TAXES AND FINANCIAL REPORTING: NEW EVIDENCE FROM DISCRETIONARY INVESTMENT WRITE-OFFS IN ITALY

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Taxes and financial reporting: new evidence from discretionary investment write-offs in Italy

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PRELIMINARY DRAFT

Abstract

This paper provides further empirical evidence on the relationship between taxes and financial reporting focusing on accounting decision to write-off investment using panel data for Italian companies. In the period 1998-2006 the Italian corporate income tax has been reformed several times. In particular the tax deductibility of investment write-off was repealed in 2004. The paper exploits the ensuing high cross-sectional and times series variation in the marginal tax rate to identify significant tax effects. Further the paper identifies some of the factors which constraint tax minimization and provides some estimates of non-tax costs of earnings manipulation.

Keywords: corporate taxation, investment write-offs, financial reporting, tax planning

JEL classification: H25, K34, M41,

1 Introduction

A large body of empirical literature in accounting has long investigated the coordination of taxes and other factors in business decisions.[1] These papers take as their starting point the consideration that taxes cannot be minimized without affecting other organizational goals: many actions that decrease income for tax purposes will decrease

[1] Shackelford and Shevlin (2001) provides an extensive review.

income for other purposes as well. Therefore these studies try to explain why tax minimization might not be the optimal business strategy.

However, while the interaction of financial reporting costs and taxes is well documented, little is known about the relative importance of taxes. One of the main difficulties in the estimation of the magnitude of the effects is to find an adequate proxy for the company-specific marginal tax rate (MTR). The MTR is defined as the present value of current and expected future taxes paid on an additional unit of income earned today. Due to carryback and carryforward provisions, the MTR differs from the statutory tax rate. For example, if a firm has no taxable income today, an additional unit of income reduces the losses that can be carried forward and used to offset taxable income in future years. In this case the MTR is equal to the discounted value of the taxes paid on the marginal unit of income in the first year where the firm is expected to have positive taxable income. Unfortunately the 'true' MTR is not observable as it depends on managers' expectations on the future tax status of the company (Shevlin, 1990).

Several proxies have been proposed for MTRs. Most studies use observable variables that are presumably correlated to the MTR such as statutory tax rates, non-debt tax shields or tax paid over pre-tax income (Graham and Mills, 2007). Overall, these proxies have proven to be inadequate either because they do not display sufficient cross-sectional or time-series variation for testing (e.g. the statutory tax rates) or because they fail to describe the true MTR (see MacKie-Mason 1990 for a discussion of tests based on non-debt tax shields).

This paper examines the factors that influence both the accounting decision to write-offs investment and the magnitude of such write-off[2], in a context characterised by a high alignment between financial and tax reporting in the presence of agency costs. The empirical analysis is made using panel data for Italian companies in the period 1998-2006. The are two main reasons for this choice. The first one is that during the period the corporate income tax has been reformed several times. The paper exploit the variation in statutory rate and tax base using the Graham-Shevlin methodology (Shevlin, 1990 and Graham 1996a, 1996b, 1999) for calculating the MTR which allows

[2] We use the term "write-off" to refer to both complete and partial downward investment revaluations.

to take into account several non linearities of Italian corporate income taxation. As a result, the simulated MTRs display considerable cross-sectional and time-series variation. The second is that tax deductibility of investment write-off has been repealed in 2004: this provides an ideal setting for testing the effect of taxes on financial reporting.

The econometric analysis shows significant coefficients on both tax and non-tax variables: this result has been interpreted as the evidence that firms trade-off taxes and financial reporting and agency costs in the choice to accounting investment write-offs.

We try to make the stronger interpretation that firms trade-off taxes with other non-tax costs and benefits, using a model specification which includes an interaction term between tax and non tax effects.

We view our paper as extending trade-off literature in three important areas. Firstly, investigating which variables could affect the decision to account investment write-offs, we insert as independent variables some proxies for the financial accounting costs and some proxies for agency cost. In this way we overcome the traditional dichotomy of the trade-off literature, divided into papers that address the interaction of financial reporting and tax factors and papers that examine the effects of agency costs on tax minimization.

Secondly, the innovation of our paper is in the decision to consider investment write-offs as the instrument aimed at reducing tax burden. In literature there are a few of papers which explain the decision to accounting write-offs (e.g Francis, Hanna, Vincent 1996), and none of these analyzes these decision in presence of agency costs (e.g. Garrod, Kosi, Valentincic).

Thirdly, we analyze tax and non-tax trade-off looking at the behaviour of Italian firms, unlike the most part of trade-off studies, which use USA data. In particular, we construct a microsimulation model to predict the marginal tax rate which could be adopted in other similar studies, which analyze Italian firms.

The remainder of this paper is organised as follows. Section 2 outlines the relevant provisions of the Italian tax code before and after the 2004 Tax Reform. Section 3 discusses the issues related to the measurement of the marginal tax rates for individual companies. Section 4 examines model specification and defines the variables used in the analysis whereas section 5 describes the data sources and summary statistics regarding

the tax variables. The estimations and the results are discussed in section 6. The final section provides some concluding remarks.

2 Outline of corporate taxation in Italy before and after the 2004 Tax Reform

Up to 2003 Italian companies were subject to the corporate income tax called IRPEG (Imposta sul reddito delle persone giuridiche). The base for IRPEG was accounting income (as defined under the civil code) subject to some adjustments. From 1998 to 2000 tax rate on IRPEG was stable at 37%; it has been reduced to 36% in 2001 and to 34% in 2004. Companies with taxable income negative were allowed to carry losses forward to offset the taxable income up to 5 years. Current-year losses could be added to any unused losses from previous years. No tax-loss carry-backs existed under IRPEG. Investment write-off were fully deductible from the tax base.

In 1997, in order to reduce the tax cost of equity, the corporate tax was amended. Profits were split into two components. One component was categorized as "ordinary income", the opportunity cost of new equity financing, and taxed at a rate of 19%. "Ordinary income" was computed by multiplying the interest rate on long-term government bonds (plus a measure of the equity risk premium) times the value of new share issues and retained earnings. Another element of the tax base was "extra normal profits" measured as the difference between total profits and "ordinary income". This second component was taxed at the IRPEG tax rate. It was also established that the average tax rate had to be higher than 27%[3] and that, if the IRPEG tax base was smaller than the "ordinary income", the difference between "ordinary income" and IRPEG tax base could be carried forward and used to calculate IRPEG in the following years up to 5 years. This new method of taxation was commonly named Dual Income Tax despite it has nothing to do with the dual income taxation implemented in the Nordic Countries but is more akin to the ACE scheme.

In 2003 the Government implemented a new tax reform, which came into force in 2004 (after the reform the corporate tax is named IRES). Besides the reduction of the statutory tax rates from 36% to 33%, the reform repealed the "Dual income taxation" as well as the full imputation system for dividend taxation. For intercompany dividends the

[3] The limit according to which the average tax rate had to be higher than 27% was abolished in 2001; but in 2002 a new limit was introduced, according to which the average tax rate had to be higher than 30%.

reform introduced the exemption method[4]. The same treatment was applied to capital gains from share disposals by corporations. The new treatment of intercompany dividends and capital gains trigger the abolition of the deductibility of investment write-offs.

3 Tax consequences of discretionary investment write-offs

One of the key hypotheses which is tested in the paper is that manager take advantage of the discretion afforded by the accounting rules to manipulate earnings either by not recognizing impairment when it has occurred or by recognizing it when it is when it is not occurred in order to reduce the fiscal burden. The reduction of tax liabilities, due to a marginal increase in deductible investment write-offs is measured by the MTR. This is defined as the present value of current and expected future taxes paid on an additional unit of income earned today. If a firm has positive taxable income the MTR is equal to the statutory tax rate. In contrast, if a firm has no taxable income today, an additional unit of income reduces the losses that can be carried forward and used to offset taxable income in future years. In this case the MTR is equal to the discounted value of the taxes paid on the marginal unit of income in the first year where the firm is expected to have positive taxable income. The computation of the MTR requires two sets of information. The first is the tax code treatment of net operating losses. The second is managers' expectations on future income flows.

