

The Role of Taxes in Earnings Management: Evidence from Writedowns of Long-term Equity Investments

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This paper provides new empirical evidence on the role of taxes in discretionary asset writedowns. By focusing on a class of assets that has not been analyzed by prior research, namely long-term equity investments, and by exploiting exogenous changes in tax legislation in Italy, we are able to disentangle the influence of taxes on the decision to write down and on the magnitude of a writedown, conditional on taking the decision to write down. We find that taxes affect the timing of discretionary writedowns but not their magnitude. Consistently with this pattern, we also find that tax-driven opportunistic reporting does not significantly alter the effective tax burden of firms.

Keywords: corporate taxation, asset impairment, financial reporting, tax planning, writedowns of long-term equity investments, effective tax burden

JEL classification: H 25, H 32, K 34, M 41

1. Introduction

This paper investigates the existence of an interaction between taxes and the strategic management of financial statements. In particular, it provides new empirical evidence on the role of fiscal considerations in discretionary accounting choices and on the effects of strategic reporting on companies' effective tax burden. The analysis focuses on an area where discretion in accounting choices is high: companies' choice to write down the balance-sheet value of long-term equity investments.

The literature has long acknowledged that asset writedowns¹ differ from most other financial statement items due to the greater discretion afforded with regard to their magnitude and timing (Elliott and Shaw, 1988), and consistent

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1 We use the term "writedown" to refer to both write-off and partial downward revaluations of equity investments. As explained in section 2, within the Italian framework writedowns and write-offs are subject to the same accounting and tax treatment.

evidence has been provided of the strategic use of asset writedowns to manage earnings even in the presence of authoritative guidance (Boone and Raman, 2007; Riedl, 2004). The same literature has provided scant direct evidence on the role of taxes in influencing writedown decisions, despite the fact that writedowns usually bring about a reduction of the present value of the tax burden of a firm.

Testing the influence of taxes on discretionary accounting choices is indeed difficult, for two reasons. Firstly, the actual tax benefits of a marginal increase in writedowns cannot be observed, as they depend on managers' expectations of the future tax status of the company (Shevlin, 1990). Empirical analyses have mostly relied on proxies (e.g., profitability, tax-loss carryforward), raising concerns regarding potential errors-in-variables and endogeneity biases (Garrod et al., 2008; Strong and Meyer, 1987). Secondly, statutory tax rates and bases are usually uniform across firms and constant for long periods, which makes it difficult to find sufficient cross-section and time-series variations to identify tax effects.

Kosi and Valentincic (2013) have overcome these hurdles by taking advantage of the change in tax legislation in Slovenia, whereby asset writedowns have ceased to be considered tax-deductible expenditure. By comparing asset writedowns in the two different regimes – one that generates tax savings and the other that does not – the authors have managed to disentangle tax incentives from nontax incentives, and have found evidence of the fact that tax minimization is one of the main reasons for asset writedowns.

The evidence of a tax motive underlying writedown decisions raises a number of interesting issues. The first is whether taxes have a differential effect on the decision to write down or not, and on the magnitude of any writedown. Once a permanent decline in the value of existing assets has occurred, the management should take two conceptually distinct discretionary choices. Firstly, managers may choose the timing of writedowns, deciding whether to report the impairment in the current year or to wait and report it in future years. Secondly, managers may choose to record a writedown that differs from their best estimate of the permanent decline in value. Both the decisions on timing and on magnitude will be affected by costs and benefits of financial reporting; but, in theory, some costs and benefits, including tax savings, may have a different bearing on the two choices. The empirical literature has rather neglected the possibility that the same factors could affect in a different way the decision to write down or not and the decision on the magnitude of such writedowns, and it has usually assumed that such decisions cannot be logically separated (Riedl, 2004; Kosi and Valentincic, 2013), thus relying on tobit regression.

Second, tax-driven opportunistic reporting may have a significant economic effect on the private sector, by affecting earnings' informativeness about the underlying performance of the firm for outside stakeholders (e.g., banks), and

on the public sector, by reducing the effective tax burden and tax revenues. The effect might be smaller when taxes only affect the timing of the recognition of the impairment, not the magnitude of writedowns.

This paper contributes to the existing literature in several ways. First, we focus on a class of nondepreciable assets that has not been analyzed by prior research, namely long-term equity investments, where both managerial discretion regarding writedowns, and the tax benefits of the deductibility of writedowns, are relatively high. Second, by adopting the double-hurdle specification proposed by Cragg (1971), we are able to show that taxes have a different influence on the decision to write down and on the magnitude of a writedown, conditional on taking the decision to write down. Third, we provide evidence that tax-driven opportunistic reporting of writedowns of long-term equity investments has an effect on the earnings quality but does not significantly alter the effective tax burden of firms.

The empirical analysis is based on a panel of Italian companies covering the period 1998–2006. Our identification strategy exploits the exogenous variation of the statutory tax rate and tax base brought about by several reforms implemented in the period. In particular, we take advantage of the 2004 reform that repealed the tax deductibility of writedowns of long-term equity investments.

The remainder of this paper is organized as follows. Section 2 provides background information on the accounting and tax treatment of writedowns of long-term equity investments in Italy and develops the hypotheses tested in the empirical analysis. Section 3 presents the research design. Section 4 describes our data and the variables used in the analysis, while section 5 contains the results of the empirical analysis. The final section offers some concluding remarks.

2. Background and Hypothesis Development

Long-term equity investments are normally held for strategic reasons. A firm holding a substantial part of the equity of one of its suppliers can exercise pressure in order to obtain better terms of supply or preferential deliveries. On the other hand, a firm may invest in that supplier's equity because it wishes to influence or control the future policy and direction of the investee company. The reporting of long-term equity investment impairments is conceptually based on economic factors. Managers may record writedowns of long-term equity investments in order to allow for expected poor performance of the investee company. However, in the absence of enforceable restrictions on the reporting of writedowns, managers may strategically adjust their timing and magnitude, in order to recognize the impairments only when it is advantageous to do so.

The Italian accounting rules allow wide managerial discretion in the write-down of long-term equity investments. Accounting practice is based on the Civil Code (Zambon and Saccon, 1993), which requires recording the value of long-term equity investments in the financial assets section of the balance sheet (Italian Civil Code art. 2424). It offers the choice between two methods of equity investment accounting: cost and equity value.

If managers believe that a permanent decline in long-term equity investments has occurred, at the end of the fiscal year such investments have to be recorded at this lower value, with a writedown of the investment valuation (Italian Civil Code art. 2426). The writedown is based on the management's judgment that the value of the long-term equity investments has been permanently reduced. The writedown has to be recorded as a loss on investments in the "value adjustments to financial assets" section of the income statement. Since the late 1970s a series of accounting standards (*principi contabili*) were developed by organizations representing accounting professionals with the aim of providing interpretative benchmarks of general provisions in the Civil Code (Cameran et al., 2014). However, accounting standards did not significantly limit managerial discretion over writedown choices.² Further, as reported by Zambon and Saccon (1993), *principi contabili* were not compulsory in the period covered by our sample and in fact tended to be ignored by most Italian companies.

