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# The Pecking Order Theory and the Static Trade Off Theory: Comparison of the Alternative Explanatory Power in French Firms

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## Abstract

*The purpose of this study is to revisit the capital structure theory and compares the explanatory power of the Pecking Order Theory (POT) and the Static Trade-off theory (STT). Using a sample of French firms introduced on the stock exchange and belonging to SBF 250 index over a period from 1999 to 2005. We use in the paper a panel data. It provides the researcher a large number of data points, increasing the degrees of freedom and reducing the colinearity among explanatory variables, hence improving the efficiency of econometric estimates. Basing on the studies made by Shyam-Sunder and Myers (1999); Frank and Goyal (2003), our result shows that the estimation of both empirical models explaining the financial structure favors the pecking order theory on the French companies. These results can be explained by the existence of asymmetric information involving adverse selection problems. While static trade-off-model is not fit to explain the issuance of new debt issue in French firms. The evidence from pecking order model suggests that the internal fund deficit is the most important determinant that possibly explains the issuance of new debt. The simple form of the target adjustment model states that changes in the debt ratio are explained by deviations of the current ratio from the target. This paper compares the explanatory power of the Pecking Order Theory (POT) and the Static Trade-off theory (STT) on French firm.*

**Keywords:** Pecking Order Theory, Static Trade-off Theory, internal fund deficit, debt ratio, capital Structure, asymmetric information.

## Introduction

The determination of an optimal capital structure has been one of the most contentious issues in the finance literature. Modigliani and Miller (1958, 1963) put the framework of the modern theory of the companies' financial structure by leaning on the possibilities of arbitration on the financial market. The introduction, of several variables, such as bankruptcy cost, the personal tax and the agency cost, allowed widening the field of analysis to many research for an optimal financial structure. The recent literature offers two rival theories such as: the Pecking Order Theory (POT) and the Static Trade off Theory (STT).

The static trade-off theory, which focuses on the benefits and costs of issuing debt, predicts that an optimal target financial debt ratio exists, which maximizes the value of the firm. The optimal point can be attained when the marginal value of the benefits associated with debt issues exactly offsets the increase in the present value of the costs associated with issuing more debt (Myers, 2001). The benefits of debt are the tax deductibility of interest payments. The tax deductibility of corporate interest payments favours the use of debt. This simple effect however, can be complicated by the existence of personal taxes (Miller, 1977) and non-debt tax shields (DeAngelo and Masulis, 1980). Another benefit of debt is that it mitigates the manager-shareholder agency conflict. Corporate managers have the incentive to waste free cash flow on perquisites and bad investment. Debt financing limits the free cash flow available to managers and thereby helps to control this agency problem (Jensen and Meckling, 1976). The costs associated with issuing more debt are the costs of financial distress (Modigliani and Miller, 1963) and the agency costs triggered by conflicts between shareholders and debtors (Jensen and Meckling, 1976). Costs of financial distress are likely to arise when a firm uses excessive debt and is unable to meet the interest and principal payments.

The pecking order theory of capital structure is one of the most influential theories of corporate finance. The pecking order theory suggests that firms have a particular preference order for capital used to finance their businesses (Myers and Majluf, 1984). Owing to the information asymmetries between the firm and potential investors, the firm will prefer retained earnings to debt, short-term debt over long-term debt and debt over equity. Myers and Majluf (1984) argued that if firms issue no new security but only use its retained earnings to support the investment opportunities, the information asymmetric can be resolved. That implies that issuing equity becomes more expensive as asymmetric information insiders and outsiders increase. Firms which information asymmetry is large should issue debt to avoid selling under-priced securities. The capital structure decreasing events such as new stock offering leads to a firm's stock price decline.

This study complements the previous studies by comparing the explanatory power of these two models on 88 French companies introduced on the stock exchange and belonging to SBF 250 over the period from 1999 to 2005 using the panel data.

The following study examines the explanatory power of the Pecking Order Theory and the Static Trade-off theory. The first section one summarizes the theoretical argument behind both models and prior empirical work carried out. The second section describes the two competing hypotheses. The third section describes the data and definition of variables. The fourth section presents Analysis and discussion of Results. The last section offers the conclusions.

## Literature Review

Syham – 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 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 tested 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).