3.1 The marginal tax rate

Tax provisioning governing Italian companies between 1998 and 2003 entail that in order to calculate the MTR we must distinguish three different cases:

a) in year t IRPEG "Extra normal profits" are positive and the average tax rate is higher than 27%[5]. An additional unit of income pays the comprehensive tax rate. Hence, in this case, the MTR is equal to:

$$MTR = \tau_{IRPEG}$$

[4] Only 5% of dividends are taxed. For individual shareholders the reform introduced the partial inclusion system (40% of received dividends is included as taxable income at the shareholder level).

[5] In 2001 the minimum level requirement for average tax rate (at least 27%) was abolished, so it was sufficient that IRPEG "Extra normal profits" were positive to be in the case "a"; in 2002 it was introduced a new minimum level requirement for average tax rate (at least 30%), so it was necessary that IRPEG "Extra normal profits" were positive and the average tax rate was higher than 30% to be in the case "a".

where τ_{IRPEG} represents the statutory IRPEG tax rate.

b) in year t the IRPEG tax base is smaller than "Ordinary income" or the average tax rate is lower than 27%[6]. An additional unit of income produces two changes in the company's tax position. First, it increases the tax liabilities by the minimum tax rate of 27%. Second, it reduces the "Ordinary income" that can be carried forward and used to calculate IRPEG in the following years. If IRPEG taxable income in year $t+1$ is smaller than "Ordinary income", the firm next applies the "Ordinary income" in excess to taxable income in year $t+2$ and so on. Assume that $t+n$ is the first year where the IRPEG "Extra normal profits" are positive. If $n>5$ a reduction in the "Ordinary income" carry-forward in year t has no consequences on the IRPEG that the company pays in future years. In this case the MTR is therefore equal to the minimum tax rate of 27%. In contrast, if $n<5$, a unit increase in income of year t translates into a unit decrease in the IRPEG paid in year $t+n$. In this case the MTR is equal to the minimum tax rate of 27% plus the discounted value of the IRPEG saved in year $t+n$.

Summarizing:

$MTR = \tau_{IRPEG}$ if $n>5$

$$MTR = \tau^{m}{}_{IRPEG} + \frac{\tau_{IRPEG} - \tau_{DIT}}{(1+r)^{n}} \text{ if } n<5$$

where $\tau^{m}{}_{IRPEG}$ represents the IRPEG minimum tax rate.

c) In year t the IRPEG tax base is negative. In this case the MTR is equal to the discounted[7] value of the additional IRPEG that will be:

$MTR = 0$ if $n>5$

$MTR = T \times (1+r)^{-n}$ if $n<5$

where $T = \tau^{m}_{IRPEG}$ or τ_{IRPEG} depending on the value of "Ordinary income" in year n.

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[6] Please, refer to the considerations inserted in the footnote 4.

[7] Taxed paid from the year $t+1$ to the year $t+5$ are discounted using the average yield of a set of Government and listed bonds. We receive the data from Mediobanca.

Since year 2004, due to the abolition of the so-called "Dual income taxation" we have only two different scenarios:

a) In year t the IRES tax bases is positive. An additional unit of income pays the comprehensive tax rate. Hence, in this case, the MTR is equal to:

$$MTR = \tau_{IRES}$$

where τ_{IRES} represents the statutory IRES tax rates.

b) In year t the IRES tax bases is negative. The MTR is equal to the discounted value of the additional IRPEG that will be paid in year $t+n$:

$$MTR = 0 \text{ if } n > 5$$

$$MTR = \tau_{IRES} \times (1+r)^{-n} \text{ if } n < 5$$

3.2 Simulating managers' expectations and marginal tax rates

The "true" marginal tax rate cannot be computed since it requires knowledge of managers' expectations on future income flows. We proxy managers' expectations using the method proposed by Shevlin (1990) based on the assumption that pre-tax income follows a pseudo-random walk with drift:

$$\Delta Y_{it} = \mu_i + \varepsilon_{it}$$

where ΔY_{it} is the first difference in pre-tax income of company i in year t, μ_i is the sample mean of ΔY_{it} and ε_{it} is a normally distributed random variable with mean zero and variance equal to that of ΔY_{it} over the years 1998-2006.

When, in a given year, the IRPEG (IRES since 2004) tax base is negative, or when the IRPEG tax base is smaller than "Ordinary income" or the average tax rate is lower than 27%[8] we run 100 simulations of income in the next five years using a different random normal realization of ε_{it} for each year. For each simulation we calculate first the present value of taxes to be paid taking into account loss carry-forward provisions. Then we add a unit of income in the reference year and recalculate the present value of the tax bill.

[8] In the period 1998-2000 we run simulations if the average tax rate is lower than 27%; instead, in 2002 and 2003 we run simulations if the average tax rate is lower than 30%. For more details, please, refer to the considerations inserted in the footnote 2.

By taking the differences between these two present values, 100 simulations of the marginal tax rate are obtained. We use their average as the proxy for the ”true” marginal tax rate. This procedure is adopted for each company in the sample. Graham (1996b) shows that this proxy is the best predictor of the marginal tax rate calculated on actual income realizations.

Besides this proxy (which we refer to as MTR), we have considered one additional specification. This alternative specification assumes that managers, when computing the relevant marginal tax rate for investment decisions, set it equal to the top statutory tax rate when the firm has a positive value of income before taxes and before investment write-offs and equal to zero otherwise. By assuming a sort of myopic behaviour (we will refer to these as AMC), we are actually reducing across-firm variability when compared to MTR.

4 Non tax motive of discretionary write-off

Tax minimization is not the only factor which drives discretionary investment write-off. From one hand, managers may record investment write-offs to account for poorer participated firm's performances. From the other hand, tax motivated investment write-offs may bring about several non tax costs. We consider several variables to control for non tax effects.

4.1 Financial reporting costs

The trade-off theory implies that firms balance the benefits of write-offs with the financial reporting costs. Financial reporting costs are related to reporting lower income and are a direct consequence of tax-minimizating strategies. Many financial agreements with stakeholders (for example with creditors, lenders or customers) use accounting numbers to specify the terms of trade, influencing manager’s willingness to report lower income. Thus, the choice to account investment write-off involve weighing the tax incentive to lower taxable income against the financial reporting incentives to increase book income, making better the external stakeholders' perception of the company. In this section we will introduce several variables to analyze the importance of the external perception of the company.

Our assumption is that more indebted companies, less liquid companies, companies with smaller profitability and companies with a higher probability of bankruptcy are exposed to higher controls by stakeholders and will prefer to record a better performance, in order to not increase the costs of borrowing, rather than to minimize taxes.

Debt to Net Equity Ratio

We expect that very indebted companies will be less likely to accounting investment write-off, because these firms should prefer to record a better performance, in order to obtain a better creditor's perception and not to increase the costs of debt, even at the cost of not minimizing the fiscal imposition (e.g., Bontempi et al., 2004). For this reason we control for:

$$IND_{it} = \frac{(Debt)_{it}}{(Net\ Equity)_{it}}$$

In addition we control for $INDP_{it}$, which is a value of the debt to net equity ratio weighted according to the ratio Total investment/Total Assets:

$$INDP_{it} = IND_{it} \cdot \frac{(Total\ Investment)_{it}}{(Total\ Assets)_{it}}$$

This variable should capture the effect of higher creditor control on write-offs when investment are a higher share of total assets.