Italian accounting rules on writedowns of long-term equity investments remained unchanged from 1998 to 2006, but in 2005 listed companies, financial institutions, banks, and other regulated financial companies were allowed to adopt IAS/IFRS.³ The introduction of IAS/IFRS did not significantly change long-term equity investment accounting methods⁴ and did not eliminate the

- 2 Accounting standards OIC20 and OIC21, revised in 2005 by the Organismo Italiano di Contabilità (the national standard setter since 2001), allowed choosing whether to write down or not a long-term investment in a company that has experienced a loss. The choice to write down had to be motivated with reference to factors internal to the investee company (e.g., fixed costs in excess of revenue, obsolete technology) or external to it (e.g., long-lasting reduction in demand, new regulation, new competitors) that will reasonably be taken to prevent restoring profitability in the short term. The manager could also take the alternative choice of not writing down the long-term investment in a loss-making investee if the investee company had prepared detailed plans showing that profitability could be restored in the short term.
- 3 IAS/IFRS became mandatory for listed companies and the financial sector in 2006. All other companies had the option to voluntarily adopt IAS/IFRS thereafter (Matonti and Iuliano, 2012).
- 4 In particular, IAS 27 (Consolidated and Separate Financial Statements) establishes that in the parent companies' unconsolidated financial statements, investments in subsidiaries, associates, and jointly controlled entities should be accounted for at either cost, equity, or fair value (in accordance with IAS 39).

discretionary nature of the decision to write down long-term equity investments.⁵

The existing literature provides consistent evidence of the strategic use of asset writedowns both in contexts where managerial discretion is substantial (Elliott and Shaw, 1988; Francis et al., 1996; Strong and Meyer, 1987) and in the presence of authoritative guidance (Boone and Raman, 2007; Riedl, 2004). The same literature usually assumes that the choice on discretionary writedowns is taken by balancing benefits and costs of writedowns. From the benefit side, managers may choose to reduce reported earnings through discretionary writedowns in order to reduce taxes, to the extent that writedowns are tax-deductible. They can also use discretion in writedown reporting to achieve a series of organizational goals: they could use writedowns to build up future capacity to meet debt covenants (Szczesny and Valentincic, 2013), to maintain a target dividend payout (Kasanen et al., 1996), to moderate the demand for higher wages from employees (Brown et al., 1992; Kosi and Valentincic, 2013) or to reduce any variation in, and maintain a steady and predictable rate of, the growth in earnings (Moses, 1987). As to the cost, many financial agreements with stakeholders (e.g., creditors, lenders, or employees) use accounting numbers to specify the terms of trade, thus affecting managers' willingness to report lower income (Cloyd et al., 1996) even if this would result in reduced tax liability. Furthermore, an aggressive tax minimization strategy might trigger a tax audit that could result in an increased level of tax liability (Garrod et al., 2008).

The literature has long struggled to provide convincing empirical evidence on the role of taxes in influencing writedown decisions. One reason is that the tax benefits of a marginal increase in writedowns cannot be observed, as they depend on managers' expectations on the future tax status of the company (Shevlin, 1990). A few papers that claim the existence of a fiscal effect affecting writedown decisions rely on simple proxies of the marginal tax benefit. Strong and Meyer (1987) proxy for a low effective tax benefit using tax-loss carryforwards, and find a significant negative relationship between writedowns and the increase in tax-loss carryforwards since the previous year. Garrod et al. (2008) use profitability as a proxy for a high marginal benefit, and show that higher levels of profitability will increase the probability and magnitude of a writedown.

5 In fact, IAS39 (the International Accounting Standard regarding the recognition and measurement of financial instruments) establishes that an entity shall assess, at each reporting date, whether there is objective evidence that a financial asset is impaired, as a result of one or more events that occurred after the initial recognition of the asset. If impairment is recorded, the amount is calculated with reference to IAS 36 (Impairment of Assets).

A weakness of these simple proxies for firms' tax status is that they measure the marginal tax benefit with a large error, and may be correlated with other variables affecting writedowns. This point is clearly illustrated by the fact that both papers use losses as a control variable, whilst providing different interpretations of the estimated coefficients. As mentioned before, Strong and Meyer (1987) find a *negative* association between losses (namely an increase in loss carryforwards) and writedowns, and interpret this as proof that writedowns are lower when the effective tax rate is lower. Garrod et al. (2008) find a *positive* association between the probability and magnitude of writedowns and losses, and interpret this as evidence that writedowns partly reflect actual asset impairment. In this paper we implement a new identification strategy based on accurate, company-specific marginal tax rates (MTRs) measuring the present value of current and expected future taxes paid on an additional unit of income earned today. We simulated the MTRs following the Graham–Shevlin methodology (Graham, 1996a, 1996b, 1999; Shevlin, 1990). The simulated MTRs display considerable cross-sectional and time-series variation due to the high frequency of tax reforms implemented in the sample period, and to the extremely nonlinear structure of Italian corporate income.

The existing literature has commonly assumed that the decision to write down or not, and the choice of the magnitude of such writedowns, cannot be logically separated (Riedl, 2004; Kosi and Valentincic, 2013). However, once a permanent decline in the value of existing assets has occurred, the management should take two conceptually distinct discretionary choices: (a) whether to report the impairment in the current year or to wait and report it in future years, and (b) whether to report an amount that differs from their best estimate of the magnitude of the permanent decline in value. Managers' discretion may therefore affect both the timing of reported profits, when manager report their best estimate of the magnitude of the impairment but postpone the recognition of the loss, and the amount of reported profits, when they report a writedown that differs from the impairment. Tax considerations may affect the two choices in different ways.

Assume that managers choose, within the discretion allowed by accounting rules, the optimal amount to be written down by equating marginal benefits and costs, and consider the effect of an increase in the tax rate on the magnitude of the writedowns, once the decision to write down has been taken. Such an increase would enhance the marginal tax benefit of a writedown and bring about a shift of the marginal-benefit curve towards the right. The optimal magnitude of the reported writedown would rise as the equilibrium point moved along the marginal-cost curve. The final effect on the magnitude of the reported writedown will then depend on the slope of the marginal-cost curve. To the extent that the marginal-cost curve is steeply increasing (e.g., if tax penalties for misreported income are nonlinear due to thresholds), changes in

the tax rate will bring about a small (or no significant) change in the magnitude of the reported writedown, once the decision to write down has been taken. Even in this case, taxes may still significantly affect the timing of the writedown. If tax and nontax costs are related to the magnitude of the writedown and are not affected by the timing, managers may still be motivated to postpone any (given) discretionary writedown if they foresee an increase in the tax rate in the near future. Hence we might observe that tax considerations have a significant bearing on the timing of the writedowns and, at the same time, a weaker influence, or none at all, on the magnitude of writedowns.

We consider the possibility that tax considerations could affect in different ways the decision to write down or not and the decision on the magnitude of such writedowns. This possibility has been rather neglected in the empirical literature (Strong and Meyer, 1987; Kosi and Valentincic, 2013). One reason may be that previous studies have mainly focused on writedown of depreciable assets. For such assets a writedown brings about only a temporary reduction in taxable income, as it reduces future depreciation expenses. The effective tax burden, measured as the present value of present and future taxes, is only reduced by the higher discounting of future tax payments. Therefore, the difference between the choice of timing and the choice of magnitude is somewhat blurred.

To test whether the decision on timing and the decision on magnitude differ, we analyze a specific class of assets that are not depreciated, namely long-term equity investments, where the tax benefits of a writedown are relatively high. An investment writedown entails a permanent reduction in taxable income: the incentive to exploit discretion in impairment reporting in order to reduce the tax burden is therefore stronger. We focus on impairments of long-term equity investments recorded among financial assets and evaluated using the equity method or the cost method, which probably involve greater discretion, leaving out mark-to-market adjustments and impairments of available-for-sale securities,⁶ which involve significantly less discretion. In this framework the managers can use their discretion in choosing either the timing of reported profits, by reporting their best estimate of the impairment but postponing the recognition of the loss, or the amount of reported profits, by reporting a writedown that differs from the impairment.

