indicates that the bankruptcy and agency costs are very critical for Jordanian firms.

Fifthly, the estimated symmetric adjustment model suggests that target adjustment in the Jordanian firms occurs in a manner inconsistent with the suggestion of the pecking order theory. Firms with financial surpluses appear to be faster than firms with financial deficits in adjusting their leverage toward the target ratios when the adjustment requires an increase in the leverage level. However, the estimated asymmetric adjustment model supports the proposition that the adjustment costs are not symmetric between increasing and reducing leverage for deficit firms only, while surplus firms appear to be faster when they are below the target level than above the target level. This finding suggests that, for firms with a surplus, adjustment takes place in a way consistent with the pecking order theory. However, it also suggests that the costs of having and keeping leverage above its target are not significantly large for surplus firms.

Finally, the estimated error correction model supports the symmetric adjustment model that Jordanian firms are slower when the adjustment requires an increase in the leverage level. It also does not support any short run effect of the target leverage on the actual

leverage in the Jordanian firms. However, the short run effect exists only for large and surplus firms.

This conclusion provides evidence suggesting that Jordanian firms are value-maximizing firms since they have a target leveraged ratio and move gradually towards their target if any deviation from that target level exists. Hence, the target adjustment or trade-off theory is relevant to the Jordanian context. In fact, extensive efforts and measures have been taken to shift the Jordanian market toward the free economy and integrate this market into the world market. More precisely, the government efforts to liberalize the financial system, privatize the public sector and increase the capital market efficiency firstly, lead to the reduction in the state share or stack on the listed firms, secondly, make the market signals price information to its participants, thirdly, to result in a substantial transformation of the institutional set-up within which firms have been operating. As a result, Jordanian financial managers are given more flexibility in choosing the capital structure of the firm and consequently, providing those with the incentive to maximize their firms' values by setting the target level of capital structure that maximize the value.

## **CHAPTER 6 - SUMMARY AND CONCLUSIONS**

### **6.1 Introduction**

The focus of this study has been the financing behaviour of the Jordanian firms listed on Amman Stock Exchange during the period 1997-2005. The study is constructed to achieve three objectives: firstly, investigate evidence on the determinants of optimal leverage ratio for the Jordanian listed firms. Secondly, investigate evidence on the pecking order theory and finally investigate evidence on the target adjustment theory. For the purpose of analysis, a sample of 114 non-financial companies (62 Industrial Companies and 52 Services Company) was used and analyzed using pooled and panel data analysis. The sample data was extracted from two sources; the firm's annual reports and ASE data base (The Yearly Shareholding Companies Guide and the Amman Stock Exchange Monthly Statistical Bulletins).

This chapter aims to present the main conclusions and discuss some of their possible implications for the financing policy. In addition, limitations of the study will be discussed. Finally, it ends with suggestions for future research. The chapter is structured as follows: section 6.2 provides a summary of the main findings of this study and some their possible implications. Section 6.3 provides limitations and some recommendations for further research.

### **6.2 Findings and implications**

The empirical part that comprises chapter three, four and five is devoted to analysing and interpreting the results obtained from the econometric analysis. Chapter three investigated the empirical evidence on the determinants of optimal leverage ratio for Jordanian firms listed in ASE over the period 1997-2005. In this chapter, the study developed a static model to investigate these determinants. The results showed that firm's size, profitability and tangibility are positively related to leverage while non-debt tax shields, growth opportunities and earnings are negatively related. These results suggest that the borrowing capacity of Jordanian firms is largely limited by their expected risks of financial distress or bankruptcy. This is not a surprising result because

the Jordanian bankruptcy law emphasizes on the role of lenders and put less emphasize on the firm as an ongoing concern. It is not conducive to reorganization of firms; in contrast, firms entering bankruptcy are usually liquidated at higher costs. Consistent with their conservative credit policies, Jordanian banks usually offer debt to high quality firms, to those who have low risks of financial distress or bankruptcy. These findings can be considered as an indication that firms generally finance their activity procedure implied by the trade-off theory of capital structure not the pecking order theory.

