

FINANCIAL MANAGEMENT WHEN INTERESTS ON DEBT ARE NOT FULLY DEDUCTIBLE. THE ITALIAN CASE STUDY

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Abstract:

Purpose: *Corporate finance management rules are written under the assumption that financing costs are deductible from taxable income. If this assumption is relaxed, such management rules need to be revised. How do managers maximise operating margins and returns if this assumption no longer holds true? We faced this issue using both an algebraic and a simulation approach. By defining numerical analysis models, we bypass algebraic profile and skills, which might become too complex for practitioners.*

Methodology/approach: *The recent tax reform introduced in Italy, that creates a partial tax deduction for financing costs, offers a case study. We reviewed traditional management tools and we proposed an analytical model for a simulation approach to measure the effect of these new tax rules on the optimal financial leverage and the maximum firm leverage.*

Findings: *We demonstrate that the new regulation might have a deep impact on not sufficiently profitable companies. We also outline that the regulation is not addressed to highly profitable firms which could be the target for a taxation system aimed to an excess profits redistribution. The recent tax reform ultimately did not address the key issue for the Italian political economy: to strengthen the corporate financial structure and to reduce excess profit generation.*

Originality/value: *We propose a new set of guidelines for financial management wherever financing costs would no longer be deductible from taxable income by linking a well known theoretical framework with a practitioners' approach.*

Keywords: financial leverage, corporate taxation, accounting ratios, Italy.

JEL classification: G32, G38, H25, H32, K34, M49.

1. INTRODUCTION

Corporate finance management rules mirror a deeply rooted awareness that draws from a large body of academic literature. These rules are written under the assumption that financing costs are deductible from taxable income (e.g. generate "tax shields"). However, if this assumption is relaxed, such management rules need to be revised. The recent tax reform introduced in Italy, which creates a partial tax deduction for financing costs, offers a case study to review traditional corporate finance management rules.

Managers' quest for corporate value maximisation is founded on instruments aimed to increase operating margins and returns on invested capital. How do managers maximise corporate value wherever tax shields on interest bearing debt vanish?

We faced this issue using an algebraic approach, by revising the existing well known accounting ratios and cash flows statement and, alternatively, we run a simulation approach. By defining numerical analysis models we bypass algebraic profile and skills, which might become too complex for practitioners.

This article is structured as follow. Section 2 presents the current Italian taxation system which affects corporate financial leverage by limiting the tax deduction of financial interests from gross profit. Section 3 presents financial analysis based on accounting ratios, cash flows and corporate values that need to be revised wherever a country's tax laws include partial deductibility from gross profit of financial interest on debt. Section 4 presents an analytical model for a simulation approach based on MatLab[®]. The simulation model makes it possible to provide some insights on what financial approaches would fit the new regulatory context. Concluding remarks are provided in Section 5.

2. CORPORATE CAPITAL STRUCTURE AND ITALIAN TAX RULES

Since the seminal work of Modigliani and Miller (1963), it is widely known and accepted (Brealey and Myers, 2003) that there is a rational link between financial structure and corporate market value. The optimal capital structure trades-off present value of tax benefits and the expected insolvency costs (Copeland and Weston, 1988) to maximise firm's equity value. Actually, the optimal capital structure depends on other factors, including the regulatory framework for banking activities, uncertainty about the company's expected operating income and the corporate governance (Jensen and Meckling, 1976; Harris and Raviv, 1991).

Tax rules do always influence company decisions about investments, financing and business locations. Such decisions are based on the general assumption that financing costs are fully tax deductible: for every dollar value of financial costs deducted from gross income, the firm gains a tax shield on the marginal corporate tax rate.

In the presence of high leveraged companies, tax authorities should wonder if these financial decisions were pulled by economic fundamentals or were pushed by tax avoidance. Indeed, there might occur situations where the suspect about the latter is concrete: where shareholders "lend themselves money," either by setting collaterals to secure a bank loan or by underwriting bonds instead of new equity issued by their holding company. Since collaterals fully back the loan granted by a bank, it is difficult to understand why a shareholder should provide an indirect guarantee for the company instead of financing it directly unless by doing so they gain some tax benefits. Such triangular transactions put in place an effective scheme for tax avoidance. As long as the personal tax rate on interests is lower than the corporate tax on profit, the shareholders gain a tax arbitrage. This gain is even higher in case of funding directly the firm by underwriting bonds instead of equity.

Rajan and Zingales (1995) found evidences that Italian companies are the most leveraged among G-7 countries, and that the main determinant were the relative tax advantage of financial debt.

Not surprisingly, the rationale underling the set of fiscal laws that Italian government introduced since 1995 it was therefore towards the aim of contrasting such tax avoidance schemes.

2.1. THE SET OF FISCAL LAWS AGAINST HIGH FINANCIAL LEVERAGE IN ITALY

- Act no. 549/1995: the aim of this law is to prevent companies from raising capital by issuing debt which pays "above market interest rates" {1} to their shareholders rather than by increasing equity capital. Since personal tax rate on financial income is lower than corporate tax rate on profit (e.g. 12,50% vs 36% at that time, 27% as from 2008), share-bondholders gain a net tax arbitrage. To prevent this tax avoidance scheme, this law establishes that interest on bonds, whose yield is above a market-defined ceiling, cannot be deducted from taxable income.
- Act no. 425/1996: it is addressed to companies' practice of securing bank loans using money or securities (other than shares) set as a collateral. Such transactions are still permitted but this law

reduced the tax benefits by increasing (from 12,50% to 32,50%) the tax burden on personal income on financial instruments if they are set as a collateral on bank loans.