Shyam-Sander and Myers (1999) introduced a test of pecking order theory of capital structure. Their test is based upon the prediction of what type of financing is used to fill the "financing deficit". The financing deficit is defined using the cash flow identity, as the growth in assets less the growth in current liabilities (except the current portion of long-term debt) less the growths in retained earnings. According to this identity, this deficit must be "filled" by the net sale of new securities. Shyam-Sander and Myers ague that, except for firms at or near their debt capacity, the pecking order predicts that the deficits will be filled entirely with new debt issues. They propose to test these two models:

***The pecking order model***: $\mathbf{\Delta D_{it} = a + b_{po}\ DEF_{it} + e_{it}}$

The funds flow deficit is: $\mathbf{DEF_t = DIV_t + X_t + \Delta W_t + R_t - C_t}$

Where, $\mathbf{DIV_t}$: dividend payments;

$\mathbf{X_t}$ : capital expenditures;

$\mathbf{\Delta W_t}$: net increase in working capital;

$\mathbf{R_t}$ : current portion of long-term debt at start of period;

$\mathbf{C_t}$: operating cash flows, after interest and taxes.

$\mathbf{\Delta D_{it}}$ : is the amount of debt issued or retired

The simple pecking order predicts that the firm will only issue or retire equity as a last resort. It fill their deficit by using only debt, therefore, they suppose that a = 0 and $b_{po} = 1$.

***The Static Trade-off model*: $\mathbf{\Delta D_{it} = a + b_{TA}\ (D^*_{it} - D_{i\ t-1}) + e_{it}}$**

Where $\mathbf{D^*_{it}}$**:** the target debt level for firm i at time t.

They propose that the hypothesis to be tested is $b_{TA} > 0$ indicating adjustment towards the target, but also $b_{TA} < 1$ implying positive adjustment costs.

Shyam-Sander and Myers argue that the "Sample" version of the pecking order predict = 0 and βpo = 1. Intuitively, the slope coefficient in this regression indicates the extent to which debt issues cover the financing deficit; they acknowledge that βpo may be less than 1 for firms. Near their debt capacity, behavior, the firms in their sample should not be significantly constrained by such concerns. They find βpo = 0.75 with an R2 of 0.68. They interpret this as evidence that "the pecking order is an excellent first-order description of corporate financing behavior for the sample. They also find that a target adjustment model based on the tradeoff theory has little power to explain the changes in debt financing for these firms.

The search of Shyam-Sunders and Myers (1999) has generated an interesting discussion in the literature of capital structure. First, Chirinko and Singha (2000) were among the first to

criticize Shyam-Sander and Myers through illustration using several examples that their test has no power to distinguish between plausible alternative hypotheses, as Fama and French (2002); Frank and Goyal (2003) and Lemon and Zender (2008).

Chirinko and Singha (2000) criticizes the modeling and the inferences of Shyam-Sunder and Myers (1999) by arguing 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. The Pecking Order's weak form accepts a low level of equity issues, which is considered by Chirinko and Singha (2000) as a more plausible and likely hypothesis to be found and tested. In this case, the b coefficient would be less than but close to one. According Chirinko and Singha (2000), the hierarchical model initiated by Shyam Sunder and Myers (1999) is likely to be rejected even when the firms' behavior is consistent with the assumptions of the POT. The hierarchical model can be also used even when the financial behavior firms is inconsistent with the POT.

Fama and French (2002) examined many of the predictions of the tradeoff and the pecking order theories with respect to capital structure and dividend policy. They argue that for the majority of the predictions, the two theories agree and generally report findings consistent with these shared predictions. Consistent with Shyam-Sander and Myers (1999), Fama and French (2002) find that (for their large sample) debt is used to address variations in investment and earnings in the short term. However, they also find, as in Frank and Goyal (2003), that small; high-growth companies issue most of the equity (see Fama and French (2002)). Fama and French join Frank and Goyal in arguing that these findings contradict the pecking order theory.

Frank and Goyal (2003) also question the conclusion drawn by Shyam-Sander and Myers (1999) on several fronts. The most interesting challenges are the extent to which the Shyam-Sunder and Myers findings hold for broader sample of firms, whether the results hold over a longer time horizon (in particular including the 1990s) and whether their findings hold for subsamples of firms with high level of asymmetric information. For their broader sample of firms, Frank and Goyal show that the prediction βpo =1 does not hold and that it significantly weakens in the 1990's, even for the types of firms (large, mature) examined by Shyam-Sunder and Myers (1999). Frank and Goyal (2003) and Fama and French (2005) argued that small, high-growth companies issue most of the equity; this finding contradicts the pecking order theory. Similarly, Leary and Roberts (2007) also question the ability of the pecking order to explain financing decisions. Using a different empirical approach, they find little support for the pecking order, even for subsamples of firms for which they argue the pecking order should be most likely to hold.