To the extent that the timing is affected by the tax, we should observe that writedowns are more frequent when the marginal tax rate is high. To the extent that the writedown magnitude is affected by the tax, we should observe that writedowns are greater the higher is the marginal tax rate.

⁶ We have no data for mark-to-market adjustments and impairments of available-for-sales securities.

Although the simulated MTRs are more accurate than alternative proxies, we cannot rule out the possibility that they may reflect unobservable or unknown factors. The existing literature provides evidence that asset revaluations are associated with changes in management (Boone and Raman, 2007; Francis et al., 1996; Moore, 1973; Riedl, 2004; Strong and Meyer, 1987), with the existence and quality of external auditing (Kosi and Valentintic, 2013), and with dividends (Szczesny and Valentincic, 2013). Unfortunately, we do not have any figures for these variables and cannot control for them. In order to provide further convincing evidence that tax minimization is a significant driver of writedown decisions, we compare writing-down choices in two separate regimes, one that generates tax savings and one that does not, taking advantage of the 2004 reform of the Italian corporate tax. Until 2003, writedowns of equity investments were fully deductible from the tax base of the corporation tax.⁷ In 2004 the government implemented a tax reform introducing the participation exemption rule. This rule provides for the exemption from the corporate tax base of capital gains and losses arising from the disposal of corporate shares and investments in other companies.⁸ The same reform completely ruled out the possibility of deducting writedowns of equity investments from the tax base.

Following the approach suggested by Riedl (2004) and Kosi and Valentintic (2013), we compare estimates of the effect of the MTR on the probability and magnitude of writedowns, both before and after the reform. As the reform did not affect any other factor influencing writedowns, any observed structural break in the correlation between writedowns and MTR may be attributed to the removal of the tax-minimization incentive. More specifically, if the MTR correctly measures the tax incentive, we should observe no correlation between the MTR (calculated assuming deductibility) and writedowns following the reform. Hence, we test the following two hypotheses:

- 7 In order to curtail tax avoidance, the law required that in the presence of long-term equity investments evaluated using the equity method, deductible writedowns could not exceed impairments evaluated using the cost method (Articel 66, paragraph 1-ter of the Italian Consolidated Act on Income Tax – TUIR). In 2002, Legislative Decree no. 209 introduced further anti-tax-avoidance provisions, concerning the writing down of long-term equity investments using the cost method. This decree specifically established that writedowns should be calculated with reference to the reduction in the equity value of the investee company net of distributed retained earnings, nondeductible goodwill amortizations, and nondeductible provisions.
- 8 Four requirements must be met in order to qualify for the exemption of capital gains: the stocks have to be held for a minimum period of time (holding period); stocks must be recorded as a long-term asset in the shareholder's financial statements (booking requirement); the company whose stocks are sold should actively run a business (active-business requirement); and (if the company is located in a foreign country) it should not be resident in any low-tax jurisdiction included in a "blacklist."

Hypothesis 1: The probability of writing down long-term equity investments increases with an increase in the marginal tax rate before 2004 and is not statistically correlated with the marginal tax rate after the 2004 tax reform;

Hypothesis 2: The magnitude of writedowns of long-term equity investments, conditional on the decision to write down, increases in the marginal tax rate before 2004 and is not statistically correlated with the marginal tax rate after the 2004 tax reform.

The answer to the question whether taxes do affect only the timing of writedowns of long-term equity investments or affect both timing and magnitude has relevant policy implications. The effects of tax-driven earning management on the public sector and on private outside stakeholders of firms may differ, depending on whether discretion is only used to modify the timing of the recognition of the impairment or it is also exploited in the choice of the magnitude of writedowns. From the perspective of the public sector, a firm reporting a writedown that is higher than the permanent decline in value of the long-term equity investment will reap a reduction in taxes equal to the product of the MTR and the writedown in excess of the impairment. In contrast, if only the reporting of the impairment is postponed to a period where the MTR is higher, the tax saving will be equal to the product of the impairment and the difference between the present value of the future MTR and the present MTR. Hence the reduction in the effective tax burden of firms (and the corresponding loss in tax revenue) brought about by earnings management may depend on whether managers misreport the magnitude of the impairment or postpone the recognition of the impairment. As illustrated previously, if the marginal cost of reporting a writedown in excess of the impairment is steeply increasing, managers would not significantly alter the magnitude of the reported writedowns due to tax considerations. The same managers may choose a different timing of the writedown if they foresee an increase in the MTR, even if the tax saving is relatively low. We are not able to disentangle the effects of the strategic use of timing and of the misreporting of writedown magnitude on the effective tax burden. However, we can exploit the 2004 Italian reform to test whether earnings management driven by tax consideration has a significant overall effect on effective tax burden.

When writedowns are deductible, managers may reduce the effective tax burden by misreporting the magnitude of discretionary writedowns of long-term equity investment. Hence, we should observe, *ceteris paribus*, a lower effective tax burden in companies that report an impairment of long-term equity investment. When writedowns are not deductible, discretionary writedowns do not alter the effective tax burden. As a consequence, if we compare the effective tax rates before and after the Italian 2004 reform that repealed

the deductibility of writedowns, we should observe that the difference in the effective tax rate was greater for those companies that had benefited from writedown deductibility prior to the 2004. We therefore test the following hypothesis:

Hypothesis 3: Following the 2004 tax reform, the effective tax rate increases (decreases) more (less) for those companies that had written down long-term equity investments at least once prior to the reform.

In the private sector, outside stakeholders will be concerned with the effect of tax-driven opportunistic reporting on earnings informativeness about the underlying performance of the firm. Following Kosi and Valentincic (2013), we will also test whether the 2004 fiscal reform, by removing the tax motivation from the financial reporting of long-term equity investment, has increased earnings quality.

3. Research Design

Our empirical analysis proceeds in a series of steps. In the first step we investigate the effect of tax and nontax costs on the decision to record writedowns of long-term equity investments, and on the magnitude of such writedowns. Our baseline specification is the following:

$$WOTA_{it} = \alpha + \beta MTR_{it} + \gamma X_{it} + \text{industry dummies} + \text{yearly dummies} + \epsilon_{it}, \quad (1)$$

where $WOTA_{it}$ is the ratio between writedowns of long-term equity investments and previous-year total assets. MTR_{it} is the marginal tax rate computed using the Graham–Shevlin methodology in the years in which writedowns were tax-deductible (i.e., up to 2003), and it is equal to zero when writedowns were no longer deductible from the tax base (i.e., from 2004 on). We are concerned with the coefficient β , which we expect to be statistically significant and positive. To control for any unobserved or unobservable factors that may affect the probability and magnitude of writedowns, we estimate the regression (1) by adding to the controls the variable $MTR-post$, which measures the marginal tax rate firms would have been faced with after 2003 if the reform repealing writedown deductibility had not been implemented. Insofar as MTR correctly measures the tax incentive, we should obtain a nonsignificant coefficient for $MTR-post$. The vector X_{it} contains several factors that previous studies have shown to be correlated with the likelihood of writedowns and their magnitude. We will discuss these variables in detail in the following section.