The second empirical chapter of this study introduced the estimation results of the models used to investigate empirical evidence of pecking order theory. The finding did not support the pecking order theory. The results showed that the Jordanian firms use debt and equity funds to finance their financing deficit with equity issues track the financing deficit relatively more closely. Hence equity is not the last resort for financing as the pecking order theory predict. The results also showed that financial surplus and financial deficit affect leverage differently, supporting the prediction of pecking order theory that firms with funds deficit will tend to raise debt, while those with surplus will use up their surplus to retire debt or invest in cash and marketable securities. However, the results showed that Jordanian firms are more sensitive in retiring debt to take up surplus than in expanding debt to meet their financing requirement, suggesting that expanding debt are constrained by the bankruptcy and agency costs. Although the results did not support the pecking order theory for both small and large Jordanian firms, small Jordanian firms depend on equity more debt and more than large firms, since large firms use debt more than equity to finance their financing deficit. As the Jordanian firms do not use surplus to retire equity, the results suggest that Jordanian firms use up their surplus to retire debt and invest in cash or marketable securities with debt retirement constitute a major portion of the total mounts of surplus. Compared with large firms, the results showed that small Jordanian companies use up their financial surplus in securities more than retiring debt. Finally, the results showed that the deficit variable is one among other factors affect the firm's financing behaviour where adding the deficit variable to the conventional leverage equation does not change the sign and the significance of the explanatory variables that have been suggested as determinants of the optimal leverage ratio in chapter three.

The last empirical chapter showed the empirical investigation of target adjustment theory. The results showed that Jordanian firms have a target leverage ratio; however, they have weak desire to move toward that target. The adjustment speed coefficient is

found to be positive and statistically significant under symmetric partial adjustment model. The estimated adjustment coefficient is quite low, suggesting that target leverage adjustment in the Jordanian firms occurs slowly. Beside the explanation of transaction costs, increases in stock prices in the Jordanian stock market and the conservative credit policies of the Jordanian banks provide another explanation as to why Jordanian firms have a slow adjustment toward their target leverage ratio. This is besides the relatively higher cost of debt itself and the weak desire of these firms to issue debt for tax considerations, since tax deductions for depreciations are found to be negatively related to leverage which suggests that Jordanian firms substitute non-debt tax shields for debt tax shield.

The results of asymmetric adjustment model suggest that the rates of adjustment vary depending on whether the leverage ratio is above or below its target increasing debt. They are higher for above-target leverage ratio than for below-target leverage ratio. This implies that Jordanian firms experience downward adjustment faster than their upward adjustment. This finding also supports the view that the financing decisions are largely affected by the expected risk of bankruptcy. The results for small and large sample firms largely support these explanations, since upward adjustment of large firms is found to be faster than those for small firms which suggest that large firms are too-big to fail and face low transaction costs comparable to those for small firms. When the target adjustment theory models are tested with two sub-samples of surpluses sample firms and deficit sample firms, it was found that the firms with internal funds surpluses moves faster than those with internal funds. The results also showed that speed of adjustment is significantly different for small and large firms, since large firms can adjust their leverage faster than small firms. This pattern is found under partial adjustment and error correction model. These findings support the view that large Jordanian firms are able to obtain debt easier than small ones and Jordanian banks offer debt to high quality firms.

The analysis of the previous findings regarding the capital structure theories suggests that the trade-off or target adjustment theory is more powerful than the pecking order theory in explaining the financing behaviour of the Jordanian firms listed on ASE. Hence, it is more relevant to the Jordanian context, implying that Jordanian firms are value maximizing firms. Since 1990, Jordan has been implementing a comprehensive social and economic reform program (financial liberalization and privatization programs), reducing the state share or stack on the listed firms, increasing the capital

market efficiency, and giving more flexibility to the Jordanian financial managers in choosing the capital structure of the firm which provides those managers with the incentive to maximize the value of their firms. The reasons for not making the pecking order theory relevant in the Jordanian context are firstly, investors in the Jordanian market prefers dividend payments, making the supply of internally generated funds from retained earnings inelastic. This may provide another support for the target capital theory where paying cash dividend creates a positive reaction from the market that may increase the value of the firms. Secondly, the increase in interest rates on loans due to the financial liberalization and the adoption of conservative credit policies by the Jordanian banks force Jordanian firms, in general, and the small ones, in particular, to finance their investment opportunities by equity. This along with the increase in the stock prices on ASE made equity financing less expensive than debt financing, increasing the reliance of Jordanian firms on equity funds for financing which is inconsistent the prediction of pecking order theory of capital structure.

Several implications can be drawn from the previous analysis of the study findings and conclusions. Firstly, the study demonstrated that much of existing theoretical literature on the field of capital structure can be applied to Jordan market as one of developing markets. Many of the factors that were found to be significant in the determination of capital structure are the same as those found in developed countries.