- Act. No. 446/1997: it introduces a regional tax on productive activities (the IRAP), levied on the "net value added" derived in each Italian region by resident company. The "net value added" does not include labour costs, extraordinary items and financial revenue and expenses. The ordinary tax rate is 3,9% (as from 2008) and it is not deductible from gross profit.
- Act no. 244/2007: this is the fundamental act which introduces the partial tax deductibility of interest expenses. Under this new rule, interest expenses are fully deductible up to an amount equal to the interest income accrued in the same tax period. Any excess over that amount is deductible to the extent of 30 percent of gross operating income (roughly equal to earnings before interest, taxes, depreciation, and amortization – EBITDA). Any interest expenses exceeding 30 percent of EBITDA may be carried forward for deduction in subsequent tax periods, to the extent that the net interest expenses (that is, those exceeding interest income) accrued in such tax periods are less than 30 percent of each period's EBITDA. For tax periods beginning on or after 1 January 2010, the portion of EBITDA not used up in the deduction of interest expenses and financial charges pertaining to a period may be added to the EBITDA of subsequent tax periods.

In the following sections our main concern is on the effects on financial management generated by any rule which limits the deductibility of financial expenses from taxable income, such the one Italy experiences since 2008.

3. IMPLICATIONS FOR FINANCIAL ANALYSIS

Whenever a country's tax law includes partial deductibility from the gross profits of monetary costs {2} and, more specifically, of interest on debt financing, {3} the traditional rules for the financial analysis of balance sheet ratios, cash flow and corporate values need to be adapted. Indeed, making interest expenses only partially deductible from corporate profit means that the financial analysis of this intermediary situation differs from both situations of full taxation (Modigliani and Miller, 1963) and no taxation (Modigliani and Miller, 1958).

As such, this section examines the adjustments to the traditional financial analysis based on financial ratios, cash flows and corporate market value.

3.1. EFFECTS ON STRUCTURED FINANCIAL RATIO ANALYSIS

Return on equity (ROE), along with return on assets (ROA), is one of most widely used general measures of corporate financial performance (Rappaport, 1986, p.31). Since ROE represents the ultimate result of structured financial ratio analysis (Fierer et al., 2004, p. 68), also called "Du Pont analysis" (Stowe et al. 2002, p. 85; Correia et al., 2003, pp. 5-19), this contributes to its popularity among analysts, financial managers and shareholders (Monteiro, 2006).

ROE can be broken up into three separate ratios as follows:

$$ROE = \frac{\text{earnings}}{\text{sales}} \times \frac{\text{sales}}{\text{assets}} \times \frac{\text{asset}}{\text{equity}} = \frac{\text{earnings}}{\text{equity}} \quad (1)$$

The three ratios of (1) can be described, respectively, as profitability, asset turnover and financial leverage. At first glance, this seems to be a good synthesis of operating, assets and financial management results. However, equation (1) has some serious flaws as a measure of performance (Fierer, 1999, p. 35; Parès, 1980, p. 367; Rappaport, 1986, p. 43; Boyd, 1989).

An alternative formulation for ROE, presented by Zakon (1968), leads to the following decomposition:

$$ROE = [ROI + (ROI - I) \times D/E] \times (1-k) \times (1-t) = \frac{\text{earnings}}{\text{equity}}, \quad (2)$$

where ROI = return on invested capital (defined as the sum of D+E)

D = net interest-bearing debt

E = book value of equity

I = net interests

k = - (earnings before tax)/(earnings before tax – extraordinary items)

t = - taxes / earnings before tax

The greater explanatory power of (2) comes from the fact it separates the contributions of three management areas: operating activities (e.g. ROI), financing activities (the spread “ROI – I” and the leverage effect), and extraordinary (1-k) and tax activities (1-t).

All corporate finance manuals (Berk and DeMarzo, 2008; Brealey and Myers, 2003; Copeland and Weston, 1988; Eitman et al., 2007; Van Horne and Wachowicz, 1992; Lumby and Jones, 2003; Ross et al., 1993) treat the tax variable residually, as an external factor not governed by management. The impact of taxes is merely an algebraic step that adjusts the gross results of the three management areas.

Such an approach is sound if the company's costs are deductible from its income and there are no revenues that enjoy beneficial taxation (e.g. interest income, dividends and capital gains). If we relax this assumption, analysis based on balance sheet ratios needs to be adjusted to account for increased or decreased tax payments when compared to the theoretical marginal payments. This influence of taxes on financial analysis is tied to the need for the manager in charge of corporate tax planning - both for operating and financing activities - to be held accountable.

As such, (2) is adjusted with the following new formulation:

$$ROE = [ROI + (ROI - I) \times D/E] \times (1-k) \times [(1-T) *] = \frac{\text{earnings}}{\text{equity}}, \quad (3)$$

where, in addition to the abovementioned symbols:

T = marginal tax rate burden,

= (1 - t) / (1 - T)

(4)

Since (1-T) is calculated on the basis of perfect equivalence between book and taxable income while (1-t) expresses the effective tax burden, the coefficient (*lambda*) measures the degree of alignment between accounting and taxable income. In other terms, it measures the impact of the fiscal inefficiency of managerial decisions taken when determining the taxes on earnings.

The management in charge of corporate tax planning now has a clear goal: increase [(1-T) *] by acting on the two components: the local tax system and the fiscal inefficiency of decisions.

The new proposed formulation of ROE in (3) benefits the following items:

- it does not change ROI: ROI is a pre-tax ratio and so the presence or absence (or some situation in the middle) of taxes should not change its value;
- it does not change the spread (ROI - I): since the new tax treatment does not alter ROI and the gross cost of financing is not affected by taxes the spread has to remain the same;
- it does not directly influence choices about the composition of liabilities (the debt equity ratio): the fact that financing costs are not deductible does not depend solely on leverage, but also, for example in Italy, on three variables: gross profitability, the cost of the financial debt and, finally, the amount of financial debt taken on. As such, it would be incorrect to simply make the level of debt (D/E) the cause for the interest not being deductible from gross income;

- the coefficient shows the degree of misalignment between accounting and taxable income: this is the starting point that should be used by management for optimisation.