Our dependent variable, the magnitude of writedowns of long-term equity investments ($WOTA$), is limited between 0 and 1 and frequently takes the value

zero. An important issue is whether *WOTA* should be treated as a censored or a truncated variable. Some papers (Riedl, 2004; Kosi and Valentincic, 2013) have assumed that asset writedowns and upward asset revaluations should be thought of as continuous variables and that a zero value of *WOTA* can be observed either because there has been no change in the value of equity investment or because equity investment has increased in value, but the upward revaluation (a “negative” writedown) has not been recorded due to accounting conservatism (Basu, 1997; Pope and Walker, 1999). As highlighted by Lin and Peasnell (2000), due to the large discretion allowed by accounting standards, the reported amount is a decision variable, making it inappropriate to treat devaluation as simply revaluation with the sign reversed. We may observe a zero value even when there is an impairment but the managers choose not to report it because tax and nontax costs are higher than benefits. Using Wooldridge’s (2002) taxonomy, our dependent variable is best described as a *corner-solution* outcome.

The standard approach to dealing with corner-solution models is the tobit model (Wooldridge, 2002). This model jointly analyzes the decision to write down and the decision regarding the entity of such writedowns (once the decision to write down has been taken),⁹ by imposing the restriction whereby the probability of writedown and the expected magnitude thereof, given the decision to write down, are determined by the same vector of parameters. As explained in the previous section, we assume that the decision to write down or not and the choice of magnitude of such writedowns are not simultaneous but sequential and that tax and nontax costs and benefits might have a different bearing on the decision to record a writedown and on its magnitude. Previous studies have shown that our approach is consistent with data. Garrod et al. (2008) found that firm size, measured by sales, is positively correlated with the probability of writing down, but negatively linked to the magnitude of writedowns.

We adopt the alternative specification proposed by Cragg (1971). This is a more flexible approach, which allows for modeling two separate processes: one for the probability of writing down long-term equity investments, and the other for the magnitude of such writedowns. This methodology is based on a two-stage specification. During the first stage, the entire data set is used to analyze the determinants of the probability of a writedown of long-term equity investments. The probit model is appropriate for the estimation of this stage. The second stage exclusively considers the subset of firms that actually write down long-term equity investments. A truncated estimation procedure is used, since the dependent variable is only observed when it is greater than zero. Existing literature uses a combination of a logit or probit regression for

⁹ See Lin and Schmidt (1984) for further details.

the choice to write down and OLS to determine the magnitude, or else a tobit regression. If companies make two separate choices, the one on whether to write down or not and the other on writedown magnitude, OLS is inconsistent (Wooldridge 2002, 524). The tobit model is nested within Cragg's model (Wooldridge 2002, 536–538).

In order to test the robustness of our empirical results, we estimate the regression (1) using the tobit method (Tobin, 1958; Maddala, 1987), following the methodology adopted by previous empirical literature. In the second step of the robustness analysis, we estimate (1) for different restricted samples. Finally, we evaluate the efficiency of our identification strategy in capturing the fiscal effect on writedown behavior. We compare our methodology with two alternative approaches. Firstly, we estimate the empirical model using a simple alternative measure of the marginal tax rate, the taxable-income dummy (*TID*). Secondly, following the analysis conducted by Kosi and Valentincic (2013), we use profitability (before writedowns) as a proxy for the tax minimization incentive, instead of the marginal tax rate. We estimate our model using the tobit regression (Tobin, 1958; Maddala, 1987), and we compare the link between writedowns and operating profits (before writedowns) before and after the repeal of writedown deductibility. To avoid a possible error-in-variable bias, we also perform the reverse regression (Cready et al., 2001; Leuz and Schrand, 2009; Kosi and Valentincic, 2013), using the level of operating profits (before writedowns) as the dependent variable.

In the final step, we test if opportunistic financial reporting affects companies' effective tax burden and earnings quality. In particular, we investigate the effect of the repeal of writedown deductibility on companies' effective tax rate, by estimating the following regression:

$$ETR_{it} = \mu + \delta WDC_i + \lambda Z_{it} + \text{industry dummies} + \text{yearly dummies} + \epsilon_{it}, \quad (2)$$

where ETR_{it} is given by income tax expenses divided by book income before writedowns. WDC_i is a dummy variable equal to one if a company had written down long-term equity investments in at least one fiscal year between 2001 and 2003. The vector Z_{it} contains several independent variables that, together with industry dummies, control for firm-specific characteristics that may affect the effective tax burden (Richardson and Lanis, 2007; Markle and Shackelford, 2012). The regression (2) is estimated over the prereform period (years 2001–2003) and over the postreform period (years 2004–2006). We then test differences in coefficient estimates across the two regimes. The separate intercept for each regime and the time dummies control for any other institutional change and macroeconomic shifts across the two regimes, to the extent that such changes also have a mean effect (Riedl, 2004). The coefficient δ measures

the mean difference of *ETR* between companies that had written down long-term equity investment in the prereform period and all other companies that is not explained by firm-specific characteristics and/or institutional or macroeconomic variables we control for. Discretionary writedowns of long-term equity investment could only affect the coefficient δ in the prereform period, when they were tax-deductible. A significant negative difference between the estimated coefficients in the pre- and postreform periods is therefore consistent with the hypothesis that companies were able to reduce their effective tax burden by earnings management when discretionary writedowns could be deducted from the tax base.

We also try to exploit the 2004 reform to test whether tax-motivated earnings management has a significant effect on earning quality. Following Kosi and Valentincic (2013), we implement a simple test based on the informativeness of current-period earnings for future cash flows (Barth et al., 2001). The correlation between current-period earnings and future cash flows is weaker when managers use the financial process to achieve objectives, including tax savings, other than communicating to outside stakeholders the underlying performance of the firm. *Ceteris paribus* we should then observe an increase in the correlation between current earnings and future cash flows following the reform that removed the tax incentive to use discretion in the choice to write down long-term equity investments. This effect should be greater for those companies that had actually used writedowns before the reform. Unfortunately, we cannot identify and control for all other factors that may differently affect the relationship between current earnings and future cash flow in the pre- and postreform periods. However, to the extent that those other factors do not have a differential effect on the forecast relevance of earnings of those companies that had actually used writedowns before 2004, we may detect the effect of the reform using the following OLS regression:

$$CFO_{it+1} = \gamma_0 + \gamma_1 EARN_{it} + \gamma_2 EARN_{it} \cdot POST + \gamma_3 EARN_{it} \cdot WDC + \gamma_4 EARN_{it} \cdot POST \cdot WDC + \epsilon_{it}, \quad (3)$$

where the dependent variable, *CFO*, is the cash flow from operations, *EARN* is the bottom-line net income, *POST* is a dummy equal to 1 for the postreform years, and *WDC* is a dummy variable equal to one for companies writing down at least once during the prereform period. A positive and significant coefficient γ_4 is consistent with the hypothesis that the reform reinforced the link between current earnings and future cash flows for those companies that had actually used writedowns in the past.

4. Definition of Variables and Sample Composition

In order to identify correctly the link between taxes and financial reporting, we need to measure the marginal tax benefit of writedowns of long-term equity investments and to control for other factors that may affect companies' discretionary writedown decisions.

4.1. The Marginal Tax Rate

When deductible, a marginal increase of writedowns of long-term equity investments implies a reduction in tax liabilities, as measured by the marginal tax rate, defined as the present value of current and expected future taxes paid on an additional unit of income earned today. If a firm has a positive taxable income, the MTR is equal to the statutory tax rate. Otherwise, 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 the 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 in which the firm is expected to have a positive taxable income.