Secondly, it is cleared that the findings regarding the pecking order and target adjustment theories that Jordanian stock market is not in minimum use. Non financial firms in general and small ones in particular use equity more than debt. This shed the light on the importance of equity in financing decisions. It also empirically provides evidence supporting the measures that the Jordanian government (the Ministry of Industry and Trade and the Amman Stock Exchange (ASE) Authorities) has taken to develop the Amman Stock exchange and to increase its efficiency to make it signals price information to its participants. Consequently, the policy makers in Jordan should consider the findings of this study to undertake further steps in liberalizing the financial system and developing the ASE to encourage the Jordanian firms to this market more.

Thirdly, the findings also demonstrated the need for improving the bond market in Jordan to increase the availability of long-term external source of funds and provide Jordanian firms with more alternative sources of finance. A well developed bond market is important for financial development in developing market. Moreover, policy makers in Jordan should take in consideration the inefficiency of credit management and

practices of Jordanian banks. Such inefficient management hinders the objectives of the monetary policy to stimulate economic growth and to fix the imbalances in the economic sector.

### **6.3 Limitations of the study**

While this study has provided valuable insight, there are some limitations which may limit the generalisability of these findings.

The first limitation stems from the period of study where, the sample data of the study covered the period of 1997-2005. During this period, Amman Stock Exchange has witnessed an increase in stock prices with the adoption of conservative credit policies by Jordanian banks. Therefore, non-financial Jordanian firms, in general, and the small ones, in particular, find better to go to the stock market to raise funds. Hence, the results of the study are restricted within the period of the study. Moreover, the results are also specific to Jordan, but they do shed light on the generality of the rival models of capital structure. Many of the structural characteristics of the Jordanian capital market are however, also present in other developing markets. Therefore, the results from this study may help to provide the basis for comparative research both in the region and in other developing countries.

The second limitation comes from the data set. It was extracted from the firms' annual reports and the publications of the Amman Stock exchange. The reliability and accuracy of that data will, therefore affect the robustness of the results of the current study. All efforts have been made to insure the accuracy of the data, but this potential data problem remains. However, this problem is not limited only to developing capital market; it may be found in developed ones. It is worth noting that the failure of data to meet the assumptions underlying regressions may lead to biased estimates of the coefficient and standard of error, making the p values of t-test and F-test invalid. Therefore, the study has checked how well collected data meet the assumptions of regressions. The Stata programs (9.1) that we used to analyze its data has many of these methods built-in, and others are available that can be downloaded over the internet. In chapter three (section 3.3.1); we explored the methods of testing data and show how to verify regression assumptions. For example, we test for unusual and influential data (outliers and leverage), that is, a single observation that is substantially different from all other observations can make a large difference in the results of your regression



analysis. Moreover we test for Multicollinearity, Linearity, Normality and Homoscedasticity of Residuals. Furthermore, to insure the accuracy of the data, data for the sample of study are compared using four alternative sources of data; the firm's annual reports, the Amman Stock Exchange's publications (The Yearly Shareholding Companies Guide and Amman Stock Exchange Monthly Statistical Bulletins), CDs (containing the balance sheet and income statement of each company listed on ASE) and the website of ASE. The comparison result shows no difference among the four alternative sources of data.

The third limitation stemmed from the various proxy variables used in the study. Although the proxy variables used were defended empirically and theoretically, they remain proxies and may not perfectly represent the theoretical propositions. Moreover, it is difficult to find the proxies that are not related to another. However, the proxy variable issue is a problem common to all empirical studies in the field of capital structure.

#### **6.4 Recommendations for further research**

The current study is the first attempt to examine empirically the suggestions of pecking order, target adjustment theories and the determinants of capital structure in Jordan taking into account a large sample size. A sample data of 114 non financial Jordanian firms over the period of 1997-2005 was used. The study has developed new models and used a well-defended testing methodology. It has produced a set of results which are of interest in themselves. It also has helped to reveal much about the nature of corporate finance in Jordan. Moreover, it has provided the basis for testing the explanatory power of the most competitive models under the corporate finance theory. The study generally provided a number of insights which could form the basis of both further research in Jordan, and comparative research in other developing markets.

Therefore, further research can be carried out to extend the investigation to other developing markets such as Middle East and North Africa (MINA), South East Asia (such as Malaysia, Indonesia, and Thailand), and Latin America (such as Brazil and Argentina). The incentives for this kind research on other developing markets come from the contradictory results and the limitations of those studies that currently exist. Most of the existing studies have sample selection problems since they rely on small samples, and even the leading studies have often used samples comprising only large

companies in each market. An immediate area of further research therefore would be to replicate these studies using more comprehensive and representative samples of firms from these countries.