Finally, at this point it seems worthwhile to note that the other financial ratios derived from decomposing ROE are not influenced by the solution in (3): if the operating management is not also responsible for the fiscal impact of its decisions, then measuring its performance is in no way influenced by the company's fiscal efficiency.

3.2 EFFECTS ON CASH FLOW STATEMENT ANALYSIS

Entities need cash to conduct their operations, to pay their obligations and to provide returns to their investors (IASF, 2008). The provision of transparent and useful information on market participants is essential for an orderly and efficient market (Fama, 1970).{4}

Under IAS 7 all entities shall prepare a statement of cash flows in accordance with the requirements of the Standard. IAS 7 sets out that the statement of cash flows must show the financial flow for the period in question, classifying them into one of three areas:

- Operating activities: the main revenue-producing activities of the entity that are not investing or financing activities.
- Investing activities: the acquisition and disposal of long-term assets and other investments that are not considered to be cash equivalents.
- Financing activities: activities that alter the equity capital and borrowing structure of the entity.

Nonetheless, individual transactions can include cash flows that are classified differently. For example, when the repayment of a loan includes both interest and capital, then the interest could fall under operating activities and the capital under financing activities. Alternatively, the entire cash flow could be placed under financing activities. It is unclear whether the payment of interest falls under operating or financing activities.

The payment of taxes faces a similar problem. IAS 7 established that the payment or reimbursement of income tax be placed under operating activities, unless it can specially be included under financing or investment activities. Moreover, once taxable income has been calculated from the sum of the interest payable on financing activities, it follows that a part of the operating taxes fall under financing activities. If this is the case, then we have to consider whether it is necessary to divide cash flows for taxes according to the various areas that resulted in such taxes.

The operating cash flow of two companies that have identical economic margins and returns on capital, but different financial structures, should be identical (hence the value of the business is equal). If the cash flow from operations would include all income taxes, then such equivalence would be breached: an higher leveraged company would show greater financing costs which could be deducted from taxable income. As a result, it would have a lower tax burden, thus increasing the cash flow from operations artificially.

This is reason why operating cash flow is calculated net of taxes linked to operating activities, but gross of any impact from financing activities (unlevered after-tax cash flow). Hence, it is incorrect to calculate unlevered after-tax cash flow net of all operating taxes on the company or, even worse, net of interest expenses. By contrast, it is necessary to divide the taxes into the respective areas from which they originate.

Table 1 provides a numerical example. The lower section of the table shows three possible ways of displaying the statement of cash flows. The reclassified version in column C is the one we prefer. Each of these three methods of displaying cash flow has the following in common:

- profit;
- changes in the net financial position;
- cash flows from and for shareholders.

In column A, "Gross cash flow from operations" is the sum of EBITDA and operating taxes. Financing costs are placed under financing activities without subtracting the tax shield they generate. Using this approach, the "Gross cash flow from operations" is 196. Net of Capital expenditures (Capex), unlevered after-tax cash flow amounts to 296.

Table 1 - Cash flow statements (Euro 000)

	Year n		
Revenues	1,150.00	1,150.00	1,150.00
EBITDA	300.00	300.00	300.00
EBIT	190.00	190.00	190.00
Net financial items	- 94.0	- 94.0	- 94.0
Extraordinary items	10.0	10.0	10.0
Earnings before tax	106.0	106.0	106.0
Taxes	- 54.0	- 54.0	- 54.0
Earnings after tax	52.00	52.00	52.00
	A	B	C
Earnings after tax		52.00	
EBITDA	300.00		300.00
Amortisation and provisions		110.00	
Operating taxes	-54.00		-52.25
Gross cash flow from operations	246.00	162.00	247.75
+/- Working capital changes	-50.00	-50.00	-50.00
Cash flow from operations	196.00	112.00	197.75
Capex	100.00	90.00	100.00
Marginal taxes on Capex			-2.75
UNLEVERED AFTER-TAX CASH FLOW	296.00	202.00	295.00
Net financial items	-94.00		-94.00
Marginal tax impact on net financial items			25.85
Fiscal inefficiency for financial items			-1.10
Changes in net debt	-197.00	-197.00	-197.00
Dividend	-5.00	-5.00	-5.00
Fiscal inefficiency for operating activities			-23.75

In column B, "Gross cash flow from operations" is the sum of the net profit and non-monetary costs (amortisation and provisions). Calculating cash flow for operations in this manner is, in our opinion, wrong on two reasons: including both the financing costs (94) and all taxes (54) do not split marginal taxes levied on financial and extraordinary items. Moreover, the financing costs are no longer included under the financing activities in any way. This approach results in a lower "Cash flow from operations" (112) and a lower "Unlevered after-tax cash flow" (202).

In column C, "Gross cash flow from operations" is the sum of EBITDA and the marginal taxes on EBIT, calculated as follows:

$$\text{Corporate Taxes} = \text{Marginal corporate tax rate} \times \text{EBIT} = 27.5\% \times 190.0 = 52.25.$$

The investment activities correctly show an inflow of 100, but they are also the net of the marginal taxes generated by the capital gain (effect of the decision to disinvest) of 10 in the profit and loss account. The marginal tax implication of this activity can easily be calculated:

$$\text{Corporate Taxes} = \text{Corporate tax rate} \times \text{Extraordinary items} = 27.5\% \times 10 = 2.75$$

Thus, cash flow from operations and unlevered after-tax cash flow equal, respectively, 197.75 and 295.00. "Cash flow from operations" is not influenced by financial decisions in any way {5} (debt level, cost of debt, various types of financing, etc.) and operating activities are valued as if they were a company without any debts and that pays its own taxes.

