CAPITAL STRUCTURE AND INCOME INEQUALITY

by

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Abstract

Using the new issuance of equity and corporate bond data series, this research finds that recent surge in top incomes shares have negative effect on the capital structure choice of North American firms. This paper also uses information from firm specific and macroeconomic variables to explain the dynamics of capital structure choice of OECD firms. The result of this empirical study provides some of the insights from modern capital structure theory. But these traditional determinants might not have the robust explanatory power in explaining the capital structure choice of a firm.

Key words: Capital structure, Top inocme shares, Macroeconomic factors, Firm specific factors

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1 Introduction

The increasing share of the top income earners in total income in the United States, and Canada (see Atkinson, 2007; Piketty and Saez, 2007) has been one of the most hotly discussed topics over the last few years. Piketty and Saez (2007) argued that top capital shares in Anglo Saxon countries were mostly induced by capital gain, although the surge in top income shares is not common in non-English speaking countries (particularly in France, Japan and Switzerland). Accumulated income stimulates the top income earners to buy more risky assets over less risky assets. Over time investors increase their average equity ownership. However, the empirical insights into how recent surge in top incomes shares in many advanced countries affect the capital structure choice of a firm is still missing. This research provides novel facts and shows that top income shares have negative effect on the capital structure choice of a firm.

Top income shares are computed by dividing the observed top income by the equivalent total income earned by the entire (tax) population, had everyone filled a personal tax return. Capital structure refers to the way a corporation finances its assets through some combination of equity and debt. According to Modigliani and Miller (1958) in a perfect capital market, i.e. in a world without tax, the concept of capital structure is not relevant in financing for a project. Certainly in this framework institutional and macroeconomic factors (e.g., economic growth rate, top income shares, inflation etc.) do not affect the capital structure choice of a firm. But imperfections exist in the real world and Modigliani and Miller's model falls behind to capture these realities. However, theories like the Trade-off

model, the Pecking Order hypothesis, the Agency Theoretic framework and the Market Timing theory address some of the issues of imperfections of real world.

Trade-off model is based on target capital structure and allows tax shield as a benefit and bankruptcy as a cost of debt. The theory states that it is a trade-off between costs and benefits of debt that can establish a target level of debt for a firm. In the Pecking Order theory, firms prefer to finance their activities using retained earnings to minimize the asymmetric information between insiders within a firm and capital markets. If retained earnings are inadequate, they turn to the use of debt. Equity financing is only used as a last resort.

In the Agency Theoretic framework, potential conflict of interest between inside and outside investors determines the target capital structure of a firm. Here, agency cost might evolve either in a circumstances of asset substitution (i.e., replace equity by accruing more debt while investing) or underinvestment. Underinvestment in the sense that high debt oriented firm might lose the opportunity of some attractive investment opportunity due to the debt overhang problem (Jensen and Meckling (1976), Myers (1977)). In this setting, the debt holders have the ability to extract some of the net present value. Thus, management has an incentive to reject positive NPV (net present value) projects, even though they have the potential to increase firm value. Lastly Market Timing hypothesis assumes that there are changes in market-to-book values which will create permanent changes on firm's capital structure. It contradicts the idea of Trade-off theory. In this Market Timing hypothesis, firms try to time the market by using debt when it is cheap and equity when it seems cheap.

Obviously, there is close links between these theories discussed above and it is very difficult to distinguish the hypothesis of capital structure theory particularly in an empirical framework. Potential variables that describe the Trade-off theory could also be used as important variables for other capital structure theories and vice versa. As a result, recent empirical research has focused on capital structure by using variety of variables that can be justified by any or all of the models.

Most of the empirical evidence on capital structure theory are based on studies of the determinants of corporate debt ratios (see Titman and Wessel (1988), Rajan and Zingales (1995)) and studies of financing choice (i.e., choice between issuing firm's debt versus equity) (Booth, Ivazian, Demirguc-Kunt and Maksimovic (2001), Banjeree, Heshmati, and Whilborg (2004), Frank and Goyal (2009), Jong, Kabir and Nguyen (2008) among others). These empirical studies show that the firm-specific factors (e. g., firm size, tangibility, intangibility, liquidity, market risk, research and development, profitability, uniqueness and corporate tax rate) are important in determining the capital structure of a firm.

Another stream of research explains the capital structure choice based on institutional and macroeconomic factors. Booth, Ivazian, Demirguc-Kunt and Maksimovic (2001) and Frank and Goyal (2004), Jong, Kabir and Nguyen (2008) documented the importance of domestic macroeconomic factors in the empirical research of capital structure theory. They report that macroeconomic factors (e.g., market rate return, market risk, economic growth rate, inflation rate, financial development and Millers tax term) seem to have explanatory power to determine the capital structure choice of a firm.

Recently, Kacperczyk, Nosal and Stevens (2014) build a noise rational expectations equilibrium model on the basis of information based framework. In their model, they assumed that sophisticated investors have capacity to access superior information over non-sophisticated investors. They have ability to invest in better assets and generate profit through trading. Consequently, sophisticated investors accumulate more wealth over time and the investment of accumulate wealth in turn earn even more profit. Eventually sophisticated investors allocate more of their resources on risky assets than less risky assets and increase their average equity ownership.

However, the detailed empirical treatments of similar thought are still missing particularly for the recent years. This research provides new empirical evidence based on firm's new corporate bond and new equity issuance data and shows that top income shares has negative effect on the capital structure choice of a firm. That means that in presence of high top income inequality, rich people tend to buy more stocks than bonds and firms would tend to issue more equity as opposed to debt. Hence investors increase their average equity ownership relative to debt.

The rest of the paper proceeds as follows. In Section 2, a leverage model of capital structure is specified introducing the econometric analysis and explaining the determinants of the capital structure. Section 3 presents the data analysis. Section 4 contains the empirical results, Robustness analysis is reported in Section 5 and section 6 concludes.

2 Model

As mentioned before, it is very difficult to distinguish the hypothesis of capital structure theory, discussed in the introductory part, particularly

in an empirical framework. Empirical research mostly focused on leverage ratio by using variety of variables that can be justified by any or all of the models capital structure. Previous empirical evidence shows that capital structure choice of a firm not only depends upon the firm-specific factors but also on the country's institutional factors and macroeconomic conditions (Booth et.al (2001), Jong, Kabir and Nguyen (2008); Frank and Goyal (2004)). We explore the effect of top income shares on firms' capital structure choice while controlling the effect of macroeconomic and firm-specific variables.

In the process of developing the econometric model we assume that the observed leverage ratio of firm i at time t, denoted as y_{it}. The expected leverage ratio can be explain by

$$E\left(y_{it}\right) = \beta_1 Top_{it} + \beta_2 X_{it}^{/} + \delta t + u_i, \tag{1}$$

where, the term Top_{it} represents the top income shares of the rich, X_{it} is the vector of control variables that we are interested in as well. The terms u_i and δt represent fixed country and time effect respectively.