In order to compute the actual value of the MTR, three items of information are required. The first regards corporate taxation rules, and consists in the statutory tax rate and the fiscal treatment of net operating losses. The second is the value of losses to be carried forward. The third item of information needed to compute the MTR is managers' expectations of future income flows. We proxy managers' expectations of taxable income using the methodology proposed by Graham (1996a, 1996b, 1999) and by Shevlin (1990), and use these values to compute the marginal tax rate for each company in the sample.¹⁰

Graham (1996b) argues that this proxy is the best predictor of the marginal tax rate calculated on actual income realizations. This claim has recently been questioned by Blouin et al. (2010). They show that the Graham–Shevlin MTR forecasting approach produces inaccurate estimates of mean future income (which tend to be too high when current income is high, and too low when current income is low), and also underestimates the future volatility of income for all income groups. As an alternative they propose a nonparametric procedure to estimate the marginal tax rate. The reasons for this are twofold. Firstly, income is better described by a mean-reverting process than a random walk, due to transitory components in accounting income, and to economic factors such as entry and exit. Secondly, when a firm's assets and income grow over time, the historical volatility of income since the firm's inception is likely to substantially understate future volatility. However, in our analysis the

¹⁰ Further details on the methodology used to compute the MTRs are available upon request.

bias in the MTR calculated according to the Graham–Shevlin methodology is limited by two factors. Firstly, our sample covers a significantly shorter period than the one (stretching 27 years from 1980 to 2007) analyzed by Blouin et al. (2010); this should reduce the underestimation of income volatility for growing developing firms. Secondly, loss carryforward is limited to 5 years in Italy, compared to 22 years in the USA. The shorter forecasting horizon should reduce the error in the simulated MTR. Moreover, Graham and Kim (2009) demonstrate the importance of using firm-specific data when estimating marginal tax rates, and show that the nonparametric approach proposed by Blouin et al. (2010) produces a distribution of MTRs that is characterized by too many observations clustered near the center.

The endogeneity of tax status may produce a spurious correlation between the writedown decision and the marginal tax rate. By recording writedowns of long-term equity investments, which benefit from deductibility, a company reduces its taxable income and potentially lowers its MTR. This may result in a negative correlation between writedowns and estimated MTRs, even if high taxes induce companies to record writedowns in order to reduce their tax burden. In order to avoid this spurious correlation, following Graham et al. (1998) and Alworth and Arachi (2001), we compute a measure of the marginal tax rate based on pretax income before writedown deductions are made, which means that it is not endogenously affected by writedown decisions.

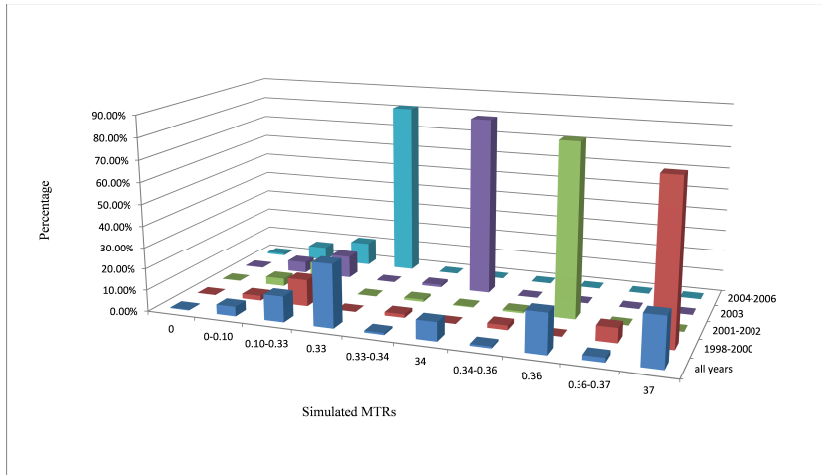
One potential deficiency of the simulated MTRs is that they are calculated using data from financial statements. As is well known, book income is adjusted to calculate the tax income and accounting income can vary greatly from tax-return income. However, Graham and Mills (2008) have shown that the book simulated MTRs are highly correlated with simulated rates based on corporate tax-return data.

Figure 1 shows the distributions of the simulated MTRs for the companies in the sample. The MTRs are aggregated into subgroups of years with the same statutory tax rate. The time-series variation in the MTRs is primarily due to the change in the statutory tax rate, which fell from 37 % to 33 % during the period 1998–2006. The figure shows that most companies faced the maximum statutory tax rate, since their taxable income is positive. In particular, the share of companies facing the maximum statutory rate remained virtually stable (at the 80 % mark) during the period in question (see panel B of table 1), and this is consistent with the findings of previous studies regarding Italy (Alworth and Arachi, 2001).

The simulation of the Graham–Shevlin MTRs involves a series of complex calculations. In order to underline the advantages of the aforesaid simulation, we have tried to see whether we can identify the presence of a fiscal motive for writedown behavior, by considering a simplified measure for the marginal tax rate. This alternative variable (which we will refer to as the taxable income

dummy: *TID*) assumes that managers, when computing the relevant marginal tax rate for investment decisions, set it equal to the top statutory tax rate when the company enjoys positive pretax income prior to any writedown of long-term equity investments, and equal to zero otherwise. This means assuming that they act in a rather myopic manner, and thus the variable *TID* varies less across companies than does the MTR.

Figure 1
The Distribution of the Simulated MTRs



Note: The figure shows the distributions of the simulated marginal tax rates using the Graham–Shevlin methodology. The MTRs are aggregated for all years and for subgroups of years having the same statutory tax rate: 1998–2000 (during this period the statutory tax rate was equal to 37%); 2001–2002 (36%); 2003 (34%); 2004–2006 (33%).

4.2. Nontax Factors Affecting Writing-down Decisions

In the absence of opportunistic behavior, firms will write down long-term equity investments when there is a permanent decline in the value of the investee company. Unfortunately, we have no financial and economic data on the investee companies. Therefore, we have used several variables to proxy for the investee company's performance, which reflect the trend of the investor company's performance.

Firstly, we control for current-year losses of the investor company, using the dummy variable *LOSS*, which takes the value 1 if pretax and prewrite-down income is negative, and zero otherwise. The existing literature shows that this variable may account for various different effects. Garrod et al. (2008)

suggest that accounting losses might be a signal that assets are impaired, and find a positive correlation between writedowns and current-year losses. Strong and Meyer (1987) argue that losses reduce the effective marginal tax rate. As a consequence, when writedowns are tax-motivated, the propensity to write down may be smaller for loss-making companies than for equivalent companies reporting profits. In this paper we have managed to disentangle these two effects by simulating the marginal effective tax rate faced by each firm. Firms with current-year losses will have different MTRs, depending on differences in the forecasted stream of future income and the size of losses carried forward. We can then estimate the effect of current losses on the propensity to write down and on the magnitude of writedowns, depending on firms' specific MTR. As a consequence, losses should exclusively represent an impairment effect, and we would expect to find a positive correlation between current losses and writedowns, as suggested by Garrod et al. (2008).

We control for the amount of long-term equity investments, supposing that the higher is the ratio of long-term equity investments to total assets (*EI*), the more likely are companies to account discretionary investment writedowns.

The trade-off theory suggests that firms balance the benefits of writedowns (e.g., the reduction in taxable income) against costs related to financial reporting.