Finally, "Unlevered after-tax cash flow" is split among the residual claimants of corporate value: financial creditors, the government and shareholders.

In column C, the cash flows from and to capital providers clearly highlight the marginal tax shield on financing costs:

$$\text{Tax shield on interests} = \text{Corporate tax rate} \times \text{Net financial items} = 27.5\% \times 94 = 25.90$$

and the higher taxes due to the partial deductibility of interest from income:

$$\text{Maximum deductible interest} = \text{maximum share allowed} \times \text{EBITDA} = 30\% \times 300 = 90.0$$

$$\text{Excess that cannot be deducted} = \text{net interest} - \text{maximum deductible interest} = 94 - 90 = 4.0$$

$$\text{Reduced tax shield for interest} = \text{Excess that cannot be deducted} \times \text{marginal tax rate} = 4 \times 27.5\% = 1.1$$

Logically, by only stripping the fiscal inefficiency from the financing activities, the item "Fiscal inefficiency in operating activities" refers, in a residual and undifferentiated manner, to the increased taxes (compared to the theoretical marginal ones) generated by the other two areas (operating and investment activities):

$$\text{Fiscal inefficiency for operating activities} = \text{Taxes} - \text{operating taxes} - \text{marginal taxes on Capex} + \text{tax shield for interest} - \text{reduced tax shield for interest} = 54.0 - 52.25 - 2.75 + 25.90 - 1.1 = 23.75$$

The "Reduced tax shield for interest" and the "Fiscal inefficiency in operating activities" show, in monetary terms, the misalignment between theoretical and effective taxes. As such, they provide objective parameters that a corporate tax planner can seek to minimise.

The logic used to display information in column B is conceptually wrong and harmful. In column A, it is misleading but easy to understand. Column C seems to be the best, but it might be too sophisticated for practitioners.

3.3 EFFECTS ON COMPANY ASSESSMENT

The two main approaches to analysing company value are Economic Value Added (Stewart, 1991) and discounted cash flow (Hirshleifer, 1958). Both methods provide the same result (Shrieves, 2001) since accounting, finance and financial mathematics do not create or destroy value, but they describe it in their own language.

Economic Value Added (EVA) is simply the difference between net operating profit after tax (NOPAT) and the weighted average cost of capital (WACC):

$$\text{EVA} = \text{NOPAT} - [\text{WACC} \times (\text{D} + \text{E})] \quad (5)$$

If there is perfect equivalence between the book and market value of capital, then a positive value indicates excess profit compared to the expectations of capital investors (Young and O'Byrne, 2001).

This method is based on the clear separation between operating activities (NOPAT) and financing activities (included in WACC and capital employed). As long as the taxes in NOPAT are not the only taxes on gross profit, but the theoretical or effective ones due on EBITDA, then NOPAT is not influenced by financing activities in any way. Therefore, national tax laws that allow

interest to be partially deducted from gross income (or tax exemptions on financial income) have no impact on NOPAT. {6} Nevertheless, excess profit would be influenced due to the increased effective taxation of financing interest.

In order to isolate the effect on the financing costs caused by partial deductibility from corporate taxes, we propose two alternative adjustments {7} on accounting data:

- adjusting capital employed by adding equity-equivalent reserves to capital;
- adjusting after-tax WACC.

The assumption underlying the adjustment to employed capital is that increased taxation due to local tax laws can be seen as reducing the profit (corporate value) of equity and bond investors. As such, the increase in taxes becomes an "equity equivalent" capital taken by the government, which has a marginal opportunity cost that is the unadjusted WACC:

equity equivalent = non-deductible interest x marginal tax rate.

The rationale of the adjustment to WACC is that the partial deductibility of the interest results in an increased effective cost for the debt after tax, since the tax shield is only applicable to the deductible interest. The employed capital is unadjusted, while the adjusted WACC increases as the percentage of the financing costs that cannot be deducted increases:

$$\text{WACC adjusted} = \text{WACC}^* = \sum_{i=1}^n Wk_i \times k_i \times (1-t) + \sum_{j=1}^m Wk_j \times k_j, \quad (6)$$

where:

- Wk_i = the i-th capital share of the total financing capital;
- k_i = gross cost of the i-th type of entirely deductible acquired capital;
- t = marginal tax rate on the interest expense
- Wk_j = the j-th capital share of the total financing capital;
- k_j = gross cost of the j-th type of capital acquired that is not deductible

Obviously, company performance is not different in one reclassification model or the other, it is merely represented differently. The role of the CFO is to manage the capital charge payable on operating performance. The EVA method, as a value-based management tool, provides an objective parameter for setting company goals (Zimmerman, 1997).

In evaluating corporate value based on discounted cash flow analysis, firm value is given by the net present value of forecast unlevered after-tax cash flow .

Partially deductible interest can be treated in two different ways:

- [1] by adjusting forecast unlevered after-tax cash flow;
- [2] by adjusting WACC.

The first method calculates WACC as a discount rate, assuming interest is fully deductible, and subtracts the present value of the lack of the tax shield from the present value of cash flow:

$$\text{EV} = \sum_{t=1}^n FCF_t \times (1 + \text{WACC})^{-t} - \sum_{k=1}^m LTS_k \times (1 + \text{WACC})^{-k} \quad (7)$$

The second method of calculation indexes the forecast unlevered after-tax cash flow to WACC, adjusted to the amount of interest that is not deductible from income (this is the same as adjusting after taxes WACC in the EVA method): :

$$\text{EV} = \sum_{t=1}^n FCF_t \times (1 + \text{WACC}^*)^{-t}, \quad (8)$$

$$WACC^* = \sum_{i=1}^n Wk_i \times k_i \times (1-t) + \sum_{j=1}^m Wk_j \times k_j .$$

If the interest expense is partially (or totally) non-deductible, then the value of the company is divided differently among the residual claimants, namely the government, debt and equity investors. In this case, the financial analyst and the company's management must correctly allocate the amount to be paid to the state as a consequence of marginal decisions.