In the Jordanian context, further research could be conducted to investigate the role of the Amman Stock Exchange (ASE) in developing the Jordanian economy. Other research may be significant in the area of the market efficiency and the corporate financial decisions.

In addition, further research might attempt to extend the current examination of this study to include the two remaining sectors (banking and insurance). This would make the results of this study more effective; and as a result, provide further evidence for the policy implications previously discussed. It also provides empirical investigation to the difference that might exist between the capital structure of financial firms and non-financial ones.

## References

- Adedeji, A. (2002). A Cross Sectional Test of Pecking Order Hypothesis against Static Trade-Off Theory on UK Data. *Working Paper*, UK: University Of Birmingham.
- Adedeji, A. (1998). Does the Pecking Order Hypothesis Explain the Dividend Payout Ratios of Firms in the UK. *Journal of Business Finance and Accounting*, **25**, 1127-157.
- Allen, D. (1993). The Pecking Order Hypothesis: Australian Evidence. *Applied Financial Economics*, **3**, 101-120.
- AL-Nuaimat, A. & AL-Bakheet, Y. (2005). The Socio Economic Impacts of the Association Agreement between Jordan and The EU Countries. Amman: Royal Scientific Society.
- AL-Otoom, R. (1996). *The Jordanian experience in Achieving Economic Stability and Structural Adjustment*. A study submitted to the Arab society for economical research, Egypt 46-50.
- AMMAN FINANCIAL MARKET (1997), *The Twentieth Annual Report*. Research and Studies Department, Amman, Jordan.
- AMMAN FINANCIAL MARKET (1998), *The Twenty First Annual Report*. Research and Studies Department, Amman, Jordan.
- AMMAN STOCK EXCHANGE (1999), *The First Annual Report*. Research and External Relations Department, Amman, Jordan.
- AMMAN STOCK EXCHANGE (2000), *The Second Annual Report*. Research and External Relations Department, Amman, Jordan.
- AMMAN STOCK EXCHANGE (2001), *The Third Annual Report*. Research and External Relations Department, Amman, Jordan.
- AMMAN STOCK EXCHANGE (2002), *The Fourth Annual Report*. Research and External Relations Department, Amman, Jordan.
- AMMAN FINANCIAL MARKET (2003), *The Fifth Annual Report*. Research and Studies Department, Amman, Jordan.
- AMMAN FINANCIAL MARKET (2004), *The Sixth Annual Report*. Research and Studies Department, Amman Jordan:
- AMMAN STOCK EXCHANGE (2005), *The Seventh Annual Report*. Research and External Relations Department, Amman, Jordan.
- Anderson, M. & Prezas, A. (1998). The Interaction of Investment and Financing Decisions under Moral Hazard. *International Review of Economics and Finance*, **7**, 379-392.
- Anderson, D., Sweeney, D. & William, T. (1999). *Statistics for Business and Economics*. St.Paul (MN): West Publishing Company.