Profitability

For very profitable companies the probability to need loans decreases and the external consideration becomes less important; so it is possible to act to minimize current tax liabilities. As a consequence we expect that very profitable companies use write-offs to reduce taxable profits more than less profitable ones. We modify the profitability used by Garrod, Kosi and Valentinovic (2008):

$$PROF_{it} = \frac{(EBIT)_{it}}{(Total\ Assets)_{it-1}}$$

Z-score

Firms use less investment write-offs when the expected costs of financial distress are high. A variable linked to expected distress costs is Altman's (1968) Z-score. The Z-

score predicts the probability of bankruptcy within two years: the lower the value of ZSC_{it}, the higher the probability of bankruptcy.

We modify the Z-Score used by MacKie-Mason (1990), Graham, Lemmon, and Schallheim (1998) and Alworth and Arachi (2001) and use a ZSC_{it} which is defined as:

$$ZSC_{it} = 3.3 \cdot \frac{(EBIT)_{it}}{(Total\ Assets)_{it} + (Write-Offs\ of\ Participation)_{it}} + 1.2 \cdot \frac{(Working\ Capital)_{it}}{(Total\ Assets)_{it} + (Write-Offs\ of\ Participation)_{it}} + 1.0 \cdot \frac{(Sales)_{it}}{(Total\ Assets)_{it} + (Write-Offs\ of\ Participation)_{it}}$$

In addition we insert $ZSCP_{it}$, which is equal to ZSC_{it} weighted according to the ratio Total participations/Total Assets:

$$ZSCP_{it} = ZSC_{it} \cdot \frac{(Total\ Participation)_{it}}{(Total\ Assets)_{it}}$$

We expect that firms with a higher probability of bankruptcy (firms for which the costs of financial distress are very high) will be less likely to accounting investment write-offs, in order to obtain a better firm's external perception. So we expect that the decision to account investment write-offs will be positively linked to both ZSC_{it} and $ZSCP_{it}$.

Liquidity

Liquidity can affect the cost of borrowing. With regard to liquidity, the most basic assumption is that illiquid firms face high ex ante borrowing costs. Then we expect that illiquid firms are less likely to accounting investment write-offs than liquid ones, in order to account higher income and to not increase further the costs of borrowing.

We use two different measures of liquidity (e.g. Graham, 2000). The first one is given by:

$$CR_{it} = \frac{(Current\ Assets)_{it}}{(Current\ Liabilities)_{it}}$$

while the second is:

$$TA_{it} = \frac{(Tangible\ Assets)_{it}}{(Total\ Assets)_{it}}$$

as we assume that tangible assets increase company's debt capacity, because these assets are promptly marketable in case of short-notice liquidation.

Size

Large firms have lower ex ante costs of financial distress, in general because they are more diversified. Large firms may also benefit for lower informational costs associated with borrowing. Firm size is gauged with the natural log of real sales accounted in the year preceding the accounting of write-off (e.g. Francis, Hanna and Vincent, 1996).

$$SIZE_{it} = \ln(Sales_{it-1})$$

We expect larger companies to be more likely to accounting investment write-offs than smaller ones.

4.2 Agency Costs

Scholes and Wolfson (1992) asserts that agency costs are another non-tax costs that can explain why tax minimization may not result the optimal strategy. In this section we present some variables which could proxy for the effect of information asymmetry on tax planning.

Independence from shareholders

We assume that companies are less likely to account investment write-offs if the firm is independent from shareholders and there aren't majority shareholders that can appreciate the minimization of fiscal burden.

To calculate the dummy variable SCI_{it} we have used the Index of independence of shareholders (BvD)[9]. This dummy variable assigns value 1 to firms which are independent from the shareholders (firms in which there is no shareholder with a direct control higher than 25%: the index BdV record a value equal to A^+, A or A^-), value zero otherwise.

Participation in foreign firms

The presence of participation in foreign firms may influence the decision to account discretionary investment write-offs. In particular, we expect that firms with participations in foreign firms will be more likely to account investment write-offs,

[9] Aida provides a value of the Index BvD.

because it is more difficult to verify if the participated firm's income has been lower than in the previous year.

We introduce in our model the dummy variable SPE_{it}, which assigns value 1 to firms with foreign participations, value zero otherwise.

Listed firms

We expect that listed firms are less likely to account investment write-offs, since them are exposed to several controls. The dummy variable SCQ_{it} assigns value 1 to listed firms, value zero otherwise.

4.3 Impairment motive

In this section we include some variables which proxies for the firm's performances and for the stock market trend.

Poorer performance of participated firm

Firms may account investment write-offs in presence of a complete or partial downward revaluation of a participated firm. Considered the impossibility to know exactly the performance of the participated firm, we use the dummy variable SPP_{it}: this variable assigns value 1 to firms with participations in companies with income higher than 1 million euro, value zero otherwise.

We expect that companies are less likely to account investment write-offs if the participated company has positive income.

Stock Market Trend

We also include a proxy for the market value of all the firms in the same industrial sector $(AZIO_{it})$ [10].

$$AZIO_{st} = \frac{MIB_{st} - MIB_{st-1}}{MIB_{st-1}}$$

We expect that firms in sectors characterized by a decreasing trend of stock market are more likely to accounting write offs of participations.

[10] To calculate the value of $(AZIO_{it})$ we use the data diffused by BORSA ITALIANA "Indici MIB Storici Settoriali, base 30.12.1994=1000".

Performance of the firm's industry

We also add two variables to proxy for the performance of the firm's industry. We compute the average sales growth (IND_GRO_{st}) and the log of GDP ($LGDP_{st}$) in each industrial sector (e.g. Francis, Hanna and Vincent, 1996). We expect that for firms in industries with declining (IND_GRO_{st}) and ($LGDP_{st}$) is very important to record a better performance. So we expect that firms in growing markets are more likely to accounting investment write-offs than firms in decreasing ones.

5 Data and summary statistics

The accounting data are gathered from the AIDA database, made by Bureau van Dijk Electronic Publishing, containing accounting information on more than 200.000 Italian firms.

Our sample is restricted to firms which:

1. have balance sheet data in all the years in the period 1997- 2006;
2. have at least one participated company;
3. are not sector "Agriculture, forestry and fishing".

We obtain a balanced panel data set of 6146 companies. Figure 1 shows the trend of investment write-offs, expressed in percentage of total assets (*WOTA*), from 1998 to 2006, for the companies in the sample. From 1998 to 2003 we have an increasing trend: the value of *WOTA* grew from 6.6% to 8.5%, with the only exception of 2002, when the value decrease to 7.7%. This reduction is strictly linked to 11 September 2001 attacks, and their negative impacts on the U.S. economy and in general in the worldwide-economy. The drop of the Index Stock Market in 2001 may explain the reason why the value of *WOTA* grew to 8.3%, while the recovery of 2002 explain the *WOTA* reduction to 7.7%. The peak of *WOTA* in 2003 coincides with the reform of Italian Fiscal System, which abolished the deductibility of investment write-offs starting from 2004 onward (2003 was the last year in which firms could benefit from the deductibility of investment write-offs). From 2004 to 2006 there is a continuing decrease of *WOTA*, which goes down to 5.4% in 2006. This is consistent with the hypothesis that in previous years part of investment write-offs were motivated by tax-planning.