Company finance has never created value, but rather it has allocated it between the government and investors. If the financial decisions made by managers result in different tax treatments, then the financing activities of companies are not external to the creation of value. The financial management of a company can reduce company value when marginal decisions are made that reduce investor wealth or the reinvestment of cash flows. The cost incurred by the company is the opportunity cost of the lost capital. Only measuring methods that support value-based management correctly assign this cost to the manager who made the decision that created it.

In Section 3, we proposed a correction to the traditional financial ratios analysis and other financial approaches in order to assess what financial policies are encouraged or discouraged by a regulation which limits costs deduction from taxable income. Our proposed solution was succinct and straightforward to use but it hides the drivers of tax efficiency. Thus, the formula appears simple, but closer examination reveals hidden links between variables which are not easy to understand and to manage.

Our first simulation is an assessment of the impact of the new regulation given changes to operating margins. Table 2 provides an example of our reclassification model.

Table 2 - Profit and loss accounts

New profit and loss account	Year 1	Year 2	Year 3
Revenue	1,300,000.00	1,300,000.00	1,300,000.00
Monetary operating costs	- 1,200,000.00	- 1,190,000.00	- 1,180,000.00
EBITDA	100,000.00	110,000.00	120,000.00
Amortisation	- 70,000.00	- 70,000.00	- 70,000.00
Operating profit	30,000.00	40,000.00	50,000.00
Maximum deductibility of financing costs	- 30,000.00	- 33,000.00	- 36,000.00
Net financing costs	- 56,000.00	- 56,000.00	- 56,000.00
Taxable financing costs	- 30,000.00	- 33,000.00	- 36,000.00
Gross result	- 26,000.00	- 16,000.00	- 6,000.00
Taxable income	-	7,000.00	14,000.00
Taxes	-	1,925.00	3,850.00
Increased taxes	- 7,150.00	- 6,325.00	- 5,500.00
Net result	- 26,000.00	- 17,925.00	- 9,850.00
Operating profit	30,000.00	40,000.00	50,000.00
Adjusted net financing costs	- 65,862.07	- 64,724.14	- 63,586.21
Gross result	- 35,862.07	- 24,724.14	- 13,586.21
Taxes	9,862.07	6,799.14	3,736.21
Net earnings	- 26,000.00	- 17,925.00	- 9,850.00
Financial debt	700,000.00	700,000.00	700,000.00
Equity capital	300,000.00	300,000.00	300,000.00
Total capital employed	1,000,000.00	1,000,000.00	1,000,000.00
Interest rate on debt	8%	8%	8%
Tax rate	27.5%	27.5%	27.5%
ROE - New	-8.67%	-5.98%	-3.28%
ROI - New	3.00%	4.00%	5.00%
Debt equity ratio - New	2.33	2.33	2.33
Interest coverage ratio - New	0.46	0.62	0.79
Old Profit and Loss Account	Year 1	Year 2	Year 3
Operating profit	30,000.00	40,000.00	50,000.00
Net financing costs	- 56,000.00	- 56,000.00	- 56,000.00
Gross result	- 26,000.00	- 16,000.00	- 6,000.00
Taxes	7,150.00	4,400.00	1,650.00
Net earnings	- 18,850.00	- 11,600.00	- 4,350.00
ROE	-6.28%	-3.87%	-1.45%
ROI	3.00%	4.00%	5.00%
Debt equity ratio	2.33	2.33	2.33
Interest coverage ratio	0.54	0.71	0.89

The partial deductibility of the interest expense becomes increasingly important as ROI drops, having a significant impact when ROI drops below 10%. In companies where the operating margin is very small, the impact is substantial (Fig. 1).

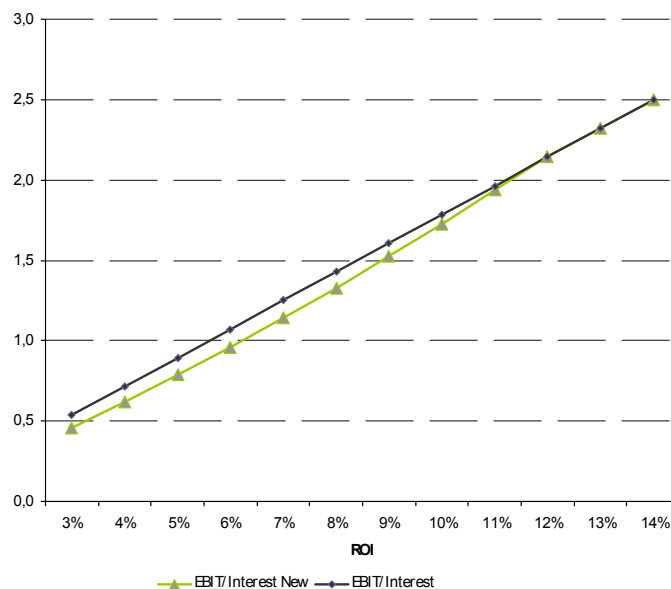


Figure 2 - The new tax effect on interest coverage ratio depending on ROI

The analysis showed the effects produced by the new regulation for both high margin companies (limited) and low margin ones (important and, after a certain level, very important). The simulation model takes into consideration a normal/average composition of liabilities and then verifies what happens as ROI changes.