- Ashton, D.J. (1989). The Cost of Capital and the Imputation Tax System. *Journal of Business Finance & Accounting*, **16**(1), 75-88.
- Baker, M. & Wurgler, J., (2002). Market Timing and Capital Structure. *Journal of Finance*, **57**(1), 1-32.
- Banerjee, S., Heshmati, A. & Wihlborg, C. (2000). The Dynamics of Capital Structure. SSE/EFI, *Working Paper Series in Economics and Finance*, No. 333, Sweden.
- Barclay, M.J. & Smith, C.W. (1995). The Maturity Structure of Corporate Debt. *Journal of Finance*, **50**(2), 609-631.
- Barclay, M.J. & Smith, C.W. (1995, 1999). The Capital Structure Puzzle: Another Look at the Evidence. *Journal of Applied Corporate Finance*, **12** (1), 8-20.
- Baskin, J. (1989). An Empirical Investigation of the Pecking Order Theory. *Financial Management*, **18**, 26-35.
- Beattie, V., Goodacre, A. & Thomson, S.J. (2006), Corporate Finance Decisions: UK Survey Evidence. *Journal of Business Finance and Accounting*, **33**(9/10), 1402-1434.
- Benito, A. (2003). The Capital Structure Decisions of Firms: Is There a Pecking order? *Working Paper*. Spain: Banco De Espana
- Bevan, A. & Danbolt, J. (2002). Capital Structure and Its Determinants in the UK – A Decomposition Analysis. *Applied Financial Economics*, **12**(3), 159-170.
- Bevan, A. & Danbolt, J. (2004). Testing for Inconsistencies in the Estimation of UK Capital Structure Determinants. *Applied Financial Economics*, **14**(1), 55-66.
- Bhaduri, Saumitra (2002). Determinants of Corporate Borrowing: Some Evidence from the Indian Corporate Structure. *Journal of Economics and Finance*, **26**, 200-215.
- Booth, L., Aivazian, V., Demircug-Kunt, A. & Maksimovic, V. (2001). Capital Structures in Developing Countries. *Journal of Finance*, **56**(1), 87-130.
- Brealey and Myers.** (2002). Principles of Corporate Finance. *Seventh Edition*
- Brounen, D., Jong, A.D. & Koedijk, K. (2005). Capital Structure Policies in Europe: Survey Evidence. *Journal of Banking and Finance*, **30**(5)1409-1442
- Bryman, A. & Cramer, D. (2001). *Quantitative Data Analysis with SPSS release 10 for Windows: A guide for Social Scientists*. 1<sup>st</sup> ed., East Sussex: Routledge.
- Byoun, S. (2008). How and when do firms adjust their capital structures toward targets? *Journal of Finance*, **63**(6), 3069-3096
- Cai, F. & Ghosh, A. (2003). Tests of Capital Structure Theory: A Binomial Approach. *Journal of business and economics studies*, **9**(2), 20-32.

- Calomiris, W., Orphanides, A., Sharpe, S. (1994). Leverage as a State Variable for Employment, Inventory Accumulation, and Fixed Investment. National Bureau of Economic Research (NBER), Working paper No.W4800
- Carruth, A. & Dickerson, A. (2003). An asymmetric Error Correction Model of UK Consumer Spending. *Applied Economics*, **35**, 619-630.
- CENTRAL BANK OF JORDAN (1992). *The Twenty Ninth Annual Report*. Research Department Amman, Jordan.
- CENTRAL BANK OF JORDAN (1999). *The Thirty Sixth Annual Report*. Research Department, Amman, Jordan.
- CENTRAL BANK OF JORDAN (2000). *The Thirty Seventh Annual Report*, Research Department, Amman, Jordan.
- CENTRAL BANK OF JORDAN (2002). *The Thirty Ninth Annual Report*, Research Department. Amman, Jordan.
- CENTRAL BANK OF JORDAN (2003). *The Fourteenth Annual Report*, Research Department. Amman, Jordan.
- CENTRAL BANK OF JORDAN (2005). *The Forty Two Annual Report*, Research Department. Amman, Jordan.
- Chen, J. (2004). Determinants of capital structure of Chinese-listed companies. *Journal of Business research*, **57**(12), 1341-1351.
- Chirinko, R.S. & Singha, A.R. (2000). Testing Static Trade-off against Pecking Order Models of Capital Structure: A Critical Comment. *Journal of Financial Economics*, **58**(3), 417-425.
- Chung, K.H. (1993). Asset Characteristic and Corporate Debt Policy: An Empirical Test. *Journal of Business Finance & Accounting*, **20**(1), 83-98.
- Cull, R. & Xu, L. (2005). Institutions, Ownership, and Finance: the Determinants of Profit Reinvestment among Chinese Firms. *Journal of Financial Economics*, **77**, 177-146.
- DeAngelo, H. & Masulis, R. (1980). Optimal Capital Structure under Corporate and Personal Taxation. *Journal of Financial Economics*, **8**, 3-29.
- Delcoure, N. (2007). The determinants of capital structure in transitional economies. *Journal of International Review of Economics and Finance*, **16**, 400-415.
- De Miguel & Pindado, J. (2001). Determination of Capital Structure, New Evidence from Spanish Panel of Data. *Journal of Corporate Finance*, **7**, 77-99.
- DEPARTMENT OF STATISTICS (2005), *Statistical Year Book*. No.56. Amman, Jordan: Department of Statistics.