Figure 1: Investment Write-offs with respect to Total Assets

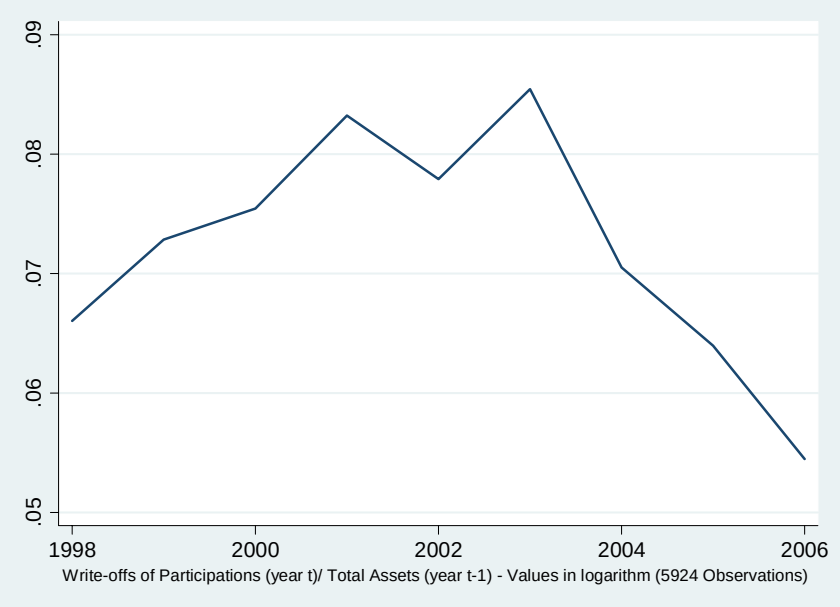

Table I reports summary statistics of all the variables included in the model.

SVA, the dummy variable that indicates if firms record investment write-offs, has a mean of 0.1488 and a standard deviation of 0.3559. In particular 3258 firms of our sample have never accounted investment write-offs in the years considered, while only 56 firms have recorded write-offs in every year.

The marginal tax rate simulated using the Graham's methodology (MTR) has a mean of 0.3056 and a standard deviation of 0.0972, while the alternative proxy (AMC) has a smaller mean (0.2924) and a higher standard deviation (0.1324).

The difference between *AMC* and *MTR* comes from the different data used to calculate themselves. We use the income before taxes and investment write-offs to calculate *AMC*, not considering the possibility to carry losses forward to offset the taxable income. Opposite, to estimate *MTR* we use a taxable income calculated using the value of income before taxes and including the possibility to carry losses forward. Moreover to calculate *AMC* we use only the top statutory tax rate, instead to estimate MTR the tax bill is calculated using the entire corporate tax schedule.

Table II summarizes some industry specific facts about write-offs and corporate taxation (*AMC* and *MTR*). For all the three variables, our sample contains full information over 5924 firms in 26 different ATECO 2002 sectors.

About a-half of the firms of our sample is in the ATECO sector "MANIFACTURING ACTIVITY" (48,41%), most of which work on "*Production of cars and mechanic machine*" (6,77%), "*Production of metal (excluding cars and plant)" (6,18%), "Food Industries" (5,72%)* and *"Textile Industries" (5,28%).*

More than one fourth of the firms is in the ATECO sector "COMMERCE AND REPARATIONS" (26,87%).

The table 2 shows that the minimum value of *WOTA* has been recorded by firms in the sector "INSTRUCTION" (0.00148%), while the higher one has been recorded by the firms in the sector "FINANCIAL ACTIVITY" (0.84%).

Looking at the marginal tax rate the sector "CIVIL SERVICES" has reached the higher value of *AMC* (35,11%), while very lower is the value of MTR (26,85).

On the other hand, the sector with the higher value of *MTR* is "WOOD INDUSTRIES" (32,80%).

All the variables exhibit a reasonable amount of variations across the sample.

As shown by table 3, the explanatory variables are essentially uncorrelated. The table 4 shows that there is no correlation between yearly marginal tax rate.

6 Estimations and results

In the first step of our analysis we want to investigate if there is a fiscal effect influencing the decision of accounting investment write-offs. Using as dependent variable *SVA*, a dummy variable which is equal to 1 for firms with positive investment write-offs, 0 otherwise, we have a binary choice model. The multivariate analysis uses a *probit* and a *logit* model to estimate the importance of variables in explaining the decision to account investment write-offs.

Afterward, in the second step, we use *WOTA* as dependent variable, where *WOTA* is equal to the ratio between investment write-offs and total assets of the previous year if the firm accounts investment write-offs and zero if the firm doesn't account write-offs. This sample is censored because the value of *WOTA* is reported as zero if the company does not account investment write-offs. We use a *tobit* model to estimate the importance of variables in explaining the amount of investment write-offs accounted by firms (see Hsiao, 2003).

Probit and Logit analysis

The table 5 summarizes the empirical results of a probit and logit model, in which we use SVA as dependent variable (it is a dummy variable equal to 1 if the firm has recorded investment write-offs) and MTR as fiscal variable. In order to consider the effects of the Italian fiscal reform of 2003 on the decision to account investment write-offs, we split the variable MTR into two components $MTR-PRE$ (MTR before fiscal reform) and $MTR-POST$ (MTR post reform). We want to investigate which are the effects of the fiscal variable on the decision to account investment write-offs if the deductibility of investment write-offs is admitted or not.

Probit and a logit estimations yield the same results in terms of signs and significance level. Both the estimates support our hypothesis that the utility of accounting investment write-offs at the margin increases with the firm's marginal tax rate, if the fiscal system allow the deductibility of such write-offs. The variable $MTR-PRE$ is statistically significant and affects positively the probability to account investment write-offs. Opposite, the variable $MTR-POST$ is statistically significant and negatively correlated with SVA. This implies that also after Italian fiscal reform fiscal variable could influence the decision to account investments write-offs. It's important to underline that $MTR-POST$ has a negative sign, opposite to $MTR-PRE$. This allow us to assert that after Italian fiscal reform there is a break in the decision to account investment write-offs.

Each of the independent variables, IND, $LGDP$, $IND-GROWTH$, CR, $SIZE$ and SPE, is statistically significant and has the presumed sign.

In particular companies which are less indebted are more likely to account write-offs, as well as bigger companies, companies in growing sectors, companies with higher current ratio or with participations in foreign firms.

The variable $INDP$ is statistically significant and is positively linked to SVA. It shows that the positive effect of the Total Participations/Total Assets ratio on the probability to account investment write-offs more than offsets the negative effect of IND.

In contrast with our expectations, the variable ZSC results negatively linked to the probability to account investment write-offs. Instead, the Z-score weighted according to

the ratio Total participations/Total Assets is statistically significant and is signed as supposed.

Both the independent variables *TA* and *AZIO* are statistically significant, but, contrary to what we expected, they have opposite signs.

None of the dummy variables *SPP*, *SCI* and *SCQ* has the expected sign, and *SCI* is not statistically significant. Also the variable PROF results not statistically significant.

The table 6 summarizes the coefficients and the marginal effects of the yearly *MTR*. By one side all the yearly fiscal variable from 1998 to 2003 are highly statistically significant and are positively linked to *SVA*. On the other side *MTR*2004 is not statistically significant and *MTR*2005 and *MTR*2006 are both statistically significant and negatively liked to the decision to account investment write-offs.

Robustness

In the first set of sensitivity analysis, following Graham (1996b), we define an alternative version of the marginal tax rate (*AMC*). *AMC* is a dichotomous variable based on the sign of current period taxable income. The variable *AMC* has value equal to the top statutory tax rate for firms with a positive income before taxes and before write-offs, value 0 otherwise.

The estimation results (table 7) can be directly compared to the ones in table 5. We find that the parameter estimates are not strongly varying among the two variants of marginal tax rate. The only one significant difference concerns the variable *AMC – POST*, which results non statistically significant, in line with our expectations.

In the second set of sensitivity analysis we restrict our sample in various ways, in order to exclude potentially influential outliers from the sample.

From table 2 emerges that in some sectors there are few firms (e.g., "*Civil Services*" and "*Instructions*"). Therefore we narrow our analysis to industries whit more than 79 firms, removing about 2.000 observations.