Let the error between actual and expected

$$\varepsilon_{it} = y_{it} - E\left(y_{it}\right) \tag{2}$$

If the leverage ratio, represented by y_{it} is auto-correlated then estimated residuals fail to follow the assumptions underlying the OLS method. To capture the possible autocorrelation that may exist in the leverage ratio series, we assume

$$\varepsilon_{it} = \alpha y_{it-1} + \epsilon_{it} \tag{3}$$

Combining equations with (1), (2) and (3) yields a general equation for a leverage ratio

$$y_{it} = \gamma_1 y_{it-1} + \gamma_2 Top_{it} + \gamma_3 X_{it}^{/} + \delta t + u_i + \epsilon_{it} \tag{4}$$

The variable X_{it} includes macroeconomic and firm specific factors (e.g., firm size, tangibility, intangibility, profitability, sales, liquidity, market risk, top income shares, inflation rate, and economic growth rate, rate of market return, financial system and Miller tax term). The above dynamic panel model could be estimated by OLS method but the assumptions underlying the standard fixed effects model are likely to be violated. Besides the inclusion of the lagged dependent variable is problematic since it is correlated with the unobserved fixed effects. Thereby, we could get biased estimates. This bias is reduced when the actual time horizon T is large (Nickell, 1981). We therefore apply the first difference estimator which relies on the assumption that the first differences of the error terms are serially uncorrelated. The first difference panel model is as follows

$$\begin{aligned} y_{it} \;=\; & \gamma_1 \left(y_{it-1} \; - y_{it-2}\right) + \gamma_2 \left(Top_{it} \; - Top_{it-1}\right) + \\ & \gamma_3 \left(X_{it}^{/} - X_{it-1}^{/}\right) + \delta \left(t - t + 1\right) + \epsilon_{it} - \epsilon_{it-1} \end{aligned} \tag{5}$$

$$\begin{aligned} \left(y_{it} \; - y_{it-1}\right) \;=\; & \gamma_1 \left(y_{it-1} \; - y_{it-2}\right) + \gamma_2 \left(Top_{it} \; - Top_{it-1}\right) \\ & + \gamma_3 \left(X_{it}^{/} - X_{it-1}^{/}\right) + \delta \left(t - t + 1\right) + \left(\epsilon_{it} - \epsilon_{it-1}\right) \end{aligned} \tag{6}$$

$$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta y_{it-1} + \gamma_2 \Delta Top_{it} + \gamma_3 \Delta X_{it}^{/} + v_{it}, \tag{7}$$

where $\gamma_0 = \delta$ and $v_{it} = (\epsilon_{it} - \epsilon_{it-1})$

The parameter $\gamma_2 < 0$ implies that top income shares has negative effect on the leverage ratio of a firm which means: during time of high top income inequality, rich people prefer to buy more risky assets than less risky assets. The nice feature of the model represented by equation (3) is to capture the possible auto correlation that arises in the leverage ratio term. We could apply OLS method to estimate this model, provided that the error term v_{it} is normally distributed. Generally, GMM (Generalized method of moments) might be an appropriate procedure to estimate the dynamic panel model. However, Flannery and Hankins (2013) documented that standard error corrected LSDV (Least Squares Dummy Variable) also performs well in estimating dynamic fixed effect than panel regression model regardless of the quality and size of the data (see also Judson and Owen (1999), Duflo and Mullainathan (2004) and Atkinson and Leigh (2010)). Therefore, we also apply the LSDV (Least Squares Dummy Variable) regression to estimate the equation (3). For the purpose of robustness, we also re-estimate the model represented by equation (3) while allowing fixed time effects and/or unobserved country-specific trends in the estimation process.

3 Data

This study is based on the top income shares, IPO (Initial public offering) and Corporate Bond issuance data. The top income shares data is available for a long period of time for all the advanced countries in Top Income Shares database. Statistical analysis, based on long and quality data series is always elegant. But, the unavailability of macroeconomic and firm specific variables restricts our sample for the period of 1995 to 2013.

Our new equity issues (i.e., IPO issuance) and new debt issues (i.e., corporate bond issuance data) for OECD countries are collected from the Thomson-Reuters Deal Database. We exclude utility companies (SIC codes 4900 – 4999), and financial firms (SIC codes 6000 – 6999) from our sample. We also impose some restrictions to our sample. IPO issuing firms must be listed in the stock exchange. IPO proceeds must be positive and exclude depositary receipts, income shares, capital shares, partnerships, unit offers, closed-end funds, sub voting shares, options, while collecting the IPO issues data[1].

Similarly we exclude utility companies (SIC codes 4900 – 4999), and financial firms (SIC codes 6000 – 6999) while collecting the corporate bond issuance data. We also restrict our sample to fixed rate bond that are not matured within one year, and non-callable, non-puttable, non-sinking funds, non-convertible and non-mortgage bonds. We further restrict our sample based on Standard and Poor's and Moody's credit ratings. We exclude all corporate bonds whose average credit rating is lower than B.

We use Top Income Shares database for top income shares data. Macro-economic variables are collected from Financial Development of Beck,Thorsten, Asli Demirgüç-Kunt and Ross Levine (2012) and OECD database. Firm-specific variables are collected from COMPUSTAT and the COMPUSTAT Global database. Tables-1 Table-2 and Table-3 define the variables used in this research and report their sources in details.

Following Baker and Wurgler (2002), we define the leverage of firm as

[1]The whole sample has only four REITs (Real estate investment trust) class of IPO issues and REITs are not excluded from our sample. We do not impose restriction on IPOs with an offer price of at least $5.00 and also relax the restriction on the listing in major stock exchanges. Later in the robustness section we allow all these restrictions to our sample while computing IPO proceeds and re-assess the whole analysis for the North American region.

Table 1

Description of macroeconomic factors

Variables	Variable defination	Source
Top1	Share of total income earned by incomes (P99-P100).	The world top income database
Top1/9	Income share of top 1%(P99-P100) devided by income share earned by the rest of the top 9%(P90-P99).	The world top income database
IvP(β)	The Inverted Pareto-Lorenge coefficient is a measure of the concentartion of wealth among the rich.	The world top income database
Inflation Rate	Inflation: Rate of change in the consumer price index.	World bank
GDP_{pc}	Natural logarithm of gross domestic product per capita.	World bank
Personal Tax (T_i)	Top marginal tax: Statutory tax rate.	OECD database
Dividend Tax (T_e)	Personal dividend tax rate.	OECD database
Corporate Tax (T_c)	Combined Corporate income tax rate.	OECD database
Rate of Return	Yearly stock maket return index.	Kenneth R. French - data library
Stock Market Devplopment	Stock market capitalisation: Value of listed shares to GDP.	Financial development and structure database
Bond Market Devplopment	Domestic debt securities issued by Govt. and financial institutions and corporations as a share of GDP.	Financial development and structure database
Financial System	Ratio of Bond Market Development to Stock Market Development	Levine (2002)
Miller Tax Term	$1-\frac{(1-T_c)(1-T_e)}{(1-T_i)}$	Booth et al (2001)