Now let us consider a company with a fairly good ROI (13%), and let us check the operational impact linked to the implementation of a financial policy that has a different approach to debt or equity. Figure 3 summarises the general details {9}. When the debt level increases, there is a modest decrease in the interest coverage ratio given high margins and a sharp drop in the value of the company analysed. For a company with high margins, the new rules do not result in an unsustainable degree of financial distress, but - significantly - in reduced profitability for shareholders and, as a result, a reduction in the equity value. The incentive created by lawmakers works even when the laws themselves do not have a major impact on a company's ability to service its financing costs.

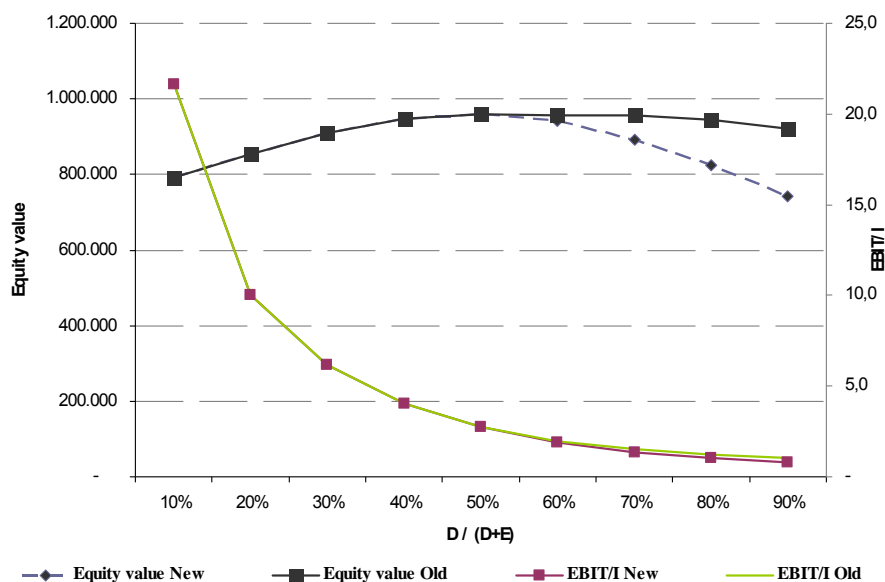


Figure 3 – The new tax effect on corporate value and the interest coverage ratio.

Figure 4 is a zoom in on Figure 3, focusing on higher ranges of debt. It should be noted that the interest coverage ratio does drop noticeably, but not dramatically. However, the value of the company changes quite substantially. A financial policy of favouring debt - an aspect that the lawmakers are avowedly against - is discouraged through the corporate value mechanism.

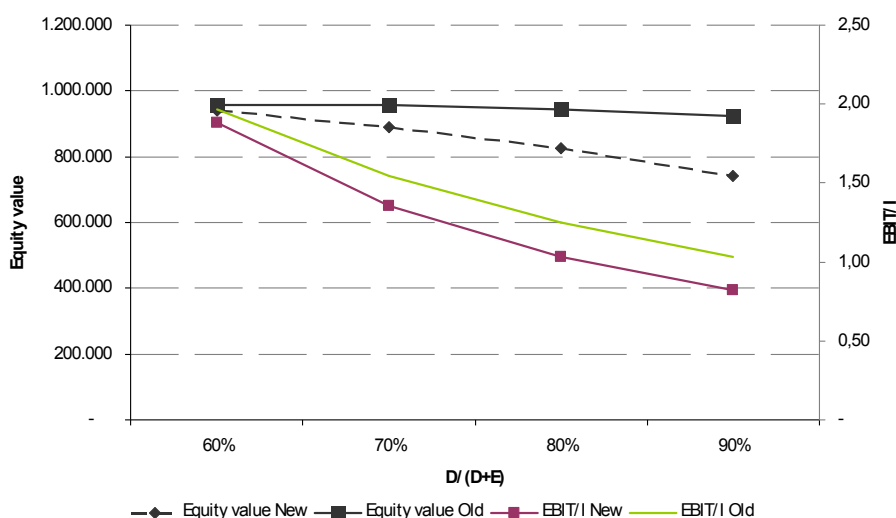


Figure 4 – The new tax effect on corporate value and the interest coverage ratio (zoom on higher leverage).

Rules which introduce a limited deductibility of financing costs discourage financial debt. An interesting way to examine this aspect is to recalculate the maximum level of debt that a company could rationally assume. Figure 5 provides such an assessment and applies a methodology that is quite close to how the problem is generally dealt with by practitioners.

Chief financial officers seldom know, and even more rarely apply, the optimal firm capital structure. The logic behind the optimal mix between debt and net asset value is thoroughly covered

in general corporate finance education and has become extremely important for financial management. Indeed, analysts often worry about measuring the maximum level of debt that a company can take on or about the degree of growth in existing debt that would not result in an unacceptable amount of risk or that would not lead to a drop in ratings.

To ensure the paradigm is coherent with such conduct, a model has been created that assesses the debt level such that the interest coverage ratio does not drop below 1.7. This level is proposed here as the lower danger threshold that should never be crossed, otherwise the company might face bankruptcy costs. As was highlighted before, a specific way of calculating the interest coverage ratio was developed and takes into account the direct tax implications. Figure 5 shows that the maximum debt level does not change with a low ROI, but it does have some effect, although not highly significant, for a high ROI. Figure 5 also shows a possible debt level that absolutely minimises the tax burden. It is known that the use of debt is a more efficient financial policy, in terms of tax, than using proprietary capital. The corrective measure proposed reduces this basic advantage, but does not undercut it. Indeed, the debt level that minimises the tax burden is well over the rational level of debt in terms of financial balance. This shows that a policy of debt has become less advantageous, but still has some benefits.