The corresponding results are summarized in the column A of table 8. We obtain almost the same marginal effects estimated as in the original model.

It is possible that our empirical findings could be driven by the presence in our sample of companies with participations in foreign firms, whose income is more difficult to control.

We exclude from the sample firms with participations in foreign firms, in order to examine whether the observed relationships between the decision to account investment write-offs and corporate tax rate is sensitive to the presence of participated foreign firms. As we can see in column B of table 8 the results are very similar to those obtained estimating the original model.

At the end we estimate the model in 3 subsample made respectively by:

1. firms with participations in companies with a positive income;
2. firms which aren't independent from their shareholders;
3. not-listed firms.

We find that the marginal effects estimated (columns C, D and E of table 8) are not so different among the three subsamples and compared to the results of the complete sample.

Interaction terms

We modify our model to capture more evidence that firms trade-off taxes with financial reporting costs and with agency costs on accounting decision to write-off investment. In particular, we include an interaction between tax and some non-tax costs. The interaction term is obtained multiplying the variable $MTR - PRE$ for the non-tax variables (because we assume that there is a trade-off up to 2003).

A significant coefficient on the interaction term is consistent with the hypothesis that firms consider the level of the other costs and trade-off tax and non-tax cost.

The results, presented in table 9, show that the coefficients on the interaction terms are not statistically significant, with the exception of the interaction term between taxes and ZSC_{it}, $ZSCP_{it}$, and SCQ. So, it emerges that modifying the model and including the interaction terms, it is not possible to make the stronger evidence that firms trade-off taxes with other non-tax costs and benefits.

Tobit analysis

The results of the *tobit* analysis (table 10) show that the amount of write-offs increase with MTR before 2003 Italian fiscal reform, with the current ratio, with the debt ratio weighted according to the ratio between total participations and total assets, with the profitability, with $ZSCP_{it}$, with the two proxies for the performance of the firm's industry, with the size of the firm and with SPS. Also as predicted, we find out that the

higher the debt ratio the smaller the write-off. Neither of *SCI* and *AZIO* results significant in explaining the write-offs decision. In contrast with our expectations we find that the write-offs are negatively correlated with *ZSC* and *TA* and positively linked to the dummy variable *SPP* and *SCQ*.

Estimating the model with yearly MTR we obtain the results summarized in the table 11. In line with our expectations, we see that the investment write-offs increase with the marginal tax rate from 1998 to 2003. MTR2004 results not significant in explaining the write-off decision. At the end, write-offs results negatively linked to MTR2005 and MTR2006.

7 Concluding remarks

This paper provides evidence that managers manipulate earnings in order to reduce the corporate tax burden. Tax deductibility is the one of the most important factors which affect the probability of discretionary investment write-offs. A mean level a unit increase in the marginal tax rate raises the probability of write-offs by about 7%-4%. The empirical analysis also confirm that tax minimization is limited by several non tax-costs. Investment write-offs brings about a reduction of taxable income, a worse firm's performance, a worse firm's reputation and higher costs of borrowing.

The results of this paper raises several interesting issues which will be scrutinized in future research. One is related to the effect of the abolition of tax deductibility on the average effective tax burden of Italian companies. Further, there is the question of whether financial account manipulation interact with other business decisions such as financial and investment choices and whether it changes the effect of taxes on such choices.

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APPENDIX 1: Summary Statistics

Table 1: Descriptive Statistics for all Variables.

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
SVA	0.1488	0.3559	0	1
WOTA	0.0021	0.0125	0	0.5586
AMC	0.2924	0.1324	0	0.37
MTR	0.3056	0.0972	0	0.37
AMC-PRE	0.2036	0.1796	0	0.37
AMC-POST	0.0887	0.1463	0	0.33
MTR-PRE	0.2139	0.1684	0	0.37
MTR-POST	0.0916	0.1425	0	0.33
IND	0.6734	0.1982	0	1
INDP	0.2051	1.294	0	110.3866
PROF	0.1212	3.740	-40.333	476.2
LGDP	10.7002	1.0369	7.5402	12.3840
IND_GROWTH	.0608	0.1050	-6.9625	0.5934
ZSC	1.737	1.096	-23.932	44.3608
ZSCP	0.0526	0.1162	-0.7029	2.7258
CR	0.0100	0.1905	-0.0026	31.4395
TA	0.1851	0.1619	0	0.99856
SIZE	9.779	1.160	1.098	15.6796
AZIO	0.0415	0.2241	-1.709	0.7696
SPP	0.5978	0.4903	0	1
SPE	0.3313	0.4706	0	1
SCI	0.0968	0.2957	0	1
SCQ	0.0145	0.1196	0	1

SVA is the dummy variable equal to 1 if the firm has recorded investment write-offs. $WOTA$ is the ratio between investment write-offs and total assets of the previous year. AMC is the fiscal variable constructed using the value of income before taxes and investment write-offs and the top statutory rate. MTR is the fiscal variable constructed using Graham's methodology. IND is the debt ratio and $INDP$ is the debt ratio weighted according to the ratio total participations and total assets. $PROF$ is the profitability measured with ROA. $LGDP$ is the industry log of GDP. IND_GROWTH is the industry average sales growth. ZSC is the modified Altman's (1986) Z-Score. $ZSCP$ is the Z-score weighted according to the ratio total participations and total assets. CR is the current ratio. TA is the value of tangible assets with respect to total assets. $SIZE$ is the natural log of sales. SPP is a dummy variable equal to 1 if firms has participations in companies with positive income. SCI is a dummy variable equal to 1 if firms are independent from their shareholders. SPE is a dummy variable equal to 1 if firms has participations in foreign firms. SCQ is a dummy variable equal to 1 if firms are listed.

The full sample is composed by 5924 firms and has 53.316 observations from 1998 to 2006.

Table 2: Summary Statistics for ATECO sectors.

ATECO 2002 SECTORS	*Mean WOTA*	*Mean AMC*	*Mean MTR*	*Obs*	*Share in Sample*
ORE-MINING	.0017458	0.3172223	0.316558	288	0.54
MANIFACTURING ACTIVITY					
Food Industries	.0012907	0.2820518	0.313556	3051	5.72
Textile Industries	.002713	0.2704296	0.293015	2817	5.28
Tannery Industries	.0011539	0.2758897	0.30711	1287	2.41
Wood Industries	.0014675	0.3011934	0.327999	486	0.91
Paper Industries, Printing and Publishing	.0036304	0.2831986	0.292544	1485	2.78
Production of coke, oil refinery	.0011721	0.3212821	0.322123	117	0.22
Production of chimical	.0031663	0.2935664	0.305106	1845	3.46
Production of non metal-bearing nugget	.0020253	0.2982451	0.319946	1926	3.61
Metallurgy	.0012475	0.2962537	0.315723	1017	1.91
Production of metal (excluding cars and plant)	.0015957	0.3010747	0.319238	3294	6.18
Production of cars and mechanic machine	.0025042	0.299576	0.310261	3609	6.77
Production of electric, electronic and optical machine	.0029418	0.2990359	0.310406	2178	4.08
Production of transports	.0026568	0.2787902	0.293177	810	1.52
Other manufacturing industries	.0016054	0.2831385	0.312343	1899	3.56
PRODUCTION AND DISTRIBUTION OF WATER, ELECTRICITY AND GAS	.0016904	0.3123809	0.298616	252	0.47
BUILDING	.0021993	0.306588	0.309817	4194	7.87
COMMERCE AND REPARATIONS	.0012517	0.2924484	0.313017	14328	26.87
HOTELS AND RESTAURANTS	.0034528	0.2834688	0.2769705	369	0.69
TRASPORTS, STRORING AND COMMUNICATIONS	.0019825	0.2851962	0.278518	2727	5.11
FINANCIAL ACTIVITY	.0084378	0.3048643	0.205101	405	0.76
REAL ESTATE, HIRE AND IT ACTIITY	.0039661	0.2945168	0.288347	3456	6.48
CIVIL SERVICES	.0012432	0.3511111	0.268455	9	0.02
INSTRUCTION	.0000148	0.3388889	0.286054	27	0.05
SANITATION AND SOCIAL WORK	.0031482	0.3084388	0.300464	711	1.33
OTHER PUBLIC, WELFARE AND SOCIAL SERVICES	.0029288	0.2758574	0.263493	729	1.37