Table 2

Description of firm specific financial factors

Variables	Variable defination	Source
Size	Size is defined as the natural logarithm of total assets (AT).	COMPUSTAT and COMPUSTAT global
Tang	Tangibility is defined as the ratio of net property, plant, and equipment (PPENT) to total assets (AT).	COMPUSTAT and COMPUSTAT global
Intang	Intangibility is defined as the ratio of intangibles (INTAN) to assets (AT).	COMPUSTAT and COMPUSTAT global
Profitability	Profititability is defined as the ratio of operating income before depreciation (OIBDP) to total assets (AT).	COMPUSTAT and COMPUSTAT global
Sales	The natural logarithm of sales (SALE).	COMPUSTAT and COMPUSTAT global
Liquidity	Liquidity is defined as the ratio of current asset (ACT) to current liability (LCT).	COMPUSTAT and COMPUSTAT global
Market Risk	Market risk is measured by the standard deviation of stock market returns.	Kenneth R. French - data library

the ratio of proceeds amount raised from the new debt issues over the sum of the proceeds amount collected from both new issues of debt and equity. A firm is defined as issuing new equities when it raises fund through IPO issuance. Similarly, a firm is defined as issuing new debt when it raises capital through corporate bond issuance from the public market. The key disadvantage of this approach is that it ignores the source of private financing and private debt which seems to be much more common in corporate world. The data series are gross yearly total of IPO issues and corporate debt issues that do not subtract out repurchases or debt retirements.

Our main depended and independent variables are leverage ratio of a firm and top income shares respectively. All the other independent variables used in this study and their measurement are largely adopted from existing literature. The macro economic variables, which will be treated as control variables in the econometric analysis, are: gross domestic product, inflation rate, corporate tax, personal tax, dividend tax, and stock market rate of return, market risk, financial system, and Miller's tax term.

Another set of dependent variables, treated as control variables in the econometric analysis, is the firm-specific factors. The firm specific-factors are: firm size, tangibility, intangibility, profitability, sales, and liquidity. These variables needed be obtained from the balance sheet of issuing firms for the purpose of this analysis. In order to collect that financial information we first use Thomson-Reuters Deal Database. Unfortunately, firm-specific factors of all issuing firms are not available. Some financial information for some issuing firms is available but those are inadequate to test our hypothesis. So we look for an alternative source and merge issuing firms' data with the COMPUSTAT and the COMPUSTAT Global Database. Af-

Table 3

Description of the top income shares data

	Unit of analysis	Treatment of capital gain	Sample period
Australia	Individual	Included where taxable	1995-2010
Canada	Individual	Capital gain excluded	1995-2010
		Capital gain included	1995-2010
Switzerland	Family	Capital gain excluded	1995-2009
Germany	Family	Included where taxable	1995-2007
Finland	Family or individual	Capital gain excluded	1995-2009
			1995-2009
France	Family until 1952 then individual from 1953	Capital gain excluded	1995-2010
United Kingdom	Family until 1989 then individual from 1990	Included where taxable before introduce of seperate capital gain tax	1995-2011
Ireland	Family	Capital gain excluded	1995-2009
Italy	Individual	Capital gain excluded	1995-2009
Japan	Individual	Capital gain excluded	1995-2010
		Capital gain included	1995-2010
Norway	Family but separate taxation possible and becomes prevalent	Capital gain included	1995-2010
United States	Family	Capital gain included	1995-2011
		Capital gain excluded	1995-2011

Table 4

Descriptive Statistics

	North American Region					Other OECD countries				
Variables	Obs	Mean	S. D	Max	Min	Obs	Mean	S. D	Max	Min
$\left(\frac{\mathrm{D}}{\mathrm{D}+\mathrm{E}}\right)$	34	0.802	0.149	0.998	0.335	170	0.554	0.340	1.000	0.000
Size	34	14.755	1.544	16.796	12.755	170	14.180	2.653	20.472	9.539
Tang	34	0.443	0.107	0.580	0.310	170	0.346	0.080	0.540	0.142
Intang	34	0.134	0.051	0.209	0.042	170	0.132	0.076	0.292	0.008
Profitibility	34	0.137	0.013	0.154	0.111	170	0.121	0.033	0.231	0.036
Sales	34	14.564	1.563	16.636	12.662	170	14.048	2.644	20.349	9.635
Liquidity	34	1.357	0.113	1.724	1.212	170	1.323	0.210	1.923	1.008
Market Risk	34	4.956	1.955	9.410	1.570	170	5.920	2.570	17.550	1.810
Top1	34	16.575	3.473	23.500	10.900	170	9.706	1.849	16.490	5.930
Top1/9	34	0.612	0.135	0.900	0.390	170	0.405	0.072	0.800	0.270
IvP(β)	34	16.575	3.473	23.500	10.900	170	9.706	1.849	16.490	5.930
Inflation Rate	34	2.294	0.835	4.000	0.000	170	1.764	1.394	6.000	-4.000
$\mathrm{GDP_{pc}}$	34	10.442	0.304	10.850	9.909	170	10.455	0.360	11.504	9.842
Market Return	34	12.588	23.278	57.000	-44.000	170	10.935	28.244	115.00	-60.000
Fin.System	34	1.095	0.333	1.900	0.580	170	1.444	1.458	8.720	0.190
Miller Tax Term	34	0.257	0.140	0.460	0.010	170	0.085	0.171	0.520	-0.380

ter merging we successfully get some financial information of issuing firms for North-American region, but financial information of issuing firms for other OCED countries are still insufficient to test the hypothesis. Then, we adopt an alternative method and use yearly aggregated value of financial information of all firms available in COMPUSTAT and COMPUSTAT global database. Although for robustness purpose, we also utilize available financial information of issuing firms and re-conduct the experiment for the North-American region. The descriptive statistics of dependent and independent variables, including mean, standard deviation, minimum and maximum, are reported in Table-4.

4 Explaining the capital structure

Table-5 and Table-6 present the results from our baseline LSDV regression. In this research we focus on the significance of top income shares in determining the leverage ratio of a firm while controlling all the known macroeconomic, institutional and firm specific factors. All reported estimates presented in these tables are heteroskedasticity and auto-correlated adjusted. Table-5 reports the results of the LSDV regression based on yearly aggregated value of financial information of all firms available in COMPUSTAT database for North American region. The estimates of Table-6 are also based on yearly aggregated value of financial information of all firms available in COMPUSTAT Global database for other OECD countries with p-values reported in parentheses.

The parameter estimate associated with the top income shares is measured by the parameter γ_1. The estimates of γ_1 are all negative and statistically significant at 5% level, reported in Table-5 and Table-7. This result

Table 5

Fixed effect panel regression estimates for the North American region countries based on the available financial information of all firms. Yearly aggregated value of all firm specific variables are used in the estimation process.The table reports HAC adjusted LSDV estimates and p-values reported in square brackets.