- Donaldson, G. (1961). *Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity*. Boston: Division of Research, Graduate School of Business Administration, Harvard University.
- Drake, P. (1977). Securities Markets in Less-developed Countries. *Journal of Development Studies*, **13** (2), 73-91.
- El-Khouri, R. & Civelek, M. (1993). Stock Price Volatility and Macroeconomics Variables: Evidence from Amman Stock Exchange. *Abhath Al-Yarmouk*, **7**(3), 9-27.
- EL-Khouri, R. & Hmedat, W. (1992). The Effect of Earning Variability on Capital Structure: The Case of Jordanian Firms. *Abhath Al-Yarmouk*, **8**(3), 49-64.
- Engle, R. F. & Granger, W.J. (1998). Unit Root Tests and Asymmetric Adjustment. With An Example Using the Term Structure of Interest Rates. *Journal of Business and Economics Statistics*, **16**(3), 304-311.
- Eriotis, N., Vasilios, D. & Neokosmidi, Z.V. (2007). How Firm Characteristics Affect Capital structure: An Empirical Study. *Managerial Finance*, **33**(5), 321-331.
- EXPORT AND FINANCE BANK (2002a). *The Jordanian Economy: Country Report*. Amman, Jordan.
- EXPORT AND FINANCE BANK (2002b). *Economic Report: Privatisation Update*, 111(1). Amman, Jordan.
- Fama, F. & French, R. (1998). Taxes, Financing Decisions, and Firm Value. *Journal of Finance*, **53**(3), 819.
- Fama, F. & French, R. (2005). Finance Decisions: Who issue stock? *Journal of financial Economics*, **76**, 549-582.
- Fischer, E.O., Heinkel, R. and Zechner, J., 1989. Dynamic Capital Structure Choice: Theory and Tests. *Journal of Finance*, **44**(1), 19.
- Flannery, M.J. & Rangan, K.P. (2006). Partial Adjustment Target Capital Structures. *Journal of Financial Economics*, **79**, 469-506.
- Frank, M. & Goyal, V. (2003). Testing the Pecking Order Theory of Capital Structure. *Journal of Financial Economics*, **67**, 217-248.
- Fazzari, S., Hubbard, G. & Petersen, B. (1988). Financing Constraints and Corporate Investment. *Brookings Papers on Economic Activity I*, 141-195.
- Gandhi, D., Saunders, A. & Woodward, R. (1980). Thin Capital Markets: A Case Study of the Kuwaiti Stock Market. *Applied Economics*, **12**(3), 341-349
- Graham, J. (2003). Taxes and corporate finance: A review. *The review of financial studies*, **16** (4), 1075-1129

- Graham, J.R. & Harvey, C.R. (2001). The Theory and Practice of Corporate Finance: Evidence from the Field. *Journal of Financial Economics*, **60**(2/3), 187-243.
- Graham, J.R., Lag, M. H. & Shackelford, D.A. (2004). Employee Stock Options, Corporate Taxes, and Debt Policy. *Journal of Finance*, **59**, 1586-1615.
- Graham, J.R. & Tucker, A.L. (2006). Tax Shelters and Corporate Debt Policy. *Journal of Financial Economics*, **81**, 563-594.
- Greene, W.H. (2003). *Econometric Analysis*. Prentice Hall: Upper Saddle River, NJ.
- Grossman, S. & Hart, O. (1982). Corporate Financial Structure and Managerial Incentives. *The Economics of information and Uncertainty*, Edited by J.McCall. Chicago: University of Chicago press, 107-137.
- Gujarati, D.N., (1999). *Essentials of Econometrics*. Irwin/McGraw-Hill: Boston.
- Gujarati, D.N., (2003). *Basic Econometrics* Fourth Edition, Irwin/McGraw-Hill: New York.
- Hair, J., Anderson, R., Tatham, R. & Black, W. (1998). *Multivariate Data Analysis*. 5<sup>th</sup> ed., New Jersey: Prentice Hall.
- Harris, M. & Raviv, A. (1991). The Theory of Capital Structure. *Journal of Finance*, **32**, 297-356.
- Harris, Milton & Raviv, Artur, (1990). Capital Structure and the Informational Role of Debt. *Journal of Finance*, **45**, 321-349.
- Hovakimian, A., Opler, T. & Titman, S. (2001). The Debt-Equity Choice. *Journal of Financial and Quantitative Analysis*, **36**(1), 1-24.
- Hovakimian, A., Hovakimian, G. & Tehranian, H. (2004). Determinants of Target Capital Structure: The Case of Dual Debt and Equity Issues. *Journal of Financial Economics*, **71**, 517-540.
- Hsiao, C. (1988). *Analysis of Panel Data*. Cambridge University Press
- Huang, S. G. & Song, F. M., (2005). The Determinants of Capital Structure: Evidence from China. *China Economic Review*, 1-23.
- Jalilvand, A. & Harris, R.S. (1984). Corporate Behaviour in Adjusting to Capital Structure and Dividend Target: An Econometric Study. *Journal of Finance*, **39**, 127-45.
- Jensen, M. (1986). Agency Cost Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review*, **76**(2), 323-329.
- Jensen, M. & Meckling, W. (1976). The theory of the Firm: Managerial Behaviour, Agency Costs, and Ownership Structure. *Journal of Financial Economics*, **3**(4), 305-360.