Lemmon and Zender (2008) also take firms' debt capacities into account when testing the pecking order theory. They consider a firm as not being financially constrained when it has rated debt outstanding, regardless of the level of the specific rating. They demonstrate the importance of controlling for the level of debt capacity in the test of Pecking Order Theory.
They found that the pecking order theory is a good descriptor of the observed financing behavior of a broad cross-section of firms.

For the French context, Molay (2005) tests two alternative theories of capital structure: the pecking order theory and the static trade-off theory. The empirical tests conducted on a sample of French firms listed on the Paris stock ex-change show that their financing choice seems to be more in line with the pecking order theory than with the static trade-off theory. The tested firms prefer internal financing to external financing and, when using external financing, debt is preferred over equity. In their recent study, Dufour and Molay (2010) analyzes the capital structure of 1535 French SME observed over a period of 8 years. Two representations of

financing behavior are tested: the first one considers that companies implement a debt policy to reach a target debt ratio while the second one relying on a pecking order of financing considers that there is no such a target ratio. Statistical tests validate the first approach. The choice of financing of French SMEs confirms the greatest explanatory power of the target ratio explanation. The industrial sector of the firms does not affect these results.

## Hypotheses

Our study consists in comparing the power of the Pecking Order Theory model and the Static Trade-off theory model, by using the tests of Shyam-Sunder and Myers (1999). According to POT, the hypothesis of the existence of an optimal capital structure is rejected, because the asymmetric information. So, new debt issues are caused by internal funds flow deficits. However, the STT assume that the Firms converge towards a target debt ratio. Throughout this study we are going to try to test following both hypotheses:

*$H_1$: According to Shyam-Sunder and Myers (1999), in a weak form, if the regression coefficient $b_{PO}$ converge towards 1, then the Pecking Order Theory can better explain the changes of the debt ratio.*

*$H_2$: According to Shyam-Sunder and Myers (1999), if the regression coefficient $b_{TA}$ is positive and it's to inferior to 1, then the Static Trade-Off theory, can better explain the changes of the indebtedness ratio*

## Data and Methodology

*3-1- Sample and data selection:*

Our empirical investigation uses a sample of firms listed in the French Stock Exchange market and belonging to SBF 250 index, during the period 1999 – 2005. The sample was further reduced to 88 firms, as a result of missing data. The financial data are extracted from the firm's annual reports, which are published and available in their sites or in the site of the Authority French Financial Market. The sample excludes the firms which the annual report is not available.

We use a panel data to check our hypothesis. It provides the researcher a large number of data points, increasing the degrees of freedom and reducing the colinearity among explanatory variables, hence improving the efficiency of econometric estimates. Eviews 5.1 was used in order to estimate the econometric model.

*3-2- Variable measurement:*

Table 1 summarizes the definition and measurement of all variables used in this study. Our dependant variable is change in the financial debt. The explanatory variables are: the funds flow deficit in a first model; dividend payments, capital expenditures, net increase in working capital and the operating cash flows after interest and taxes in the second and the deviation of the debt ratio to its target value, in a last model.

- Dependant variable: is measured by the difference between the long-term debts of the year t and the year t-1, scaled by the total asset.

$$\mathbf{D_{it} = (D_i\Delta_t - D_{it-1})/ \text{ Total Asset}}$$

- **Independent variables**: For the funds flow deficit and the deviation of the debt ratio to its target value, we will take the same definition proposed by Shyam-Sunders and Myers (1999).

Funds flow deficit is given by the accounting identity: $\mathbf{DEF_{it} = DIV_{it} + I_{it} + \Delta W_{it} - C_{it}}$

Deviation of the debt ratio to its target value: $\mathbf{Z = D^{*}_{it} - D_{it-1}}$

*3-3- Models Specification*

Using the Shyam-Sunders and Myers (1999) investigation, we test four models. Firstly we study the power of the Pecking Order Theory with the following representative empirical model.

$$\mathbf{\Delta D_{it} = a_0 + b_{po} DEF_{it} + \varepsilon_{it}} \qquad \mathbf{(1)}$$

$\varepsilon_{it}$: The residual term;

$a_0$ et $b_{po}$: The coefficients regression of the first model.