	Capital gain included without country effect			Capital gain included with country effect			Capital gain excluded without country effect			Capital gain excluded with country effect		
$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta y_{it-1} + \gamma_2 \Delta(\text{Top Income Shares}_{it}) + \sum_{i=3}^{n} \gamma_i \Delta\left(X_{it}\right) + e_{it}$												
Paramater Estimate	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9
Intercept	-0.023	0.003	-0.014	-	-	-	-0.007	0.040	0.003	-	-	-
	[0.828]	[0.970]	[0.898]	-	-	-	[0.949]	[0.702]	[0.977]	-	-	-
Lag of dependent	0.174	0.182	0.260	0.170	0.177	0.255	0.210	0.186	0.218	0.206	0.181	0.214
variable$\left(y_{t-1}\right)$	[0.022]	[0.018]	[0.001]	[0.030]	[0.026]	[0.003]	[0.016]	[0.030]	[0.010]	[0.016]	[0.026]	[0.011]
Top income	-0.743	-0.095	-2.001	-0.742	-0.095	-2.011	-1.095	-0.164	-3.699	-1.094	-0.165	-3.670
shares	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.004]	[0.001]	[0.002]	[0.003]	[0.001]	[0.002]
Size of the Firm	-0.435	-0.815	-0.770	-0.723	-1.172	-1.112	-0.856	-1.374	-1.371	-1.162	-1.740	-1.614
	[0.570]	[0.240]	[0.347]	[0.403]	[0.102]	[0.186]	[0.318]	[0.095]	[0.103]	[0.192]	[0.028]	[0.059]
Tangibility	2.019	1.670	1.940	2.164	1.864	2.125	-0.057	0.553	0.286	0.101	0.742	0.414
	[0.199]	[0.339]	[0.302]	[0.146]	[0.259]	[0.231]	[0.977]	[0.793]	[0.895]	[0.957]	[0.705]	[0.840]
Intangibility	4.737	4.350	5.053	5.121	4.829	5.516	4.203	4.531	4.531	4.614	5.018	4.859
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.007]	[0.001]	[0.001]	[0.001]	[0.00]	[0.000]
Profitability	9.695	8.229	8.173	9.023	7.417	7.393	5.863	5.969	4.668	5.154	5.134	4.108
	[0.001]	[0.004]	[0.011]	[0.003]	[0.009]	[0.023]	[0.116]	[0.076]	[0.166]	[0.186]	[0.128]	[0.244]
Sales	-1.028	-0.770	-0.952	-0.793	-0.475	-0.671	-0.630	-0.341	-0.415	-0.379	-0.037	-0.219
	[0.262]	[0.388]	[0.380]	[0.424]	[0.605]	[0.539]	[0.525]	[0.714]	[0.667]	[0.708]	[0.966]	[0.821]
Liquidity	0.604	0.518	0.590	0.526	0.420	0.497	0.391	0.420	0.426	0.308	0.321	0.361
	[0.009]	[0.018]	[0.023]	[0.050]	[0.081]	[0.074]	[0.116]	[0.075]	[0.082]	[0.270]	[0.192]	[0.172]
Market risk	0.036	0.029	0.032	0.036	0.029	0.032	0.035	0.030	0.029	0.035	0.031	0.029
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.00]

Continue table 5

Inflation	0.057	0.052	0.055	0.035	0.025	0.029	0.048	0.047	0.055	0.025	0.019	0.036
	[0.215]	[0.220]	[0.290]	[0.531]	[0.622]	[0.626]	[0.338]	[0.354]	[0.333]	[0.650]	[0.705]	[0.547]
GDP_{pc}	-1.379	-1.415	-1.239	-1.266	-1.278	-1.106	-0.928	-1.252	-0.952	-0.808	-1.113	-0.857
	[0.000]	[0.000]	[0.000]	[0.000]	[0.00]	[0.000]	[0.001]	[0.000]	[0.001]	[0.022]	[0.001]	[0.015]
Market	-0.001	-0.001	-0.002	-0.002	-0.001	-0.002	-0.001	-0.002	-0.002	-0.001	-0.002	-0.002
return	[0.065]	[0.062]	[0.075]	[0.049]	[0.035]	[0.048]	[0.000]	[0.026]	[0.020]	[0.045]	[0.011]	[0.012]
Financial	-0.825	-0.891	-0.900	-0.842	-0.916	-0.924	-0.626	-0.741	-0.788	-0.645	-0.767	-0.800
system	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.200]	[0.000]	[0.000]	[0.000]	[0.000]
Miller	-1.336	-1.325	-1.350	-1.317	-1.302	-1.328	-1.066	-1.154	-1.170	-1.046	-1.129	-1.154
tax term	[0.000]	[0.000]	[0.001]	[0.001]	[0.000]	[0.000]	[0.002]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]

provides strong evidence of a significant effect of top income shares on the choice of capital structure of a firm. The negative sign of γ_1 suggests that in presence of high top income inequality rich people tend to buy more stocks than bonds in North American region. The estimates of γ_1 are not that consistent for the firms of other OECD countries. Sometimes the coefficient γ_1 is negative but it changes in sign in some cases and for all cases the coefficient γ_1 is not statistically significant at 5% level.

The estimate of parameter γ_1 remains steady in the sense that it is significant at 5% level for the firms of North American region while controlling the effect of firm-specific, macroeconomic, unobservable country-specific and invariant time-specific variables. The estimates are reported in Table-5 and in Table-7. It is to be noted that this research has no intent to elucidate the effect of firm-specific and macroeconomic factors on the leverage ratio of a firm in details. We only use these important determinants of capital structure as control in the estimation process. As stated earlier, it is very difficult to justify the empirical relationship between these control variables with the leverage ratio of a firm and to validate a theory of capital structure, although some of the interesting results found in this analysis require some brief discussion.

Theoretically, the relationship between firm size and the leverage ratio is ambiguous. Trade-off theory predicts positive relationship whereas Pecking Order theory expects negative relationship between firm size and the leverage ratio of a firm. Trade-off theory states that large firms prefer to issue debt as an investment alternative and use own assets as insurance against bank bankruptcy cost. However, Pecking Order theory states that informational asymmetries between insiders within a firm and capital mar-

Table 6

Fixed effect panel regression estimates for the other OECD countries based on the available financial information of all firms. Yearly aggregated value of all firm specific variables are used in the estimation process. The table reports HAC adjusted LSDV estimates and p-values reported in square brackets.