Jensen, M., Gergal, P., & Thomas, S. (1992). Simultaneous Determination of Insider Ownership, Debt, and Dividend policies. *Journal of financial and Quantitative Analysis*, **27**, 247-263.

JORDAN SECURITIES COMMISSION (1999). *The First Annual Report*. Amman, Jordan

Kadapakkam, P., Kummar, P. & Riddick, L. (1998) The Impact of Cash Flows and Firm Size on Investment: the International Evidence. *Journal of Banking and Finance*, **22**, 293-320.

Kayham, A. & Titman, S. (2007). Firms' histories and Their Capital Structures. *Journal of Financial Economics*, **83**, 1-32.

Keele, L. & De Boef, S. (2004). Not Just for Cointegration: Error Correction Models with Stationary Data  
<http://www.nuff.ox.ac.uk/Politics/papers/2005/Keele%20DeBoef%20ECM%20041213.pdf>. Downloaded on 10.09.2006.

Kennedy, P. (1998). *A Guide to Econometrics*. 4<sup>th</sup> ed. Oxford: Blackwell.

Kenny, G. (2003). Asymmetric Adjustment Costs and the Dynamic of Housing Supply. *Economic Modelling*, **20**, 1097-1111.

Kraus, A. and Litzenberger, R. (1973). A state preference model of optimal financial leverage. *Journal of Finance*, **28**, 911-921.

Kunt, A. & Maksimovice, V. (1994). Capital Structure In Developing Countries: Evidence From Ten Countries. *Working Paper*, The World Bank, Policy Research Paper, No. 1320.

Lasfer, M.A. (1995). Agency Costs, Taxes and Debt: The UK Evidence' *European Financial Management*, **1**(3), 265-285.

Leary, M.T. & Roberts, M.R. (2005). Do Firms Rebalance Their Capital Structures? *Journal of Finance*, **60**(6), 2575-2619.

Maghyreh, A. (2004). The Effect of Financial Liberalization on the Efficiency of Financial Institutions: The Case of Jordanian Commercial Banks. *The Journal of Transitional Management Development*, **9**(2/3), 71-106.

Mackie-Mason, J.K. (1990). Do Taxes Affect Corporate Financing Decisions? *Journal of Finance*, **45**(5), 1471-1493

Marsh, P. (1982). The Choice between Equity and Debt: An Empirical Study. *Journal of Finance*, **37**(1), 121-144.

Mayer, C. (1990). Financial System, Corporate Finance, and Economic development in Hubbard, R.G. (ed.), *Asymmetric information, Corporate Finance, and Investment*, Chicago: University of Chicago and NBER, 297-306.