Secondly, we study the power of the Static Trade-off Theory with the following representative empirical model.

$$\mathbf{\Delta D_{it} = a_0 + b_{TA} Z_{it} + \varepsilon_{it}} \qquad \mathbf{(2)}$$

$\varepsilon_{it}$**:** The residual term;

$a_0\ et\ b_{TA}$: The coefficients regression of the third model.

To verify if the explanatory power of the various studied models, separately, improves or no, our analysis consists in combining both models with the following representative empirical model.

$$\mathbf{\Delta D_{it} = a_0 + b_{PO} DEF_{it} + b_{TA} Z_{it} + \varepsilon_{it}} \qquad \mathbf{(3)}$$

$\varepsilon_{it}$**:** The residual term;

$a_0, \beta_{PO} et\ \beta_{TA}$: The coefficients regression of the forth model.

To analyze better the tests of the Pecking Order Theory, We also tested an alternative specification, used in Frank and Goyal (2003), who realized a study to use the same information of Shyam-Sunders and Myers (1999), where the variables which constitute the deficit appear on their own, they presume that

$$\mathbf{\Delta D_{it} = a_0 + b_{DIV} DIV_{it} + b_I I_{it} + b_{W_{it}} \Delta W_{it_{it}} + b_C C_{it} + \varepsilon_{it}} \qquad \mathbf{(4)}$$

$\boldsymbol{I_{it}}$: Capital expenditures;

$\varepsilon_{it}$**:** The residual term;

$a_0, b_{DIV}, b_I, b_W \; et \; b_C$: The coefficients regression of the second model.

## 4. Analysis and discussion of Results

| Coefficient | *POT (1)* | *STT (2)* | *Combination (3)* |
|---|---|---|---|
| $a_0$ | 0.079 | 0.047 | 0.028 |
| | (0.0313) | (0.2935) | (0.0351) |
| $b_{po}$ | 0.73 | - | 0.609 |
| | (0.0000) | | (0.0000) |
| $b_{TA}$ | - | 0.11 | 0.08 |
| | | (0.0000) | (0.0000) |
| *Adjusted R2* | 0.72 | 0.59 | 0.96 |
| *Durbin Watson* | 2.52 | 1.31 | 1.71 |
| *F1* | 1.22 | 3.77 | 2.96 |
| | (0.0492) | (0.0000) | (0.0000) |
| *F2* | 27.81 | 2.003 | 1.31 |
| | (0.0000) | (0.000002) | (0.0371) |
| *Hausman stat* | 45.30 | 22.76 | 20.07 |
| | (0.0000) | (0.0000) | (0.0000) |

According the Pecking Order test, by basing on fischer statistics ($F_1$ = 1.22; $F_2$ = 27.81) and Hausman test (H = 45.30), the result shows that we will take the fixed effect model. Durbin-Watson statistics equal to 2.52, this shows an absence of autocorrelation between residuals term. The result provides that the coefficient $\alpha_0$ is statistically significant, suggesting that debt is used to finance firm's funds deficit. The estimated coefficient on the deficit (DEF) variable $b_{PO}$ is positive and statistically significant at the1% level, it's equal to 0.73. It's statistically different from one; hence the strong version of the Pecking Order is not empirically supported by the French firms in this study. However it confirms a weak form of Pecking Order Theory. For this model $R^2$ is very high, it's equal to 0.72. This finding suggests that debt financing dominate equity financing. Consequently, we can confirm the first hypothesis witch assume that for Shyam-Sunder and Myers (1999), in a weak form, if the regression coefficient $b_{PO}$ converge towards 1, then the Pecking Order Theory can better explain the changes of the debt ratio.

Molay (2006), made the same study on a sample which contains 393 French companies, for which the information is available over the period 1995-2004. The estimation of the coefficient $b_{PO}$ on the whole period gives a value 0,78, close to the expected value ($b_{PO}$ = 1), is of the same order as that presented by Shyam-Sunder and Myers (1999).the determination coefficient $R^2$ is equal to 61.3 %.

According the Static Trade-off test, by basing on fischer statistics ($F_1$ = 3.77; $F_2$ = 2.003) and Hausman test (H = 22.76), the result shows that we will take the fixed effect model. Durbin-Watson statistics equal to 1.31, this shows an absence of autocorrelation between residuals term.