	Capital gain included without country effect			Capital gain included with country effect			Capital gain excluded without country effect			Capital gain excluded with country effect		
$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta y_{it-1} + \gamma_2 \Delta(\text{Top Income Shares}_{it}) + \sum_{i=3}^{n} \gamma_i \Delta\left(X_{it}\right) + e_{it}$												
Paramater Estimate	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9
Intercept	0.029	0.026	0.024	-	-	-	0.037	0.033	0.035	-	-	-
	[0.502]	[0.517]	[0.568]	-	-	-	[0.521]	[0.551]	[0.544]	-	-	-
Lag of dependent	-0.384	-0.357	-0.362	-0.393	-0.359	-0.365	-0.411	-0.427	-0.439	-0.400	-0.416	-0.430
variable$\left(y_{t-1}\right)$	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Top income	0.020	-0.027	-0.523	0.070	-0.024	-0.446	0.618	0.033	-0.491	0.641	0.032	-0.705
shares	[0.921]	[0.373]	[0.464]	[0.725]	[0.429]	[0.540]	[0.313]	[0.695]	[0.795]	[0.295]	[0.707]	[0.718]
Size of the Firm	-0.525	-0.515	-0.499	-0.503	-0.492	-0.479	-0.027	0.026	0.062	0.021	0.103	0.130
	[0.364]	[0.355]	[0.375]	[0.370]	[0.362]	[0.377]	[0.960]	[0.961]	[0.916]	[0.970]	[0.853]	[0.826]
Tangibility	3.310	3.721	3.666	3.494	3.913	3.850	2.931	3.029	2.938	3.258	3.417	3.253
	[0.018]	[0.001]	[0.001]	[0.013]	[0.000]	[0.000]	[0.054]	[0.046]	[0.066]	[0.047]	[0.033]	[0.055]
Intangibility	3.117	3.263	3.231	2.999	3.130	3.095	0.916	0.935	0.991	0.943	0.911	0.982
	[0.013]	[0.008]	[0.009]	[0.006]	[0.003]	[0.004]	[0.552]	[0.519]	[0.509]	[0.548]	[0.532]	[0.514]
Profitability	-5.151	-4.783	-4.874	-5.248	-4.762	-4.865	-7.078	-7.015	-6.757	-7.177	-7.097	-6.832
	[0.060]	[0.075]	[0.070]	[0.043]	[0.056]	[0.052]	[0.015]	[0.013]	[0.014]	[0.018]	[0.015]	[0.016]
Sales	0.712	0.790	0.771	0.884	0.964	0.948	-0.037	-0.092	-0.125	-0.094	-0.178	-0.203
	[0.122]	0.101]	[0.110]	[0.051]	[0.037]	[0.040]	[0.994]	[0.864]	[0.829]	[0.866]	[0.746]	[0.728]
Liquidity	-0.172	-0.339	-0.312	-0.024	-0.220	-0.190	0.518	0.572	0.647	0.489	0.566	0.655
	[0.600]	[0.356]	[0.397]	[0.939]	[0.545]	[0.603]	[0.227]	[0.228]	[0.192]	[0.269]	[0.248]	[0.193]
Market risk	-0.025	-0.027	-0.026	-0.028	-0.029	-0.029	0.016	0.013	0.013	0.016	0.013	0.014
	[0.151]	[0.116]	[0.128]	[0.075]	[0.056]	[0.062]	[0.307]	[0.376]	[0.384]	[0.312]	[0.365]	[0.369]

Continue Table 6

Inflation	0.017	0.015	0.015	0.033	0.024	0.025	0.025	0.027	0.027	0.052	0.055	0.054
	[0.388]	[0.435]	[0.411]	[0.271]	[0.456]	[0.425]	[0.288]	[0.196]	[0.225]	[0.189]	[0.138]	[0.155]
GDP_{pc}	-0.495	-0.583	-0.542	-0.610	-0.703	-0.664	-0.718	-0.712	-0.702	-0.805	-0.803	-0.765
	[0.149]	[0.081]	[0.095]	[0.064]	[0.029]	[0.035]	[0.075]	[0.062]	[0.066]	[0.080]	[0.068]	[0.081]
Market	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.000	0.000	0.000	0.001	0.001	0.001
return	[0.409]	[0.591]	[0.551]	[0.334]	[0.519]	[0.481]	[0.773]	[0.728]	[0.671]	[0.524]	[0.470]	[0.435]
Financial	0.242	0.232	0.238	0.296	0.286	0.292	0.026	0.016	0.012	0.039	0.024	0.016
system	[0.054]	[0.046]	[0.044]	[0.015]	[0.011]	[0.011]	[0.537]	[0.699]	[0.765]	[0.405]	[0.601]	[0.715]
Miller	-0.712	-1.092	-1.054	-0.614	-1.075	-1.026	-0.066	-0.074	-0.080	-0.061	-0.027	-0.002
tax term	[0.157]	[0.088]	[0.108]	[0.203]	[0.098]	[0.122]	[0.838]	[0.823]	[0.803]	[0.865]	[0.941]	[0.995]

Table 7

The fixed effect panel regression estimates after controlling for unobservable country-specific and time invariant effect. These estimats are based on the available financial information of all the firms. Yearly aggregated value of all firm specific variables are used in the estimation process. The table reports the HAC adjusted LSDV estimates and p-values reported in square brackets.

	North American Region						Other OECD countries					
	Capital gain included country + time			Capital gain excluded country + time			Capital gain included country + time			Capital gain excluded country + time		
$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta y_{it-1} + \gamma_2 \Delta(\text{Top Income Shares}_{it}) + \sum_{i=3}^{n} \gamma_i \Delta\left(X_{it}\right) + e_{it}$												
Paramater Estimate	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9
Lag of dependent variable$\left(y_{t-1}\right)$	-0.016 [0.957]	-0.274 [0.566]	-0.559 [0.537]	0.444 [0.354]	0.525 [0.176]	0.398 [0.248]	-0.447 [0.000]	-0.394 [0.001]	-0.413 [0.000]	-0.471 [0.000]	-0.479 [0.000]	-0.494 [0.000]
Top income shares	-0.855 [0.000]	-0.147 [0.000]	-4.101 [0.000]	-0.700 [0.056]	-0.187 [0.000]	-3.853 [0.000]	0.030 [0.848]	-0.030 [0.296]	-0.489 [0.445]	0.601 [0.131]	0.039 [0.441]	-0.202 [0.870]
Firm Size	-0.315 [0.669]	-2.065 [0.035]	-3.136 [0.063]	0.871 [0.495]	0.189 [0.824]	-0.150 [0.862]	-0.246 [0.656]	-0.358 [0.539]	-0.312 [0.585]	0.721 [0.027]	0.703 [0.042]	0.753 [0.039]
Tangibility	0.808 [0.902]	0.200 [0.983]	-0.453 [0.981]	0.575 [0.929]	0.581 [0.929]	0.668 [0.887]	2.146 [0.285]	2.418 [0.165]	2.390 [0.181]	3.709 [0.004]	3.897 [0.003]	3.874 [0.004]
Intangibility	4.112 [0.000]	2.694 [0.000]	2.489 [0.124]	3.207 [0.013]	3.689 [0.000]	2.868 [0.004]	2.566 [0.127]	2.916 [0.099]	2.790 [0.110]	1.892 [0.084]	2.127 [0.052]	2.101 [0.054]
Profitability	14.784 [0.262]	16.608 [0.375]	26.675 [0.495]	9.236 [0.562]	6.173 [0.672]	8.811 [0.440]	-4.812 [0.095]	-4.353 [0.120]	-4.542 [0.104]	-6.108 [0.003]	-6.587 [0.000]	-6.458 [0.001]
Sales	-0.603 [0.645]	0.619 [0.763]	1.681 [0.663]	-2.284 [0.235]	-2.291 [0.139]	-1.804 [0.173]	0.803 [0.042]	0.863 [0.042]	0.857 [0.039]	-0.781 [0.021]	-0.756 [0.032]	-0.803 [0.031]
Liquidity	0.585 [0.008]	0.531 [0.088]	0.929 [0.179]	0.439 [0.107]	0.357 [0.156]	0.546 [0.004]	-0.038 [0.912]	-0.194 [0.595]	-0.147 [0.680]	0.436 [0.170]	0.515 [0.149]	0.593 [0.103]
Market risk	-0.046 [0.517]	-0.097 [0.469]	-0.181 [0.476]	0.048 [0.576]	0.051 [0.523]	0.018 [0.737]	-0.028 [0.192]	-0.031 [0.141]	-0.031 [0.153]	-0.006 [0.438]	-0.008 [0.337]	-0.007 [0.421]