- Mayer, C. & Sussman, O. (2004). *A New Test of Capital Structure*. Centre for Economic Policy Research.
- Miguel, A.D. & Pindado, J. (2001). Determinants of Capital Structure: New Evidence from Spanish Panel Data. *Journal of Corporate Finance*, **7**, 77-99.
- Mira, F. & Gracia, J. (2002). Pecking order Versus Trade-off: An Empirical Approach to the Small and Medium Enterprise Capital structure. *Working paper*, University of Valencia, Spain
- Miller, M. H. (1977). Debt and Taxes. *Journal of Finance*, **32**(2), 261-275.
- Modigliani, F & Miller, M. and. (1958). The Cost of Capital, Corporate Finance and the Theory of Investment. *American Economic Review*, **48**, 261-297.
- Modigliani, F & Miller, M. (1963). Corporate Income Taxes and the Cost of Capital, A Correction. *American Economic Review*, **53**, 433-443.
- Myers, S.C. (2001). Capital Structure. *Journal of Economic Perspectives*, **15**(2), 81-102.
- Myers, S. (1984). The Capital Structure Puzzle. *Journal of Finance*, **39**, 575-592.
- Myers, S. & Majluf, N. (1984). Corporate Finance and Investment Decisions When Firms Have Information That Investors Do not Have. *Journal of Financial Economics* **13**, 187-221.
- Nakanishi, Y. (2001). Dynamic Labour Demand Using Error Correction Model. *Applied Economics*, **33**(6), 783-790.
- Nuri, J., & Archer, S. (2001). Target Adjustment Model against Pecking Order Model of Capital Structure. *Working Paper*. University of Surrey, UK.
- Oliner, S. & Rudebusch, G. (1989). Internal Finance and Investment: Testing the Role of Asymmetric information and Agency Costs. *Working Papers* (101), *Economic Activity Section, Division of Research and Statistics*, Federal Reserve System.
- Oliner, S. & Rudebusch, G. (1992). Source of the Financing Hierarchy for Business Investment. *The Review of Economics and Statistics*, **74**(4), 643-654.
- Ozkan, A. (2001). Determinants of Capital Structure and Adjustment to Long Run Target: Evidence from UK Company Panel Data. *Journal of Business Finance and Accounting*, **28**(1/2), 175-198.
- Panno, A. (2003). An Empirical Investigation on the Determinants of Capital Structure: The UK and Italian Experience. *Applied Financial Economics*, **13**(2), 97-112.
- Rajan, R. & Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *Journal of Finance*, **50**, 1421-1460.
- Rawashdeh, M. & Qudah, K. (1997). The Practice of Jordanian Firms in Financing Capital Expenditures. *Journal of College of Administration and Economy*, **4**(10), 27-42.

Regulation No. 54 for the Year 2000, 'Regulating Non Jordanian Investment Regulation', Amman, Jordan

Ross, S. (1977). The Determination of Financial Structure: the Incentive-Signalling Approach. *Bell Journal of Economics*, **8**(1), 23-40.

Ross, S.A. (1985). Debt and Taxes and Uncertainty. *Journal of Finance*, **40**(3), 637-657.

Saket, B. (2000). The restructuring of Jordan's Capital market Has Improved the Investment Inflows. *The Arab Bank Review*, **2**(2), 49-51.

Scott F. & Johnson Dana J. (1982). Financing Policies and Practices in Large Corporations. *Financial Management*, **11**(2), 51-59.

Scott Jr., J.H. (1977), Bankruptcy, Secured Debt, and Optimal Capital Structure. *Journal of Finance*, **32**(1), 1-19

Shyam-Sunder, L. & Myers, S.C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, **51**(2), 219-244.

Singh, A. (1994). How Do Large Corporations in Developing Countries Finance Their Growth. *Finance and International Economy*, **8**, 120-142.

Stulz, R. (1990). Managerial Discretion and Optimal Financing Policies. *Journal of Financial Economics*, **26**, 3-27

Suwaidan, M. & Al-Khoury, R. (2000). The Impact Of Firm Size And Internal Funding On Investment: Evidence From Jordanian Firms. *Al-Manarah*, **6**( 2), 77-92.

Tabachnick, B. & Fidell, L. (1996). *Using Multivariate Statistics*. 3<sup>rd</sup> ed., New York: Harper Collins College

Taggart, R.A. Jr 1985. Effects of Regulation on Utility Financing: Theory and Evidence. *Journal of Industrial Economics*, **33**(3), pp. 257.

Taggart, R.A. Jr (1977). A Model of Corporate Financing Decisions. *Journal of Finance*, **32**(5), 1467

Tashakkori, A. & Teddie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. London: Sage Publications Ltd.

The Income Tax Law No. 14 of the Year 1995, Ministry of Finance. Amman. Jordan.

The Companies Act No. 1 for the Year 1989. Amman. Jordan.

The Companies Act No. 22 of the Year 1997. Amman. Jordan.

The Securities Law No. 23 for the Year 1997, Amman, Jordan.

- Titman, S. & Wessels, R. (1988). The Determinants of Capital Structure Choice. *Journal of Finance*, **43**(1), 1-19.
- Tong, G. & Green, C.J. (2005). Pecking Order Or Trade-off Hypothesis? Evidence on the Capital Structure of Chinese Companies. *Applied Economics*, **37**(19), 2179-2189.
- VanderWijst, N.K. & Thurik, R.K. (1993), Determinants of Small Firm Debt Ratios: An Analysis of Retail Panel Data. *Small Business Economics*, **5**(1), 55-65.
- Warner, J. (1977). Bankruptcy Costs: Some Evidence. *Journal of Finance*, **32**, 337-347.
- Williamson, O.E., 1988. Corporate Finance and Corporate Governance. *Journal of Finance*, **43**(3), 567-591.