The estimated coefficient on the Deviation of the debt ratio to its target value $b_{TA}$ is positive and statistically significant at the1% level, it's equal to 0.11. It's statistically different from one. The $R^2$ is equal to 0.59. This result contradicts the second hypothesis, but the target-adjustment hypothesis cannot be rejected**.** This result is consistent with those obtained by Shyam-Sunder and Myers (1999). Molay (2006) found that the coefficient $b_{TA}$ equal to 0.35 and R2 equal to 13.9%.

The combination between both models provides the superiority of Pecking Order Theory. The coefficient $b_{PO}$ **is** equal to 0.609 and the target adjustment coefficient $b_{TA}$ falls from 0.11 to 0.08 when the pecking order variable is added. The $R^2$ rises from 0.72 to 0.96. But the coefficient is still highly significant: we cannot reject the target-adjustment hypothesis in the nested model, even when financing is generated only by the pecking order. The combination ameliorates the explanatory power of the Pecking Order Theory. These results are consistent with those obtained by Shyam-Sunder and Myers (1999). Consequently it confirms the first hypothesis.

The fourth model results are presented in this table

| **Coefficient** | **Model 4** |
|---|---|
| $a_0$ | 0.014152 (0.6485) |
| $b_{DIV}$ | 0.916665 (0.0000) |
| $b_I$ | 0.732070 (0.0000) |
| $b_{\mathrm{W_{it}}}$ | 0.995591 (0.0000) |
| $b_C$ | 0.732924 (0.0000) |
| *Adjusted R2* | 0.81 |
| *Durbin Watson* | 2.66 |
| *F1* | 15.22 (0.0000) |
| *F2* | 1.36 (0.0212) |
| *Hausman stat* | 53.46 (0.0000) |

Basing on fischer statistics ($F_1$ = 15.22; $F_2$ = 1.36) and Hausman test (H = 53.46), the result shows that we will take the fixed effect model. Durbin-Watson statistics equal to 2.52, this shows an absence of autocorrelation between residuals term. The global quality of the empirical model seems widely satisfactory with adjusted R2 equal to 81 %. This coefficient of explanation shows that dividends payments, capital expenditures, net increase in working capital and operating cash flows, after interest and taxes explain 81 % the variation of the financial debts. It improves by making a disintegration of the deficit passing from 72 % to 81 %. Our results illustrate that the explanatory variables of the deficit are statistically significant in 1 %. They have a positive explanatory power on the financial variation of the debts; indeed, the $b_{DIV}$ coefficient suggests that the payments of dividends are positively connected to the amounts of refund of debts with a value equal to 0.91. The coefficient $b_I$ is equal to 0.73 this means that when the investment increases by a one unit the variation of the financial debts increase by 73 %. Also $b_w$ = 0.99, this implies that an increase of the increase in working capital leads in an increase of the variation of

the financial debts of 99 %. These results are in accordance with the predictions of the theory of Pecking order which supposes a positive sign of the investment of fixed assets and needs in working capital with the variation of the debts.The operating cash flows is significant in the explanation of change debt, indeed bC = 0.73, it means that when the cash flow increase the variations of the financial debt increase.

Our results show a positive relation between the change of the financial debts and the deficit explanatory factors, however, the hypothesis coefficients of Shyam-Sunder and Myers (1999), is rejected ($b_{DIV} \neq b_I \neq b_w \neq b_C \neq 1$), but coefficients are very close to 1. This result suggests that the aggregation of the information at the level DEF variable is empirically justified. These results allow confirming the first hypothesis.

## Conclusion

The capital structure constitutes a central problem of the financial theory. Its determination is certainly one of the most difficult decisions for the managers. The financing decision is a complex phenomenon which is difficult to explain it by a single variable and by a single factor. The studies on the financial structure and the practices do not thus allow having a homogeneous vision of the structure of the capital

Based on Shyam-Sunder and Myers (1999) and Frank and Goyal (2003), we have attempted to test explanatory power of the Pecking Order Theory and the Static Trade-off theory (STT) using French listed firms. As a conclusion for all the tests made for the French firms over the studied period, we notice that the estimation, of both rival empirical modeling of financial structure explanation, privileges the hypothesis of a hierarchy of the financing of the French companies. The results support the Pecking Order Theory in its weak form is in French firms. The target-adjustment hypothesis cannot be rejected but its coefficient is very to inferior in 1, for this reason we confirm the superiority of Pecking Order Theory. We could also verify that our results are similar and comparable to those documented by Shyam-Sunder and Myers (1999) and Frank and Goyal (2003).