Among the proxies for financial reporting considerations, we include the debt-to-equity ratio (*DEBT*). As suggested by the literature, debt may play a relevant role in writedown choices. On the one hand, writedowns of long-term equity investments may be more costly for highly leveraged firms, either because writedowns are a sign of reduced borrowing capacity via a decrease in collateral values (Bontempi et al., 2004; Cotter and Zimmer, 1995), or because of debt covenants, which often prescribe a certain maximum debt-to-asset ratio (Garrod et al., 2008). This would lead to a negative correlation between writedowns and debt. On the other hand, firms may benefit from more conservative *ex ante* accounting in that this may result in a lower interest rate *ex post*, as Zhang (2008) has pointed out. This benefit is particularly valuable for highly leveraged firms. Moreover, Szczesny and Valentincic (2013) and Kosi and Valentincic (2013) find evidence that firms may choose to write down in order to "store" future capacity to meet debt covenants. By decreasing current earnings by means of writedowns, they reduce the likelihood of future writedowns for operating reasons, thus increasing the probability of sufficiently high debt-to-asset ratios in future years. These considerations may explain a positive relationship between writedowns and debt.

The cost of borrowing is also affected by liquidity and financial distress. To control for liquidity we use the variable *CASH*, computed as cash holdings as a proportion of total assets. We expect companies with lower liquidity to face higher *ex ante* borrowing costs and to be less likely to write down long-term

equity investments in order to prevent a further increase in the cost of debt. We also hypothesize that tangible assets increase a company's debt capacity, since these assets can be used as collateral in a debt contract and their disposal or purchase can be monitored by the lender. We therefore control for *TA*, the value of tangible assets as a share of total assets (e.g., Graham, 2000). Moreover, we expect firms to be more cautious about writing down long-term equity investments if they are in financial distress. We proxy financial distress using a revised version of the *Z*-score proposed by Altman (1993) for private companies (*ZSC*), given that listed companies account only for 1.6% of our sample.

The existing literature has consistently shown that larger companies are more likely to change the book value of their assets either by upward revaluations (Brown et al., 1992; Lin and Peasnell, 2000) or by writedowns (Francis et al., 1996; Garrod et al., 2008; Kosi and Valentincic, 2013). There are several reasons why size may affect firms' writedown decisions: larger firms might have a more diversified portfolio of long-term equity investments and a higher probability that some of the investee companies are going to experience a permanent reduction in their value; larger firms may also have more complex ownership structures, and hence a stronger need to report expectations of diminished cash flows (Kosi and Valentincic, 2013). Moreover, larger firms are more politically visible, and are thus under greater pressure to accurately implement accounting regulations in general, and asset writedowns in particular. However, as Garrod et al. (2008) have argued, a firm's size may have opposite effects on the likelihood of writedowns and their magnitude. Once the decision to write down has been taken, the magnitude of the writedown could trigger the scrutiny of tax auditors. Insofar as tax audits focus on larger firms in order to maximize tax revenue, larger firms are more likely to be tax-audited when they reduce reported profits through writedowns. In fact, Garrod et al. (2008) provide evidence that larger companies are more likely to write down their assets than smaller companies are (owing to the aforementioned political visibility), but that the magnitude of such writedowns decreases as company size increases (in order to reduce the likelihood of a tax audit). We use as proxies for companies' size the natural log of sales recorded during the previous year (*S*) and the average number of employees (*EMP*). Kosi and Valentincic (2013) conjecture that the number of employees could also proxy for the employees' bargaining power: the more employees the company has, the higher the possibility for employees to claim higher wages and, consequently, the higher companies' likelihood of managing earnings downwards through discretionary writedowns (Brown et al., 1992).

The last group of proxies represents the explicit or implicit reporting incentives managers may have to record writedowns, relating to the time profile of earnings. The *big-bath* literature suggests that companies are motivated to

record discretionary losses in periods of unusually low earnings. To take a bath is seen as a signal to investors that the bad times are over and better times lie ahead. The big-bath strategy has often been considered a likely reason for asset writedowns (Burton and Miller, 1986; Mime, 1986). Moreover, if management compensation is earnings-based, and if prewritedown earnings are already far short of the target, then managers have an incentive to shift future writedowns to the current year. All these arguments suggest a negative correlation between unusually low prewritedown income and writedowns. However, in periods of very low earnings, companies may well decide to reduce discretionary writedowns of long-term equity investments in order to increase their book income, thus improving how they are perceived from the outside. In contrast, the *income-smoothing* literature suggests that writedowns may be recorded in order to minimize variance in reported earnings, and to maintain a steady, predictable rate of growth of earnings (Moses, 1987). In particular, when income is unusually high, exceeding the upper bound specified in earnings-based bonus plans, management is encouraged to record discretionary writedowns. To proxy for these two separate effects, following Bartov (1993), Francis et al. (1996), and Riedl (2004), we define two variables for when prewritedown income is low (*BATH*) and when it is high (*SMOOTH*), respectively. To compute *BATH* and *SMOOTH*, we define the variable *IC*, the annual change in pretax and prewritedown income. The variable *BATH* is equal to *IC* when *IC* is below the median of its nonzero negative values, or to 0 otherwise; likewise, the variable *SMOOTH* is equal to *IC* when *IC* is above the median of its nonzero positive values, or to 0 otherwise. The income-smoothing hypothesis predicts a positive correlation between *SMOOTH* and writedowns. The sign of the correlation between *BATH* and writedowns cannot be determined *a priori*: it depends on whether the big-bath or the financial reporting incentive prevails during a period of unusually low income.

Companies' ownership structure may affect accounting decisions, since in the case of the separation of ownership and control, the interests of management and those of the firm's owners are not always perfectly aligned. Management is motivated to act in order to maximize pretax income, whereas owners are more likely to act in order to minimize the firm's fiscal burden. Unfortunately, we do not possess any detailed data on ownership (e.g., number of owners, ownership concentration). Following Garrod et al. (2008) and Kosi and Valentincic (2013), we assume that the ownership structure of small private companies implies no significant separation of ownership from management. Thus, we control for the effect of ownership structure on writedown decisions by means of a dummy variable (*SPC*) which takes a value of 1 for

small private companies.¹¹ We expect writedowns to be higher for small private companies, since such companies are less significantly affected by agency problems.

4.3. Sample Composition

Our empirical analysis uses an unbalanced panel data set of Italian companies observed during the period 1998–2006. Several reforms of the Italian corporate income tax, together with the abolition of the tax deductibility of investment writedowns in 2004, make this period particularly interesting and provide an ideal setting for testing the effect of taxes on financial reporting.

The data set is composed of accounting data gathered from the AIDA database, including accounting information on Italian corporations. Initially we identified a balanced panel composed of 6,841 companies with balance-sheet figures for every year between 1997 and 2006. Our sample does not include any observations relating to companies operating in the “Agriculture, forestry and fishing” sector, or to any years when a firm had no long-term equity investments or when the value of writedowns was higher than the value of long-term equity investments in the previous year.¹² We dropped from the sample 1,340 observations where employment data were not available. Finally, the sample was stripped of any outliers and inconsistent data¹³ in order to obtain a nonbalanced data set of 42,414 firm–year observations. Panel A of table 1 provides further details on sample formation.

Panel B of table 1 provides some information about the profit status of the companies included in the sample. The value of income before taxes and writedowns is positive in 89.4 % of the sample observations. This confirms that for most of the companies discretionary writedowns could well imply significant fiscal benefits through a reduction in the tax burden. Overall, 16.16 %

¹¹ We defined a company to be “small private” if it meets two criteria: (a) it is not listed in regulated markets, and (b) it is considered small by Italian law. In particular, Italian Official Journal (4/1/2017) established that a small company has no more than 50 employees, and it meets one of the following criteria: total assets at the end of the tax year do not exceed 10 million euros, or sales revenues at the end of the tax year do not exceed 10 million euros.