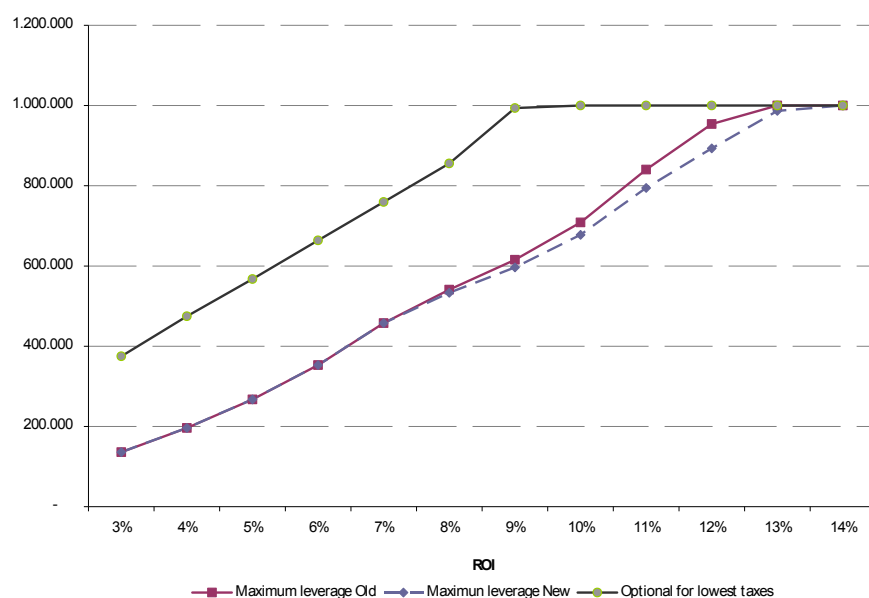


Figure 5 – The new tax effect on optimal capital structure

Is it possible to define an analytical formulation for ROE and interest coverage ratio formulae that could provide direct support for financial management without having to develop a specific reclassification and analysis model on an electronic spreadsheet? To answer to this question we used MatLab®, and more specifically Symbolic Math Toolbox™ (Tab. 3).

Table 3 - The MatLab® procedure

```
syms K I D E P t TAX EBITDA % Am GP Roi Ofi EBIT Leverage
P = GP - TAX;
EBIT = EBITDA - Am;
GP = EBIT - I;
K = E + D;
Roi = EBIT / K;
EBITDA = Am + I + TAX + P;
GP = EBITDA - Am - I;
```

```

TAX = % * GP + % * Ofi;
t = TAX / GP;
Ofi = (I - EBITDA * 0.3) ;
Roe = (Roi + ( Roi - I / D ) * D / E ) * (1 - t);
Ebit = P + I + TAX;
Leverage = D / E;
OldRoe = (Roi + ( Roi - I / D ) * D / E ) * (1 - %)
pretty(OldRoe)
NewRoe = simple(Roe)
pretty(Roe)
OldEbitOf = Ebit / I
pretty(OldEbitOf)
NewEbitOf = simple( Ebit / (I + Aliq * Ofi) )
pretty(NewEbitOf)
OldRoe = ((EBITDA - Am) / (E + D) + ((EBITDA - Am) / (E + D) - I / D) * D / E) * (1 - t)
NewRoe = -(GP + t * GP + % * Ofi) * (EBITDA - Am - I) / GP / E
OldEbitOf = (GP - TAX + I + t * GP + t * Ofi) / I
NewEbitOf = (GP - TAX + I + t * GP + T * Ofi) / (I + t * (7 / 10 * I - 3 / 10 * Am - 3 / 10 * GP))

```

The formulations indicated above obviously suffer from not being didactically clear. However, this disadvantage is, in the end, of little import. These formulations are perfectly able to support an analytic approach to estimating the result. To test the power of these formulations, we tested the differences in ROE before and after the change in the deductibility of interest expenses.

The Figure 6 in three dimensions shows the difference in ROE as the ROI and “Degree of indebtedness” parameters change. The deviation in terms of percentage points of ROE is measured on the vertical axis. As can be seen, following the introduction of the new limits on deductibility, ROE can only get worse. Furthermore, this decline is slightly progressive as debt climbs and is strongly progressive as profitability decreases. This likely shows the primary dysfunction of the mechanism.