Years 1998-2006 (53.316 observations)

Table 3: Cross-correlation. Years 1998-2006 (53.325 observations)

	AMC-PRE	*AMC-POST*	*MTR-PRE*	*MTR-POST*	*IND*	*INDP*	*PROF*	*LGDP*	*IND_GROWTH*
AMC-PRE	1.000								
AMC-POST	-0.687	1.000							
MTR-PRE	0.825	-0.771	1.000						
MTR-POST	-0.729	0.890	-0.817	1.000					
IND	0.004	-0.086	0.107	-0.043	1.000				
INDP	-0.032	-0.009	-0.023	-0.006	0.110	1.000			
PROF	0.010	-0.001	0.011	-0.001	-0.009	-0.003	1.000		
LGDP	-0.005	0.018	-0.019	0.008	0.164	0.045	0.001	1.000	
IND_GROWTH	0.001	0.011	0.003	0.013	0.058	0.003	-0.004	0.076	1.000
ZSC	0.115	-0.008	0.128	-0.006	0.008	-0.086	0.023	0.199	0.039
ZSCP	-0.001	0.051	-0.030	0.0401	-0.147	0.123	-0.003	0.007	0.002
CR	-0.001	0.006	-0.019	-0.001	-0.064	0.003	-0.001	0.008	-0.004
TA	-0.012	-0.051	0.016	-0.040	-0.201	-0.050	-0.003	-0.152	0.005
SIZE	-0.072	0.107	-0.081	0.117	0.022	-0.001	-0.092	-0.057	-0.036
AZIO	-0.233	0.262	-0.259	0.275	-0.022	0.009	-0.004	0.039	0.101
SPP	0.026	0.014	-0.007	-0.001	-0.023	0.058	-0.004	0.063	0.005
SPE	0.023	0.019	0.006	0.006	-0.059	0.033	-0.004	-0.136	-0.029
SCI	0.006	0.004	0.011	0.006	-0.034	-0.013	-0.004	-0.029	-0.006
SCQ	0.004	-0.002	-0.021	-0.013	-0.122	0.022	0.001	-0.022	-0.021

	ZSC	*ZSCP*	*CR*	*TA*	*SIZE*	*AZIO*	*SCQ*	*SPE*	*SCI*	*SCQ*
ZSC	1.000									
ZSCP	0.107	1.000								
CR	-0.037	0.005	1.000							
TA	-0.273	-0.095	-0.017	1.000						
SIZE	0.119	0.143	-0.012	-0.061	1.000					
AZIO	-0.051	-0.004	-0.005	-0.015	-0.050	1.000				
SPP	-0.101	0.160	0.017	-0.041	0.138	0.024	1.000			
SPE	-0.132	0.103	0.021	-0.053	0.214	0.042	0.205	1.000		
SCI	0.007	-0.001	0.002	0.029	0.018	-0.009	0.030	0.004	1.000	
SCQ	-0.089	0.056	0.078	-0.021	0.127	0.008	0.082	0.139	0.027	1.000

Table 4: Cross-correlation between yearly MTR. Years 1998-2006 (53.325 observations)

	MTR2000	MTR2000	MTR2000	MTR2001	MTR2002	MTR2003	MTR2004	MTR2005	MTR2006
MTR1998	1.000								
MTR1999	-0.1172	1.000							
MTR2000	-0.1166	-0.1160	1.000						
MTR2001	-0.1163	-0.1157	-0.1151	1.000					
MTR2002	-0.1154	-0.1148	-0.1143	-0.1140	1.000				
MTR2003	-0.1145	-0.1139	-0.1133	-0.1130	-0.1122	1.000			
MTR2004	-0.1141	-0.1135	-0.1130	-0.1127	-0.1118	-0.1109	1.000		
MTR2005	-0.1128	-0.1122	-0.1116	-0.1113	-0.1105	-0.1096	-0.1092	1.000	
MTR2006	-0.1117	-0.1111	-0.1105	-0.1102	-0.1094	-0.1085	-0.1082	-0.1069	1.000

APPENDIX 2: Estimation Results

Table 5: Determinants of the Investment Write-offs decision – Fiscal variable: MTR

	Expected Sign	**A** (Probit Model)	**A.1** (Marginal Effects)	**B** (Logit Model)	**B.1** (Marginal Effects)
MTR-PRE	+	0.3806***	0.0413***	0.7866***	0.0393***
		(0.1111)	(0.0121)	(0.2023)	(0.0101)
MTR-POST	N.S.S.	-0.4601***	-0.0499***	-0.7738***	-0.0387***
		(0.1295)	(0.0141)	(0.2356)	(0.0118)
IND	-	-0.4176***	-0.0453***	-0.7978***	-0.0399***
		(0.0735)	(0.0081)	(0.1340)	(0.0068)
INDP	?	0.0148**	0.0016**	0.0250**	0.0012**
		(0.0057)	(0.0006)	(0.0113)	(0.0005)
PROF	+	0.0048	0.0005	0.0090	0.0004
		(0.0032)	(0.0003)	(0.0049)	(0.0002)
LGDP	+	0.0536***	0.0058***	0.0993***	0.0049***
		(0.0167)	(0.0018)	(0.0308)	(0.0015)
IND_GRO	+	0.2034**	0.0221**	0.3929**	0.0196**
		(0.0914)	(0.0099)	(0.1631)	(0.0082)
ZSC	+	-0.2924***	-0.0317***	-0.5696***	-0.0284***
		(0.0153)	(0.0019)	(0.0307)	(0.0017)
ZSCP	+	1.1443***	0.1241***	2.0399***	0.1019***
		(0.0914)	(0.0105)	(0.1658)	(0.0087)
CR	+	0.1777**	0.0193**	0.2988**	0.0149**
		(0.0633)	(0.0069)	(0.1128)	(0.0056)
TA	+	-0.5476***	-0.0594***	-1.0524***	-0.0525***
		(0.0915)	(0.0101)	(0.1680)	(0.0085)
SIZE	+	0.2455***	0.0266***	0.4515***	0.0225***
		(0.0126)	(0.0016)	(0.0233)	(0.0013)
AZIO	-	0.0109	0.0011	0.0113	0.0005
		(0.0406)	(0.0044)	(0.0728)	(0.0036)
SPP	-	0.3791***	0.0391***	0.6943***	0.0331***
		(0.0366)	(0.0037)	(0.0678)	(0.0032)
SPE	+	0.4477***	0.0553***	0.8087***	0.0464***
		(0.03666)	(0.0052)	(0.0671)	(0.0045)
SCI	-	-0.0123	-0.0013	-0.0222	-0.0011
		(0.0563)	(0.0060)	(0.1031)	(0.0051)
SCQ	-	0.6081***	0.1028***	1.0151***	0.0795***
		(0.1238)	(0.0293)	(0.2222)	(0.0252)

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Results from a probit and logit model, in which we use as fiscal variable MTR (Marginal Tax Rate constructed using Graham's methodology). MTR-PRE is equal to MTR from 1998 to 2003 and is equal to zero from 2004 to 2006; MTR-POST is equal to zero up to 2003 and is equal to MTR from 2004 to 2006. In the column A and in the column B there are respectively the estimated coefficients from the probit and logit model. Instead, in the column A.1 and in the column B.1 there are the marginal effects.