Continue Table 7

Inflation	-0.138	-0.222	-0.336	-0.021	-0.012	-0.053	0.061	0.049	0.053	0.037	0.036	0.033
	[0.033]	[0.000]	[0.000]	[0.790]	[0.857]	[0.469]	[0.060]	[0.176]	[0.125]	[0.141]	[0.108]	[0.139]
GDP_{pc}	-2.593	-3.267	-3.625	-1.852	-2.573	-2.344	-0.674	-0.694	-0.662	-2.345	-2.211	-2.129
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.053]	[0.057]	[0.062]	[0.000]	[0.000]	[0.000]
Market	0.002	0.002	0.002	0.002	0.001	0.001	-0.000	0.000	-0.000	0.004	0.003	0.003
return	[0.025]	[0.239]	[0.488]	[0.040]	[0.371]	[0.109]	[0.926]	[0.931]	[0.996]	[0.022]	[0.064]	[0.061]
Financial	-0.888	-1.211	-1.892	0.158	0.001	-0.060	0.275	0.272	0.271	-0.131	-0.073	-0.068
system	[0.285]	[0.472]	[0.543]	[0.840]	[0.999]	[0.911]	[0.030]	[0.031]	[0.032]	[0.042]	[0.185]	[0.213]
Miller	0.431	0.567	0.971	-0.149	-0.210	0.020	-0.661	-1.112	-1.008	0.718	0.566	0.576
tax term	[0.306]	[0.007]	[0.026]	[0.748]	[0.604]	[0.963]	[0.144]	[0.056]	[0.077]	[0.061]	[0.146]	[0.144]

kets are expected to be lower for large firms. So, large firms should be more capable of issuing equity. Hence, this theory predicts negative relationship between firm size and the leverage ratio. The parameter estimates associated with firm size, reported in Table-5 and Table-7, have negative sign for North American region, although these estimates are not statistically significant in many incidents. But, the negative relationship between firm size and the leverage ratio of a firm is not common when we consider other OECD countries, reported in Table-6 and Table-7.

The relationship between tangibility and the leverage ratio of a firm is also inconsistent in North American region, reported in Table-5 and Table-7. This relationship is consistently positive for the firms of other OECD countries although the effect of tangibility on leverage ratio of a firm is fading away in some cases while controlling the effect of unobserved country and time specific factors, reported in Table-6 and Table-7. This means that firms from other OECD countries reduce the information asymmetry by issuing new debt over new equities. This process also reduces the possibility of new equity under price problem. Thus the positive effect of tangibility on the leverage ratio supports the notion of Trade-off theory and Agency theory as well.

Pecking order theory states that in presence of informational asymmetry firms prefer to invest first by retained income, then by debt and equity is the last option to invest. This process reduces the adverse selection risk premium. Intuitively intangible assets could be treated as expected growth opportunity. If the growth opportunity of a firm is high and if the firm prefers to raise fund by issuing debt, then we could expect the relationship between intangible assets and leverage ratio of a firm is positive. The

empirical evidences, reported in Table-5, Table-6 and Table-7, support the hypothesis of Peaking Order theory for firms of both North American and other OECD region.

The connection between profitability and the leverage ratio is also ambiguous. Trade-off theory predicts positive relationship whereas Pecking Order theory expects negative relationship between profitability and the leverage ratio of a firm (see Frank and Goyal (2004)). However, upon taking another look, there may be other reasons for this negative relationship rather than those proposed by the Pecking Order hypothesis. For example, if bond market is under developed and if a firm has good reputation in equity market, then firm might easily collect money by issuing equity as opposed to debt. Then, we also can predict negative relationship between profitability and the leverage ratio of a firm. Empirical findings of this research, reported in Table-5, Table-6 and Table-7, are not consistent with the Pecking Order theory particularly for the North American firms. The positive effect of profitability on leverage ratio for North American firms disappears but the negative relationship between profitability and leverage ratio of firms from other OECD region remains stable while controlling the effect of unobservable time specific and country specific variables.

From a brief theoretical discussion stated earlier, we could comprehend from the Trade-off theory that market risk should have a positive effect on the leverage ratio. The effect of log of sales should have similar effect on the leverage ratio as like as firm size. But the effect of market risk and log of sales on leverage ratio is quite heterogeneous, reported in Table-5, Table-6 and Table-7. Log of sales has negative effect, market risk and liquidity of a firm have positive effect on the leverage ratio for North American firms,

reported in Table-5 and Table-7 but the effects of these firm specific factors are not the same for firms of other OECD countries. The effect of these variables turns to be insignificant at 5% level when we allow unobserved country specific and time invariant effect in the estimation process[2] , reported in Table-6 and Table-7.

Now we are going to focus on additional set of control variables i.e. the macroeconomic factors. Our empirical findings state that economic growth rate has negative effect on the leverage ratio of a firm. This effect is statistically significant at 5% level for the firms of both North American and other OECD region. These finding states that in countries with a more healthy economy, firms are not likely to take more debt (see Jong, Kabir and Nguyen (2008)). The effect of inflation on the leverage ratio of a firm expected to be positive because high inflation makes credit cheaper today and firms willing to adopt more debt in terms of financing a project. Our empirical findings fail to support this statement[3] . All these estimates are reported in Table-5, Table-6 and Table-7.