¹² In theory, the value of writedowns may exceed the value of long-term equity investments of the previous year if a company in year t acquires equity investments and at the end of the same fiscal year decides to write down such investments. We would expect this to be a marginal case, and we assume that observations where the value of writedowns exceeds the value of long-term equity investments from the previous year are erroneous, and consequently they have been excluded from the sample (874 observations).

¹³ We excluded 508 implausible balance-sheet data as being inconsistent: we dropped any observations stating a negative value of total assets, of net worth, of debt, of sales, of long-term equity investments, of writedowns of equity investments, of cash holdings, or of tangible assets. We found 222 outliers applying Tukey’s (1997) method, based on a boxplot displaying upper extreme values of data set.

Table 1
Sample Formation and Composition and Firm-level Descriptive Statistics

Panel A: Sample formation					
		Companies		Observations	
Balance-sheet data available in every year between 1997 and 2006		6,841		61,569	
ATECO sector "Agriculture, forestry and fishing"		114		1,026	
No equity investments				15,185	
Writedowns higher than the value of long-term equity investments of previous year				874	
Employment data not available				1,340	
Inconsistent data				508	
Outliers				222	
Final sample				42,414	

Panel B: Sample composition and status of companies					
Fiscal Year	Observations	Pretax and prewritedowns income		Writing-down companies (share of total)	
		Positive	Null or negative	All	Positive income
1998	4,119	91.68 %	8.32 %	17.13 %	16.57 %
1999	4,355	92.09 %	7.91 %	17.65 %	16.41 %
2000	4,526	91.23 %	8.77 %	17.78 %	16.42 %
2001	4,794	91.49 %	8.51 %	17.69 %	16.26 %
2002	4,930	89.26 %	10.74 %	16.62 %	14.71 %
2003	4,425	88.07 %	11.93 %	18.34 %	16.06 %
2004	4,910	88.50 %	11.50 %	15.22 %	13.40 %
2005	5,108	86.73 %	13.27 %	14.06 %	11.90 %
2006	5,247	86.99 %	13.01 %	12.19 %	10.54 %
Total	42,414	89.40 %	10.60 %	16.16 %	14.45 %

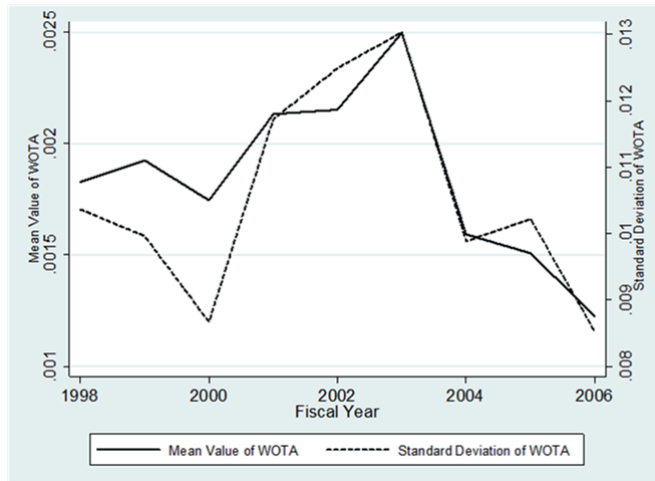
Panel C: Descriptive statistics of some of the main financial numbers, pooled for years 1998–2006 (obs. 43,712)								
	Total assets	Debt	Current assets	Sales revenue	EBIT	Net income	Cash flow from operations	Total Taxes
Mean	81,078	51,550	30,541	62,007	4,158	2,105	3,066	1,362
SD	1,235,630	1,031,680	109,896	582,016	85,447	65,339	36,150	13,710
Min	6	5	0.132	1	-1,242,142	-2,358,790	-334,067	-278,442
Max	180,894,684	176,975,919	13,879,280	59,037,239	7,117,955	5,821,358	6,652,212	1,163,300

Note: Panel A shows the sample formation. Panel B shows the sample composition and the status of companies. The third and the fourth column show for every year the shares of companies having respectively a positive and a null (or negative) value of pretax and prewritedown income. The fifth column shows the share (of total) of writing-down companies, whereas the sixth column shows the share (of total) of writing-down companies having positive pretax and prewritedown income. Panel C presents the descriptive statistics of some of the main financial numbers. All values are in thousands of euros.

of observations recorded a positive value of writedowns of long-term equity investments. The majority of such writedowns were recorded by companies profitable before taxes and writedowns (overall 14.45 % of sample observations displayed a positive value both of writedowns of long-term equity investments and of pretax and prewritedown income). Therefore, the majority of writing-down companies need to minimize taxes in the current year, and can obtain fiscal benefits by recording discretionary writedowns. The share of writing-down companies rose until 2003 and fell strongly thereafter: from

Figure 2

Writedowns of Long-term Equity Investments with Respect to Total Assets of Previous Year



Note: The figure shows the average trend of *WOTA* from 1998 to 2006 and its standard deviation. *WOTA* is the ratio between writedowns of long-term equity investments and previous-year total assets.

2003 to 2006 the total share of writing-down companies fell from 18.34 % to 12.19 % (and those with positive income fell from 16.06 % to 10.54 %). This trend shows that the repeal of writedown deductibility has reduced the number of companies writing down long-term equity investments.

Panel C of table 1 shows descriptive statistics of some of the main financial figures for firms included in our analysis. On average, sales revenues are equal to €62,007 thousand; taxes are equal to €1,362 thousand per year (on average taxes constitute 2.19 % of revenue); the mean value of *EBIT* is equal to €4,158 thousand.

Figure 2 shows the evolution of writedowns of long-term equity investments (*WOTA*) from 1998 to 2006. Note that from 1998 to 2003, *WOTA* tended to rise, increasing from 0.19 % to 0.25 %, with the sole exception of 2000, when it fell slightly. *WOTA*'s peak in 2003 coincided with the reform of the Italian fiscal system, which abolished the deductibility of writedowns of long-term equity investments from 2004 onwards (2003 was the last year in which firms could benefit from the deductibility of such writedowns). From 2004 to 2006 *WOTA* fell steadily, reaching the value of 0.14 % in 2006. This trend is perfectly in keeping with the previous considerations made, and with the

hypothesis that up until 2003 part of the writedowns of long-term equity investments were motivated by tax-planning strategies.

4.4. Summary Statistics

Panel A of table 2 reports summary statistics of all the variables included in the empirical model, pooled for the period 1998–2006. The ratio between writedowns of long-term equity investments and the previous year's total assets ranges between 0 and 36.5%, with a mean value of 0.2%. *MTR* has a mean of 0.213, while *MTR-post* has a mean of 0.105.

Panel B of table 2 shows the correlation among the independent variables. The strongest correlation is between *MTR* and *MTR-post* (−0.878). This negative correlation is easily explained by the structure of these variables: *MTR* is equal to companies' marginal tax rate up to 2003 and it is zero from 2004 on, while *MTR-post* is equal to zero up to 2003, and from 2004 on it measures the marginal tax rate firms would have been faced with after 2003 if the reform repealing writedown deductibility had not been implemented. So it results that the higher is *MTR*, the lower is *MTR-post*. There is a strong correlation between the two proxies for companies' size: *S* and *EMP* (0.469). *S* is also highly correlated with *SPC*, the dummy variable for small private companies (−0.481). There is no significant correlation between the remaining explanatory variables included in the empirical model.