5924 firms; 53.316 observations; 1998-2006; source: AIDA, BANCA D'ITALIA, ISTAT. All data measured in millions of euros.

Table 6: Estimation results. Estimated coefficients**:** yearly MTR

	Expected Sign	**A** (Probit Model)	**A.1** (Marginal Effects)	**B** (Logit Model)	**B.1** (Marginal Effects)
MTR1998	+	0.2965**	0.0321**	0.6017**	0.02993**
		(0.1304)	(0.0141)	(0.2384)	(0.0119)
MTR1999	+	0.3915**	0.0423**	0.8062***	0.0401***
		(0.1295)	(0.0140)	(0.2354)	(0.0117)
MTR2000	+	0.3920**	0.0423**	0.8242***	0.0410***
		(0.1300)	(0.0141)	(0.2357)	(0.0117)
MTR2001	+	0.5579***	0.0603***	1.1238***	0.0559***
		(0.1373)	(0.0149)	(0.2480)	(0.0124)
MTR2002	+	0.2688**	0.0290**	0.5787**	0.0287**
		(0.1370)	(0.0148)	(0.2480)	(0.0123)
MTR2003	+	0.5178***	0.0559***	1.0332***	0.0513***
		(0.1389)	(0.0151)	(0.2510)	(0.0125)
MTR2004	N.S.S.	-0.1250	-0.0135	-0.1428	-0.0071
		(0.1478)	(0.0160)	(0.2680)	(0.0133)
MTR2005	N.S.S.	-0.4597**	-0.0497**	-0.7472**	-0.0372**
		(0.1501)	(0.0163)	(0.2728)	(0.0136)
MTR2006	N.S.S	-0.7921***	-0.0856***	-1.4462***	-0.0720***
		(0.1520)	(0.0166)	(0.2783)	(0.0140)

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Results from a probit and logit model, in which we insert yearly MTR.
In the column A and in the column B there are respectively the estimated coefficients from the probit and logit model. A positive coefficient implies a higher probability to accounting investment write-offs.
Instead, in the column A.1 and in the column B.1 there are the marginal effects.

5924 firms; 53.316 observations; 1998-2006; source: AIDA, BANCA D'ITALIA, ISTAT. All data measured in millions of euros.

Table 7: Robustness I

	Expected Sign	**A** (Probit Model)	**A.1** (Marginal Effects)	**B** (Logit Model)	**B.1** (Marginal Effects)
AMC-PRE	+	0.6812***	0.0737***	1.2714***	0.0633***
		(0.0771)	(0.0086)	(0.1405)	(0.0072)
AMC-POST	N.S.S.	-0.1105	-0.0120	-0.2036	-0.0101
		(0.0938)	(0.0102)	(0.1709)	(0.0085)
IND	-	-0.3787***	-0.0410***	-0.7177***	-.0358***
		(0.0732)	(0.0080)	(0.1334)	(0.0067)
INDP	?	0.0156**	0.0017**	0.0267**	0.0013**
		(0.0057)	(0.0006)	(0.0113)	(0.0006)
PROF	+	0.0046	0.0005	0.0088	0.0004
		(0.0029)	(0.0003)	(0.0050)	(0.0002)
LGDP	+	0.0537***	0.0058***	0.0990***	0.0049***
		(0.0167)	(0.0018)	(0.0307)	(0.0015)
IND_GRO	+	0.1921**	0.0208**	0.3732**	0.0186**
		(0.0913)	(0.0099)	(0.1629)	(0.0081)
ZSC	+	-0.3011***	-0.0325***	-0.5863***	-0.0292***
		(0.0150)	(0.0018)	(0.0299)	(0.0017)
ZSCP	+	1.1424***	0.1237***	2.0365***	0.1015***
		(0.0915)	(0.0104)	(0.1660)	(0.0087)
CR	+	0.1751**	0.0189**	0.2940**	0.0147**
		(0.0634)	(0.0069)	(0.1131)	(0.0056)
TA	+	-0.5284***	-0.0572***	-1.0171***	-.0507***
		(0.0914)	(0.0100)	(0.1675)	(0.0085)
SIZE	+	0.2455***	0.0265***	0.4527***	0.0226***
		(0.0126)	(0.0015)	(0.0233)	(0.0013)
AZIO	-	0.0113	0.0012	0.8003	0.0006
		(0.0406)	(0.0044)	(0.0670)	(0.0036)
SPP	-	0.3713***	0.0382***	0.6792***	0.0323***
		(0.0367)	(0.0037)	(0.0679)	(0.0032)
SPE	+	0.4434***	0.0546***	0.8003***	0.0458***
		(0.0366)	(0.0052)	(0.0670)	(0.0045)
SCI	-	-0.0126	-0.0013	-0.0202	-0.0010
		(0.0563)	(0.0060)	(0.1031)	
SCQ	-	0.6070***	0.1024***	1.0100***	0.0787***
		(0.1238)	(0.0292)	(0.2222)	(0.0251)

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Results from a probit and logit model, in which we use AMC as fiscal variable (AMC is equal to statutory tax rate for firms with positive taxable income, zero otherwise). AMC-PRE is equal to AMC from 1998 to 2003 and is equal to zero from 2004 to 2006; AMC-POST is equal to zero up to 2003 and is equal to AMC from 2004 to 2006.
In the column A and in the column B there are respectively the estimated coefficients from the probit and logit model. A positive coefficient implies a higher probability of accounting investment write-offs.
Instead, in the column A.1 and in the column B.1 there are the marginal effects.

5924 firms; 53.316 observations; 1998-2006; source: AIDA, BANCA D'ITALIA, ISTAT. All data measured in millions of euros.

Table 8: Robusness II

	(A) *MFX ATECO*	*(B)* *MFX SPS=0*	*(C)* *MFX SPP=1*	*(D)* *MFX SCI=0*	*(E)* *MFX SCQ=0*
MTR-PRE	0.0410***	0.0282**	0.0614**	0.0368**	0.0398***
	(0.0121)	(0.0098)	(0.0220)	(0.0125)	(0.0117)
MTR-POST	-0.0489***	-0.0246**	-0.0728**	-0.0569***	-0.0421**
	(0.0141)	(0.0115)	(0.0255)	(0.0147)	(0.0137)
IND	-0.0415***	-0.0262***	-0.0684***	-0.0465***	-0.0396***
	(0.0081)	(0.0066)	(0.0144)	(0.0085)	(0.0079)
INDP	0.0016**	0.0019**	0.0021**	0.0016**	0.0024***
	(0.0006)	(0.0006)	(0.0010)	(0.0006)	(0.0007)
PROF	0.0005	0.0001	0.0010*	0.0048	0.0005*
	(0.0003)	(0.0004)	(0.0005)	(0.0003)	(0.0003)
LGDP	0.0061***	0.0032**	0.0075**	0.0055**	0.0051**
	(0.0019)	(0.0014)	(0.0034)	(0.0019)	(0.0018)
IND_GRO	0.0213**	0.0231**	0.0416**	0.0247**	0.0256**
	(0.0106)	(0.0085)	(0.0173)	(0.0104)	(0.0097)
ZSC	-0.0302***	-0.0189***	-0.0491***	-0.0310***	-0.0299***
	(0.0018)	(0.0016)	(0.0033)	(0.0019)	(0.0018)
ZSCP	0.1196***	0.0857***	0.1727***	0.1229***	0.1179***
	(0.0105)	(0.0088)	(0.0179)	(0.0109)	(0.0102)
CR	0.0169**	0.0208**	0.0312**	0.0195**	0.0374***
	(0.0073)	(0.0072)	(0.0111)	(0.0069)	(0.0100)
TA	-0.0566***	-0.0281***	-0.1012***	-0.0574***	-0.0532***
	(0.0103)	(0.0079)	(0.0182)	(0.0105)	(0.0098)
SIZE	0.0266***	0.0143***	0.0424***	0.0265***	0.0254***
	(0.0016)	(0.0013)	(0.0026)	(0.0016)	(.0015)
AZIO	0.0034	0.0058	-0.0071	0.0037	0.0019
	(0.0048)	(0.0038)	(0.0078)	(0.0047)	(0.0043)
SPP	0.0371***	0.0202***	/	0.0365***	0.0378***
	(0.0037)	(0.0030)		(0.0039)	(0.0036)
SPE	0.0544***	/	0.0897***	0.0553***	0.0538***
	(0.0053)		(0.0083)	(0.0055)	(0.0051)
SCI	-0.0015	-0.0016	0.0130	/	-0.0017
	(0.0060)	(0.0048)	(0.0117)		(0.0058)
SCQ	0.1020***	0.1371	0.1141***	0.0974***	
	(0.0310)	(0.0861)	(0.0359)	(0.0315)	