The effect of market return seems to be complex. The negative relationship between market rate of return and leverage ratio of a firm, reported in Table-5, appear to support the Market Timing theory. But this negative relation is not common for firms of other OECD countries and this negative relationship between market rate of return and leverage ratio fades away when we allow unobservable country specific and time invariant effect in the estimation process, reported in Table-7.

Finally the Miller's tax term is significantly negative at 5% level. This

[2]There are some exceptions. The effect of log of sales on leverage ratio of a firm seems to be negative for some cases, reported in Table 7.

[3]The effect of inflation rate on the leverage ratio of a firm is negative in some incidents, reported in Table 7.

means that firms from North American region unable to use more debt for financing a project, fails to support the findings of Booth, Demirgüç-Kunt and Maksimovic (2001). But it would be difficult to generalize this statement because the negative relationship between Miller's tax term and leverage ratio is not present for the firms of other OECD countries. On the other hand, the effect of Miller's tax term disappears when we allow unobservable country specific and time invariant effect in the estimation process, reported in Table-7.

To summarize, we can state that top income shares is one the most important determinant of capital structure and has negative effect on the leverage ratio for the firm of North American region. This effect is not fading away while controlling the effect of domestic macroeconomic, firm-specific, unobserved country-specific and time-invariant factors. On the other hand, neither the other domestic macroeconomic variables nor the firm specific factors are fully capable to evaluate the traditional theory of capital structure, particularly in an empirical context. The effect of firm specific and domestic macroeconomic factors seems to be important in determining the capital structure of a firm.

5 Some robustness analysis of the results

We conduct a set of robustness tests, based on sample restrictions. The first restriction focuses on the alternative measures of firm specific factors. So far we have calculated the firm specific factors based on yearly aggregated value of financial information of all firms available in COMPUSTAT and COMPUSTAT global database. But for the analytical purpose, these variables should be obtained from the balance sheet of issuing firms. So we

Table 8

Fixed effect panel regression estimates for the North American region based on the available financial information of issuing firms. Yearly aggregated value of all firm specific variables are used in the estimation process. The table reports HAC adjusted LSDV estimates and p-values reported in square brackets.

	Capital gain included without country effect			Capital gain included with country effect			Capital gain excluded without country effect			Capital gain excluded with country effect		
$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta y_{it-1} + \gamma_2 \Delta(\text{Top Income Shares}_{it}) + \sum_{i=3}^{n} \gamma_i \Delta\left(X_{it}\right) + e_{it}$												
Paramater Estimate	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9
Intercept	-0.596	-0.550	-0.560	-	-	-	-0.515	-0.492	-0.501	-	-	-
	[0.000]	[0.000]	[0.000]	-	-	-	[0.000]	[0.000]	[0.002]	-	-	-
Lag of dependent	-0.036	-0.084	-0.106	-0.042	-0.091	-0.114	-0.025	-0.079	-0.084	-0.028	-0.083	-0.085
variable$\left(y_{t-1}\right)$	[0.760]	[0.500]	[0.362]	[0.747]	[0.507]	[0.382]	[0.864]	[0.566]	[0.549]	[0.859]	[0.584]	[0.576]
Top income	-0.933	-0.094	-2.457	-0.954	-0.098	-2.530	-1.003	-0.116	-2.646	-1.071	-0.122	-2.667
shares	[0.000]	[0.003]	[0.000]	[0.000]	[0.000]	[0.000]	[0.031]	[0.094]	[0.160]	[0.009]	[0.078]	[0.155]
Size of the Firm	-0.358	-0.357	-0.371	-0.359	-0.358	-0.372	-0.349	-0.362	-0.373	-0.349	-0.362	-0.373
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Tangibility	-0.091	-0.096	-0.100	-0.093	-0.101	-0.104	-0.049	-0.010	-0.038	-0.056	-0.014	-0.039
	[0.757]	[0.774]	[0.754]	[0.751]	[0.761]	[0.745]	[0.887]	[0.975]	[0.920]	[0.870]	[0.967]	[0.918]
Intangibility	-0.839	-0.754	-0.733	-0.861	-0.779	-0.754	-0.851	-0.704	-0.696	-0.888	-0.724	-0.699
	[0.083]	[0.146]	[0.148]	[0.070]	[0.130]	[0.136]	[0.089]	[0.158]	[0.179]	[0.071]	[0.144]	[0.176]
Profitability	-1.379	-1.312	-1.284	-1.445	-1.385	-1.350	-1.240	-1.207	-1.190	-1.310	-1.251	-1.199
	[0.014]	[0.028]	[0.026]	[0.008]	[0.014]	[0.014]	[0.076]	[0.070]	[0.070]	[0.035]	[0.037]	[0.044]
Sales	0.367	0.359	0.369	0.367	0.358	0.369	0.332	0.347	0.354	0.331	0.347	0.354
	[0.000]	[0.000]	[0.000]	[0.00]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Liquidity	0.023	-0.004	0.020	0.024	-0.003	0.022	-0.025	-0.032	-0.032	-0.026	-0.033	-0.032
	[0.714]	[0.943]	[0.734]	[0.712]	[0.952]	[0.727]	[0.722]	[0.660]	[0.659]	[0.724]	[0.656]	[0.657]
Market risk	0.068	0.064	0.065	0.069	0.066	0.067	0.068	0.066	0.065	0.070	0.067	0.066
	[0.00]	[0.004]	[0.003]	[0.001]	[0.006]	[0.005]	[0.000]	[0.002]	[0.004]	[0.001]	[0.006]	[0.007]

Continue Table 8

Inflation	0.225	0.206	0.207	0.217	0.198	0.199	0.195	0.188	0.189	0.188	0.184	0.188
	[0.000]	[0.001]	[0.000]	[0.000]	[0.005]	[0.003]	[0.004]	[0.014]	[0.031]	[0.011]	[0.023]	[0.038]
GDP_{pc}	-1.123	-1.023	-1.021	-1.091	-0.994	-0.989	-0.967	-0.901	-0.908	-0.951	-0.891	-0.905
	[0.263]	[0.352]	[0.333]	[0.291]	[0.380]	[0.361]	[0.412]	[0.449]	[0.470]	[0.430]	[0.463]	[0.477]
Market	0.008	0.008	0.008	0.008	0.008	0.008	0.007	0.007	0.007	0.007	0.007	0.007
return	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Financial	-0.532	-0.355	-0.468	-0.578	-0.412	-0.518	-0.077	-0.005	-0.029	-0.133	-0.041	-0.035
system	[0.186]	[0.429]	[0.301]	[0.153]	[0.351]	[0.259]	[0.847]	[0.989]	[0.951]	[0.716]	[0.916]	[0.939]
Miller	-3.296	-3.079	-3.176	-3.297	-3.082	-3.177	-2.802	-2.749	-2.733	-2.800	-2.747	-2.732
tax term	[0.000]	[0.000]	[0.000]	[0.000]	[0.00]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Table 9

Fixed effect panel regression estimates for the North American region based on the available financial information of all firms. The restricted IPO proceeds and yearly aggregated value of all firm specific variables are used in the estimation process. The table reports HAC adjusted LSDV estimates and p-values reported in square brackets.