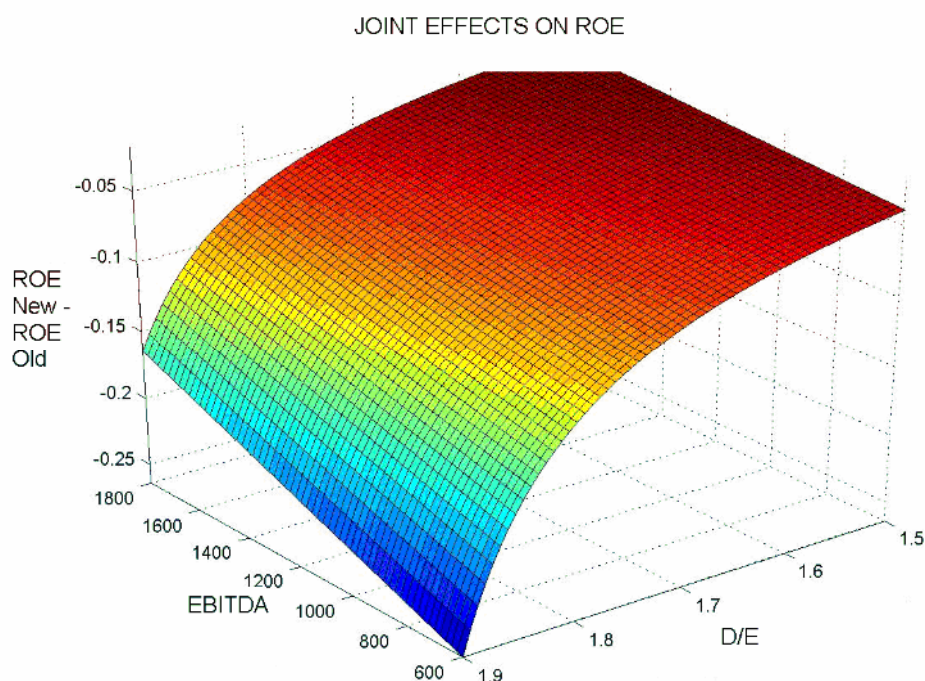


Figure 6 – The new tax effect on ROE depending on EBITDA and capital structure

Figure 6 shows the progression of the difference function of the financial distress parameter. Once again, it can only worsen. In this case, the trend is slightly progressive as debt increases and strongly progressive once profitability drops. Lawmakers wanted to create a mechanism that penalised companies for increasing debt levels and that was generally indifferent to profitability. The mechanism is very sensitive to profitability and not overly sensitive to increased liabilities; indeed, it is probably less sensitive than was desired.

It is necessary to update the traditional methods of assessing performance since these were devised in a context in which taxes were proportional to the net result of financing costs. Our explorations highlighted the following points.

The additive formula of ROE is no longer suitable and needs to be reconsidered.

One way to re-frame the problem is to create a simulation model using an electronic spreadsheet. Following this line, according to us, the best solution seemed to be to examine the consequences of the non-deductibility of financing costs that directly burden financing activities.

An alternative way to consider the analytical problem is to fine tune a new version of the traditional models. This is not a good solution in terms of the "compactness" of the final result and the ability to explain the solution.

The methodological tools we used led to the following considerations: companies that have good margins are discouraged from following a policy of high financial leverage because it would effect the value of the company; companies that have lower margins are seriously penalised; companies that choose to increase debt are far more rapidly faced, possibly without being fully aware of it, with the prospect of not being able to meet their financing costs. This means that it is easier to enter a situation of financial distress.

5. CONCLUSIONS

In the last decades, Italian banks provided financing at a cost that could be sustained by corporations due to a direct tax benefit. Over the long run, this created a situation in which companies were heavily leveraged and consequently riskier and less able to withstand an economic downturn. This was the situation that Italian lawmakers intended to address by establishing disincentives for companies to increase their financial leverage. Under the new rules, as from 2008, interest expenses can be deducted from taxable income up to an amount corresponding to the 30% of company EBITDA. The desired results will only be achieved if entrepreneurs and financial directors create new analytical methods and management rules that fit the new context.

The methods used to analyse performance are typically based on estimating and managing corporate value. Such tools assume that financing costs can be deducted from income. Hence, it is revealing to look at what happens to value creation whenever this assumption no longer holds. The new tax rules not only influence economic performance, but also financial performance.

We examined the effect of the new tax rule on the optimal financial leverage and the maximum sustainable level of debt in corporations. A management approach based on a highly leveraged financial structure is dangerous both for companies and the economy as a whole. We agree with the financial regulations designed to encourage companies to increase their equity capital base. However, we are not confident that such measures are effective. We demonstrated that the new regulation might have a deep impact on companies that are not sufficiently profitable (e.g., start up and/or fast-growing companies or in a highly competitive environment), but such firms are not necessarily inadequately capitalised. On the other hand, we also pointed out that the regulation is not addressed to highly profitable firms (at least whenever they are well capitalised too), which could be the target for a taxation system aimed at excess profits redistribution.

Our models therefore allow us to conclude that while the new rule impacts the mean of the Italian firms, it ultimately did not address the key issue for the Italian political economy: to strengthen the corporate financial structure and to reduce excess profit generation.

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ENDNOTES

{1} The limits are: twice the ECB official rate, for bonds and other securities traded on regulated markets in EU countries or placed through public offerings; the ECB official rate increased by two-thirds for bonds and other securities that are different from those mentioned previously.

{2} Tax adjustments to gross profit is found in the tax rules in effect in Albania, Bangladesh, Bulgaria, Chile, Croatia, Cyprus, the Czech Republic, Egypt, Hong Kong, Iceland, India, Israel, Italy, Malta, Montenegro, Norway, Peru, Poland, Russia, Saudi Arabia, Serbia, Singapore and Thailand. See KPMG International [8].

{3} In addition to Italy, Albania also has rules limiting the deductibility of interest expenses from income. By contrast, Russia and India have tax laws that allow for better tax rates on interest income. See KPMG International [8].

{4} We are aware, however, that financial officers view earnings, not cash flows, as the most important metric reported to outsiders [24].

{5} *On closer examination, using leasing fees rather than renting or amortization costs implicitly introduces financing costs into the operating activities. However, this is not an aspect that falls under the purview of this paper.*

{6} NOPAT is only influenced by tax laws that allow partial deductibility (or non taxation) of operating costs and earnings. In such cases, it is best to isolate the marginal tax implication of these rules using an appropriate adjustment to operating taxes. It is the company manager in charge of tax activities that has to improve the company's EVA by minimising the items "Adjustments on operating taxes" and "Operating taxes." Should the performance of a manager of an EVA centre be measured "after effective taxes" (and the manager is also responsible for the tax implications of his/her decisions), the item "Adjustments on operating taxes" would be unbundled from the group level and allocated to each EVA centre.

{7} See Dierks and Patel (1997) for examples showing how Stern Stewart adjusts GAAP accounting statements to arrive at EVA.

{8} Graham [31] proposes a mathematical model to analytically estimate the marginal tax benefit of financing costs that are deductible from the value of equity.

{9} *This graph, and the ones that follow, refers to the situation taken as an example and described in the support file, which has already been noted. The size of the example is directly linked to the specific case, but the relations between the variables are of general worth.*

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