**References**

Adedji A. (2001), "A Cross-Sectional Test of Pecking Order Hypothesis Against Static Trade-off Theory on UK data", working paper.

Adesola W. A. (2009), "Testing Static Tradeoff Theory Against Pecking Order Models Of Capital Structure In Nigerian Quoted Firms", *Global Journal Of Social Sciences*, VOL 8, NO. 1, 2009: 61-76.

Chen S.Y. and Chen L.J. (2011), "Capital structure determinants: An empirical study in Taiwan", *African Journal of Business Management*, Vol. 5(27), pp. 10974-10983, 9 November, 2011.

Chirinko. R.S. and Singha A.R. (2000), "Testing Static Trade-off against Pecking Order Models of Capital Structure, a critical comment", *Journal of Financial Economics*, vol 58, pp. 417-425.

De Medeiros O.R. and Daher C.E. (2004), "Testing Static Tradeoff against Pecking Order Models of Capital Structure in Brazilian Firms", 4th USP Congress of Management Control and Accounting, held in SaoPaulo (Brazil), October 7-8, 2004, pp. 1-15.

Donaldson G. (1961), "Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity", Boston, division of Research, Harvard Graduate School Of Business Administration.

Fama E.F. and French K.R. (2005), "Financing decisions: Who issues stock?", *Journal of Financial Economics*, Vol. 76, pp. 549-582.

Fama, E.F. and French K.R. (2002), "Testing trade-off and pecking order predictions about dividends and debt", *Review of Financial Studies*, vol15, pp.1-33.

Frank M. Z. and Goyal V. K. (2005), "Trade-Off and Pecking Theories of Debt", Chapter 7 in B.Espen Eckbo (ed), Handbook of Corporate Finance: Empirical Corporate Finance

Frank M.Z. and Goyal V.K. (2003), "Testing the pecking order theory of capital structure", *Journal of Financial Economics*, 67, p.p. 217-248.

Huson Joher A.M. et Nazrul H. (2009), "Revisiting Capital Structure Theory: A Test of Pecking Order and Static Order Trade-off Model from Malaysian Capital Market", *International Research Journal of Finance and Economics*, ISSN 1450-2887 Issue 30, pp. 58-61.

Jensen M. and Meckling N. (1976), "The theory of the firm: managerial behavior agency cost and ownership structure", *Journal Of Financial Economics*, vol. 3, October, pp. 305 – 360.

Jensen M.C. (1986), "Agency Cost Of Free Cash - Flow, Corporate Finance, and Takeover", *American Economic Review*, Vol 76, p.p. 323 – 339.

Lemmon M. L., Zender, J. F. (2008), "Debt Capacity and Tests of Capital Structure Theories", working paper, University of Utah et University of Arizona.

Medeiros and Daher (2005), "Testing the Pecking Order Theory of Capital Structure in Brazilian Firms", Working Paper, December 11, 2005, pp. 1-14. *http://papers.ssrn.com/sol3 /papers.cfm?abstract_id=868466*

Mihalca G. and Antal R. (2009), "An Empirical Investigation of the Trade-off and Pecking Order hypotheses on romanian market", The XIII International Conference (ASMDA-2009), June 30-July 3, 2009, Vilnius, LITHUANIA, pp. 109-114.

Modigliani F and Miller M. (1958), "The cost of capital Corporate finance and the theory of investment", *American Economic Review*, 48, pp. 261-297.

Modigliani F. et Miller M. (1963), "Corporate Income Taxes and the Cost of Capital", *American Economic Review*, vol 53, juin, pp 433-443.

Myers C.S. (1984), "The capital structure puzzle", The *Journal of Finance*, vol 39, n° 3 (July 1984), p.p. 575 - 592.

Myers S.C. et Majluf N.S. (1984), "Corporate Financing and investment decisions when firms have information that investors do not have", *Journal of Financial Economics*, vol. 13, pp 187-221.

Nuri J and Archer S (2001), "Target adjustment model against pecking order model of capital structure", European Financial Management Association, Annual Meeting 7 – 30 June 2001, Lugano, Switzerland, pp. 1-31.