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Marginal effects estimated using a probit model:

- (A) Sample restricted to firms with more than 79 firms: 51.363 observations, 5707 firms;
- (B) Sample restricted to firms with no foreign participations: 35.649 observations, 3961 firms;
- (C) Sample restricted to firms with participations in companies with positive income: 31.869 observations, 3541 firms;
- (D) Sample restricted to firms not independent from their shareholders: 48.150 observations, 5350 firms;
- (E) Sample restricted to not listed firms: 52.542 observations, 5838 firms.

Table 9: Regression with Interaction

	Expected Sign	**Marginal Effects**
MTR-PRE	+	0.0938*** (0.0309)
MTR-POST	N.S.S.	-0.0543*** (0.0143)
IND	-	-0.0381*** (0.0099)
INDP	?	0.0011 (0.0007)
PROF	+	-0.0001 (0.0027)
LGDP	+	0.0058*** (0.0018)
IND_GRO	+	0.0222** (0.0099)
ZSC	+	-0.0277*** (0.0022)
ZSCP	+	0.0921*** (0.0143)
CR	+	0.0158** (0.0079)
TA	+	-0.0492*** (0.0128)
SIZE	+	0.0261*** (0.0015)
AZIO	-	0.0018 (0.0044)
SPP	-	0.0393*** (0.0037)
SPE	+	0.0583*** (0.0063)
SCI	-	0.0003 (0.0074)
SCQ	-	0.0586** (0.0263)
M1	-	-0.0407 (0.0313)
M2	-	0.0036 (0.0036)
M3	-	0.0592 (0.0456)
M4	-	0.0018 (0.0077)
M5	-	-0.0185** (0.0068)
M6	-	0.1398** (0.0473)
M7	-	-0.0555 (0.0398)
M8	-	-0.0094 (0.0118)
M9	-	-0.0065 (0.0187)
M10	-	0.1353*** (0.0384)

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Marginal effects estimated with a probit model, in which we use as fiscal variable MTR and insert the interaction term between tax and non-tax costs:

$$M1 = MTR - PRE_{it} \times IND_{it}$$
$$M2 = MTR - PRE_{it} \times INDP_{it}$$
$$M3 = MTR - PRE_{it} \times CR_{it}$$
$$M4 = MTR - PRE_{it} \times PROF_{it}$$
$$M5 = MTR - PRE_{it} \times ZSC_{it}$$
$$M6 = MTR - PRE_{it} \times ZSCP_{it}$$
$$M7 = MTR - PRE_{it} \times TA_{it}$$
$$M8 = MTR - PRE_{it} \times SPE_{it}$$
$$M9 = MTR - PRE_{it} \times SCI_{it}$$
$$M10 = MTR - PRE_{it} \times SCQ_{it}$$

5924 firms; 53.316 observations; 1998-2006; source: AIDA, BANCA D'ITALIA, ISTAT. All data measured in millions of euros.

Table 10: TOBIT Estimations – Fiscal variable: MTR

	Expected Sign	**Coefficients**	**Marginal Effects**
MTR-PRE	+	0.0420**	0.0179**
		(0.1069**)**	**(0**.0072**)**
MTR-POST	N.S.S.	-0.0892***	-0.0381***
		(0.0196**)**	**(0.0045)**
IND	-	-0.0676***	-0.0288***
		(0.0112**)**	**(0.0026)**
INDP	?	0.0032**	0.0013**
		(0.0011**)**	**(0**.0002**)**
PROF	+	0.0010**	0.0004**
		(0.0003**)**	**(0**.0001**)**
LGDP	+	0.0072**	0.0031**
		(0.0026**)**	**(0.0006)**
IND_GRO	+	0.0280**	0.0119**
		(0.0125**)**	**(0.0030)**
ZSC	+	-0.0346***	-0.0148***
		(0.0019**)**	**(0.0006)**
ZSCP	+	0.1877***	0.0801***
		(0.0153**)**	**(0.0032)**
CR	+	0.0218**	0.0093*
		(0.0073**)**	**(0**.0011**)**
TA	+	-0.0748***	-0.0319***
		(0.0137**)**	**(0.0033)**
SIZE	+	0.0419***	0.0178***
		(0.0019**)**	**(0.0005)**
AZIO	-	0.0029	0.0012
		(0.0061**)**	**(0.0014)**
SPP	-	0.0563***	0.0239***
		(0.0125**)**	**(0.0013)**
SPE	+	0.0820***	0.0356***
		(0.0059)	**(0.0013)**
SCI	-	-0.0034	-0.0014
		(0.0089**)**	**(0.0020)**
SCQ	-	0.2173***	0.1039***
		(0.0349**)**	**(0.0045)**

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Results from a tobit model, in which we analyze the determinants of the magnitude of investment write-offs, using as MTR fiscal variable (Marginal Tax Rate constructed using Graham's methodology). MTR-PRE is equal to MTR from 1998 to 2003 and is equal to zero from 2004 to 2006; MTR-POST is equal to zero up to 2003 and is equal to MTR from 2004 to 2006. In the column A there are the estimated coefficients from the tobit, in the column B, instead, there are the marginal effects.

5924 firms; 53.316 observations; 1998-2006; source: AIDA, BANCA D'ITALIA, ISTAT. All data measured in millions of euros.

Table 11: Tobit estimations: yearly MTR

	Expected Sign	**Coefficients**	**Marginal Effects**
MTR1998	+	0.0319*	0.0136**
		(0.12670)	(0.0045)
MTR1999	+	0.0455**	0.0194**
		(0.1260)	(0.0044)
MTR2000	+	0.0444**	0.0189**
		(0.1263)	(0.0044)
MTR2001	+	0.0687***	0.0293***
		(0.1330)	(0.0047)
MTR2002	+	0.0214	0.0091
		(0.1332)	(0.0047)
MTR2003	+	0.0596**	0.0254**
		(0.1349)	(0.0048)
MTR2004	N.S.S.	-0.0383*	-0.0163*
		(0.1439)	(0.0051)
MTR2005	N.S.S.	-0.0891**	-0.0380**
		(0.1462)	(0.0052)
MTR2006	N.S.S	-0.1399***	-0.0597***
		(0.1480)	(0.0052)

***,**,* : significant at 1 percent, 5 percent and 10 percent respectively
(Standard Errors in parentheses)

Results from a tobit model, in which we insert yearly MTR.
In the column A are summarized the estimated coefficients and in the column B there are the marginal effects.

5924 firms; 53.316 observations; 1998-2006; source: AIDA, BANCA D'ITALIA, ISTAT. All data measured in millions of euros.