	Capital gain included without country effect			Capital gain included with country effect			Capital gain excluded without country effect			Capital gain excluded with country effect		
$\Delta y_{it} = \gamma_0 + \gamma_1 \Delta y_{it-1} + \gamma_2 \Delta(\text{Top Income Shares}_{it}) + \sum_{i=3}^{n} \gamma_i \Delta\left(X_{it}\right) + e_{it}$												
Paramater Estimate	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9	IvP (β)	Top 1	Top 1/9
Intercept	-0.009	0.025	0.016	-	-	-	-0.018	0.042	0.014	-	-	-
	[0.923]	[0.771]	[0.874]	-	-	-	[0.849]	[0.653]	[0.892]	-	-	-
Lag of dependent variable$\left(y_{t-1}\right)$	0.166	0.156	0.218	0.160	0.148	0.212	0.239	0.190	0.212	0.233	0.183	0.207
	[0.024]	[0.057]	[0.013]	[0.032]	[0.073]	[0.016]	[0.001]	[0.017]	[0.007]	[0.000]	[0.013]	[0.006]
Top income shares	-0.640	-0.074	-1.510	-0.638	-0.075	-1.520	-1.087	-0.139	-3.101	-1.086	-0.141	-3.073
	[0.000]	[0.001]	[0.006]	[0.00]	[0.000]	[0.004]	[0.000]	[0.005]	[0.006]	[0.000]	[0.003]	[0.005]
Size of the Firm	-0.358	-0.759	-0.746	-0.633	-1.091	-1.063	-0.588	-1.156	-1.160	-0.873	-1.496	-1.395
	[0.608]	[0.215]	[0.289]	[0.420]	[0.086]	[0.138]	[0.354]	[0.065]	[0.075]	[0.190]	[0.013]	[0.033]
Tangibility	0.854	0.509	0.605	1.000	0.700	0.785	-1.158	-0.446	-0.691	-1.002	-0.261	-0.561
	[0.585]	[0.774]	[0.745]	[0.498]	[0.676]	[0.653]	[0.517]	[0.822]	[0.732]	[0.536]	[0.886]	[0.768]
Intangibility	3.367	3.083	3.570	3.736	3.532	4.000	2.747	3.190	3.163	3.132	3.645	3.483
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]	[0.001]	[0.000]	[0.00]	[0.000]	[0.000]
Profitability	6.548	4.940	4.693	5.914	4.193	3.977	3.500	3.343	2.180	2.847	2.576	1.644
	[0.012]	[0.036]	[0.058]	[0.027]	[0.067]	[0.102]	[0.167]	[0.146]	[0.348]	[0.278]	[0.247]	[0.488]
Sales	-0.606	-0.338	-0.468	-0.381	-0.061	-0.206	-0.338	-0.043	-0.095	-0.104	0.240	0.094
	[0.457]	[0.674]	[0.619]	[0.661]	[0.938]	[0.821]	[0.648]	[0.954]	[0.903]	[0.887]	[0.725]	[0.899]
Liquidity	0.376	0.285	0.319	0.303	0.196	0.234	0.194	0.222	0.215	0.119	0.130	0.153
	[0.040]	[0.086]	[0.089]	[0.160]	[0.289]	[0.244]	[0.241]	[0.171]	[0.200]	[0.542]	[0.444]	[0.400]
Market risk	0.037	0.030	0.032	0.037	0.030	0.032	0.038	0.032	0.031	0.038	0.032	0.031
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.007]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Continue Table 9

Inflation	0.036	0.027	0.028	0.015	0.001	0.003	0.037	0.029	0.034	0.015	0.003	0.016
	[0.391]	[0.502]	[0.551]	[0.766]	[0.967]	[0.940]	[0.371]	[0.518]	[0.487]	[0.725]	[0.941]	[0.746]
GDP_{pc}	-0.975	-0.964	-0.812	-0.869	-0.837	-0.690	-0.597	-0.861	-0.604	-0.487	-0.733	-0.513
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.008]	[0.019]	[0.001]	[0.021]	[0.099]	[0.012]	[0.089]
Market	-0.001	-0.001	-0.002	-0.001	-0.001	-0.002	-0.001	-0.002	-0.002	-0.001	-0.002	-0.002
return	[0.105]	[0.147]	[0.134]	[0.076]	[0.101]	[0.097]	[0.135]	[0.088]	[0.073]	[0.092]	[0.054]	[0.052]
Financial	-0.649	-0.664	-0.657	-0.664	-0.687	-0.678	-0.519	-0.580	-0.613	-0.536	-0.604	-0.624
system	[0.000]	[0.002]	[0.006]	[0.000]	[0.000]	[0.002]	[0.000]	[0.006]	[0.005]	[0.000]	[0.003]	[0.003]
Miller	-1.218	-1.188	-1.209	-1.198	-1.165	-1.187	-0.997	-1.071	-1.084	-0.977	-1.047	-1.068
tax term	[0.001]	[0.001]	[0.003]	[0.001]	[0.000]	[0.003]	[0.000]	[0.000]	[0.008]	[0.000]	[0.000]	[0.001]

have retested our sample based on available financial information of issuing firms and recalculated the firm specific factors based on yearly aggregated value of financial information collected from the balance sheet of available issuing firms. The empirical findings are reported in Table-8. This analysis reconfirms our hypothesis that top income shares negatively affect the leverage ratio of a firm.

Another sample restriction is based on the price of IPOs and REITs (Real estate investment trust) class of IPO issues. The restricted sample includes IPOs with an offer price of at least $5.00, excluding all REITs and all stocks not listed on Amex, NYSE, NASDAQ and Toronto stock exchanges. The empirical findings based on the restricted sample are reported in Table-9. Again our analysis reconfirms the hypothesis that the relationship between top income shares and the leverage ratio of a firm is negative.

6 Conclusions

This paper has investigated the effect of top income shares on the capital structure choice of a firm. We find that the top income share is the dominant factor in explaining the variation in leverage ratio for the firms of North American region. The negative relationship between top income shares and leverage ratio found in the North American firms but this relationship is not present in firms from other OECD countries. This paper also uses information from firm specific and macroeconomic variables (such as, firm size, tangibility, intangibility, profitability, sales, liquidity, market risk, top income shares, inflation rate, and economic growth rate, rate of market return, financial system and Miller tax term) to explain the dynam-

ics of capital structure choice of OECD firms. The result of this empirical study provides some of the insights from modern capital structure theory. The empirical evidences also reveal that certain firm-specific and macro-economic factors are relevant for explaining the capital structure choice. However, a further investigation states that these traditional determinants might not have the robust explanatory power in explaining the capital structure choice. A larger, comprehensive, and more detailed database is required for a further detailed capital structure study.

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