Shyam-Sunder and Myers S.C. (1999), "Testing Tradeoff Against Pecking Order Models of Capital Structure", *Journal of financial Economies*, vol 51, pp. 219-244.

Strebulaev I.A. (2003), "Do Tests of Capital Structure Theory Mean What They Say?", Job Market Paper, London Business School, pp.1-46.

Swinnen S., Voordeckers W. and Vandemaele S. (2005), "Capital Structure In SMEs: Pecking Order Versus Static Trade-Off, Bounded Rationality and The Behavioural Principle", European Financial Management Association 2005, Annual Conference June 29 – July 2, 2005, Università Bocconi, Milan, Italy.

Tong G. and Green C.J. (2004), "Pecking Order or Trade-off Hypothesis? Evidence on the Capital Structure of Chinese Companies", Loughborough University, EEFS Conference in Gdansk, pp. 1-17.

Wolfgang B., Wolfgang D. and Matthias C. G, (2010), "International Tests of the Pecking Order Theory", *http://www.unifr.ch/controlling/seminar/2009-2010/Drobetz_Hamburg_Pecking*

Wolfgang B., Wolfgang D. and Matthias C. G, (2010), "International Tests of the Pecking Order Theory", *http://www.unifr.ch/controlling/seminar/2009-2010/Drobetz_Hamburg_Pecking*

Zoppa A. and McMahon R. (2002), "Pecking Order Theory and The Financial Structure of Manufacturing SMEs from Australia's Business Longitudinal Survey", School of Commerce, Research Papers Series: 02-1.

Zurigat Z. (2009), " Pecking Order Theory, Trade-Off Theory and Determinants of Capital Structure: Empirical Evidence from Jordan", Heriot-Watt University School of Management and Languages, *http://www.ros.hw.ac.uk/bitstream/10399/2244/1/ZurigatZ_0309_sml.pdf*.

# Appendix

## Table 1: Definition and measurement of variables

| Variable | Definition | Measurement |
|---|---|---|
| **Dependant variable :** | | |
| $\Delta D_{it}$ | ***change in the financial debt*** | The difference between the long-term debts of the year t and the year t-1, scaled by the total asset. |
| **Independent variables :** | | |
| DEF | ***Funds flow deficit*** | It is the sum of dividends payments, capital expenditures and net increase in working capital, minus the operating cash flows after interest and taxes, the whole divided by the total asset. |
| DIV | ***Dividends payments*** | The value is directly extracted from financial statement. |
| $\Delta$BFR | ***Net increase in working capital*** | The value is directly extracted from financial statement. |
| I | ***capital expenditures*** | The sum between the variation of fixed assets and depreciation and amortization charges and transfers to provisions, Scaled by total assets. |
| C | ***the operating cash flows after interest and taxes*** | The value is directly extracted from financial statement. |
| Z | ***Deviation of the debt ratio to its target value*** | The difference between the Target debt ratio and long-term debts of the year t-1. |
| $D^*_{it}$ | ***the Target debt ratio*** | Is estimated for every year by its chronological average over 7 years. |

## Table 2: Results Model 1

**Model 1**

**Fixed effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.079704 | 0.036905 | 2.159723 | 0.0313 |
| DEF? | 0.734875 | 0.022618 | 32.49041 | 0.0000 |
| R-squared | 0.765084 | Mean dependent var | | 0.126383 |
| Adjusted R-squared | 0.725854 | S.D. dependent var | | 1.707857 |
| S.E. of regression | 0.894216 | Akaike info criterion | | 2.747241 |
| Sum squared resid | 402.2102 | Schwarz criterion | | 3.379931 |
| Log likelihood | -722.6888 | F-statistic | | 19.50229 |
| Durbin-Watson stat | 2.524900 | Prob(F-statistic) | | 0.000000 |

**Random effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.075438 | 0.036899 | 2.044421 | 0.0414 |
| DEF? | 0.802040 | 0.020298 | 39.51350 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.729181 | Mean dependent var | 0.126383 |
| Adjusted R-squared | 0.728719 | S.D. dependent var | 1.707857 |
| S.E. of regression | 0.889531 | Sum squared resid | 463.6820 |
| F-statistic | 1577.805 | Durbin-Watson stat | 2.367210 |
| Prob(F-statistic) | 0.000000 | | |

**Table 3: Results Model 2**

**Model 2**

**Fixed effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.047354 | 0.045028 | 1.051642 | 0.2935 |
| Z? | 0.111441 | 0.004763 | 23.39707 | 0.0000 |
| R-squared | 0.651432 | Mean dependent var | | 0.124956 |
| Adjusted R-squared | 0.593222 | S.D. dependent var | | 1.707313 |
| S.E. of regression | 1.088910 | Akaike info criterion | | 3.141210 |
| Sum squared resid | 596.4195 | Schwarz criterion | | 3.773900 |
| Log likelihood | -838.5157 | F-statistic | | 11.19104 |
| Durbin-Watson stat | 1.315599 | Prob(F-statistic) | | 0.000000 |

**Random effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.039750 | 0.045000 | 0.883324 | 0.3774 |
| Z? | 0.122361 | 0.004177 | 29.29250 | 0.0000 |
| R-squared | 0.594610 | Mean dependent var | | 0.124956 |
| Adjusted R-squared | 0.593918 | S.D. dependent var | | 1.707313 |
| S.E. of regression | 1.087978 | Sum squared resid | | 693.6455 |
| F-statistic | 859.5214 | Durbin-Watson stat | | 1.274607 |
| Prob(F-statistic) | 0.000000 | | | |

**Table 4: Results Model 3**

**Model 3**

**Fixed effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.028950 | 0.013705 | 2.112391 | 0.0351 |
| DEF? | 0.609379 | 0.008673 | 70.25886 | 0.0000 |
| Z? | 0.084333 | 0.001500 | 56.22519 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.967808 | Mean dependent var | 0.126383 |
| Adjusted R-squared | 0.962357 | S.D. dependent var | 1.707857 |
| S.E. of regression | 0.331354 | Akaike info criterion | 0.763130 |
| Sum squared resid | 55.11726 | Schwarz criterion | 1.403264 |
| Log likelihood | -138.3602 | F-statistic | 177.5527 |
| Durbin-Watson stat | 1.719674 | Prob(F-statistic) | 0.000000 |

**Random effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.029478 | 0.013694 | 2.152571 | 0.0318 |
| DEF? | 0.616277 | 0.008126 | 75.84053 | 0.0000 |
| Z? | 0.082945 | 0.001373 | 60.39916 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.963121 | Mean dependent var | 0.126383 |
| Adjusted R-squared | 0.962995 | S.D. dependent var | 1.707857 |
| S.E. of regression | 0.328535 | Sum squared resid | 63.14220 |
| F-statistic | 7638.848 | Durbin-Watson stat | 1.551324 |
| Prob(F-statistic) | 0.000000 | | |

## Table 5: Results Model 4

**Model 4**

**Fixed effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.014152 | 0.031028 | 0.456083 | 0.6485 |
| DIV? | 0.916665 | 0.031901 | 28.73447 | 0.0000 |
| INV? | 0.732070 | 0.019248 | 38.03347 | 0.0000 |
| VARBFR? | 0.995591 | 0.056745 | 17.54507 | 0.0000 |
| CAF? | 0.732924 | 0.022214 | 32.99396 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.845318 | Mean dependent var | 0.126383 |
| Adjusted R-squared | 0.818403 | S.D. dependent var | 1.707857 |
| S.E. of regression | 0.727789 | Akaike info criterion | 2.339590 |
| Sum squared resid | 264.8384 | Schwarz criterion | 2.994610 |
| Log likelihood | -599.8394 | F-statistic | 31.40731 |
| Durbin-Watson stat | 2.662224 | Prob(F-statistic) | 0.000000 |

**Random effect**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.039057 | 0.030281 | 1.289794 | 0.1976 |
| DIV? | 1.046110 | 0.025197 | 41.51715 | 0.0000 |
| INV? | 0.792674 | 0.017065 | 46.45036 | 0.0000 |
| VARBFR? | 1.149858 | 0.051499 | 22.32779 | 0.0000 |
| CAF? | 0.822460 | 0.018194 | 45.20553 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.825337 | Mean dependent var | 0.126383 |
| Adjusted R-squared | 0.824138 | S.D. dependent var | 1.707857 |
| S.E. of regression | 0.716205 | Sum squared resid | 299.0493 |
| F-statistic | 688.7122 | Durbin-Watson stat | 2.522694 |
| Prob(F-statistic) | 0.000000 | | |