5. Results

In this section we present the findings of the empirical analysis. We model two separate processes: one for the probability of writing down long-term equity investments (estimated through a probit model) and the other for the chosen magnitude of writedowns, conditional on the decision to write down (estimated through a truncated regression). Table 3 reports the results for each of the two processes: columns labeled by (a) provide the marginal effects (calculated at the means of the independent variable) of the probit model; columns (b) provide the estimated coefficients of the truncated regressions.

For the sake of comparison with prior literature, we start our empirical analysis by modeling writedowns as a function of nontax benefits and costs (including both yearly and industry dummies in the empirical model). We therefore estimate regression (1) without inserting the tax variable *MTR* (table 3, column 1).

Several results of the first step of the Cragg analysis (probit estimations) confirm the findings of previous empirical studies. We find that companies' likelihood of managing earnings downward through discretionary writedowns

Table 2
Descriptive Statistics and Correlation Among Variables

Panel A: Descriptive statistics for all variables, pooled for years 1998–2006

	WOTA	MTR	MTR-post	LOSS	EI	DEBT	CASH	TA	ZSC	S	EMP	BATH	SMOOTH	SPC	ETR
Mean	0.002	0.213	0.105	0.103	0.056	0.669	0.057	0.186	1.873	9.925	0.187	-0.010	0.016	0.223	0.620
SD	0.011	0.171	0.150	0.304	0.108	0.196	0.082	0.158	1.201	1.126	0.605	0.034	0.047	0.421	0.279
Min	0	0	0	0	0	0.013	0	0	-3.875	1.609	0.001	-0.998	0	0	0
Max	0.365	0.37	0.33	1	0.995	0.994	0.830	0.999	29.266	17.894	18.412	0	0.927	1	1
Obs.	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	42,414	16,038

Panel B: Correlation among control variables included in the main empirical model

	MTR	MTR-post	LOSS	EI	DEBT	CASH	TA	ZSC	S	EMP	BATH	SMOOTH	SPC
MTR	1												
MTR-post	-0.878	1											
LOSS	-0.273	-0.153	1										
EI	-0.011	0.011	0.009	1									
DEBT	0.021	-0.065	0.072	-0.198	1								
CASH	0.011	0.044	-0.090	-0.069	-0.199	1							
TA	0.013	-0.048	0.056	-0.099	-0.074	-0.045	1						
ZSC	0.059	0.023	-0.145	-0.036	-0.309	0.250	-0.154	1					
S	-0.102	0.104	-0.001	-0.012	0.023	-0.058	-0.048	0.075	1				
EMP	-0.015	0.006	0.018	0.116	-0.074	0.029	-0.052	0.469	-0.008	1			
BATH	0.059	0.048	-0.235	-0.043	0.097	-0.016	-0.015	0.002	0.096	1			
SMOOTH	0.026	-0.013	-0.065	0.087	-0.104	0.070	-0.028	0.077	0.023	0.096	1		
SPC	0.091	-0.093	0.006	0.047	0.063	0.041	-0.067	0.158	-0.481	-0.147	-0.016	1	

Note: Panel A shows the descriptive statistics for all variables pooled for years 1998–2006. *WOTA* is the ratio between writedowns and previous year total assets. *MTR* is the marginal tax rate computed using the Graham–Shevlin methodology up to 2003 and zero otherwise. *MTR-post* is the marginal tax rate firms should have faced with after 2003 if the reform repealing writedown deductibility had not been implemented. *LOSS* is the dummy variable for loss companies. *EI* is equal to the ratio long-term equity investments/total assets. *DEBT* is the debt-to-equity ratio. *CASH* is the share of cash holdings in total assets. *TA* is the share of tangible assets on total assets. *ZSC* is Altman’s Z-score. *S* is the log of sales. *EMP* is the average number of employees (in thousands). *BATH* and *SMOOTH* show unusually low and high pretax and pretax and writedown income, respectively. *SPC* shows small private companies. *ETR* is the ratio between current taxes and taxable income pre writedowns. Panel B presents the cross-correlation among control variables included in the empirical model.

is positively linked to companies' size, to the number of employees, and to both the proxies for big-bath and income-smoothing behavior (column 1(a) of table 3). Moreover, we find that the propensity to decrease accounting income through discretionary writedowns of long-term equity investments is lower the higher are debt and cash holdings. Furthermore, contrary to existing literature (Garrod et al., 2008; Kosi and Valentincic, 2013), we find that the loss dummy is not significant in affecting companies' writedown decision.

As expected, we find a positive and significant correlation between *EI* and companies' decision to write down long-term equity investments: the write-down probability will be higher the higher the ratio of long-term equity investments to total assets is. Contrary to our own expectations, we find that the probability of writing down decreases in the presence of greater tangible assets and that the proxy for small private companies is not significant.

Moreover, we find that the *Z*-score significantly affects the decision to write down: the lower the probability of bankruptcy, the lower companies' likelihood of writing down long-term equity investments. This finding suggests that *Z*-score can be better interpreted as a sign of the impairment of investee companies than as a proxy for financial reporting costs.

For expositional convenience, the table does not report the estimated coefficients for industry and yearly dummies. However, it should be pointed out that only the yearly dummies for the tax years 2004, 2005, and 2006 are highly significant in affecting writedown decisions, and they are negatively signed, suggesting a structural decline in writedown probability following the repeal of the tax deductibility of writedowns.

We can now turn to the second step of Cragg's (1971) approach in order to test the effects of control variables on writedown magnitude (column 1(b) of table 3). By comparing columns 1(a) and 1(b) of table 3, we find strong support for the hypothesis that different costs and benefits may have a differential bearing on the choice of writing down or not and on the choice of the magnitude of the reported impairment. Several control variables significantly affecting writedown probability do not have any significant effect on the magnitude of writedowns. This is the case for debt-to-equity ratio, liquidity, tangible assets, both the proxies for companies' size, and the proxy for the big-bath strategy. On the other side, the dummy variables for loss and for small private companies, which were not significantly linked to writedown probability, significantly affect writedown magnitude. The positive correlation between *LOSS* and the magnitude of writedowns confirms that this variable represents exclusively an impairment effect, since loss-making companies are more likely to write down impaired long-term equity investments, as suggested by Garrod et al. (2008).

5.1. Tax Effects

We then investigate the presence of a fiscal effect influencing writedown behavior, by adding the marginal tax rate, our proxy for the tax-minimization incentive, to the control variables. We are interested in the effects of tax savings resulting from writedown deductibility, as represented by the variable *MTR*.

The estimation results (column 2(a) of table 3) show that the marginal tax rate significantly and positively affects the probability of writedowns, supporting our hypothesis that managers take taxes into account when choosing the timing of the recognition of any long-term equity-investment impairment. We find that the higher the marginal tax saving due to writedowns, the higher companies' propensity to reduce reported income through discretionary writedowns. We also find a correlation, albeit a weaker one, between the *MTR* and the chosen magnitude of writedowns, conditional on the decision to write down (column 2(b) of table 3).

The inclusion of the fiscal variable confirms overall both the signs and the significance of the most of the nontax variables.

Finally, we investigate whether the fiscal incentive to reduce reported income through writedowns of long-term equity investments was affected by the 2004 tax reform, and in particular by the repeal of writedown deductibility. Using both *MTR* and *MTR-post* as controls, we test whether the association between the fiscal variable and writedowns differs from the prereform to the postreform regime, assuming no structural break in the relationship between writedowns and all other remaining explanatory variables.

The results (column 3(a) of table 3) confirm that the reform eliminated the fiscal motivation to manage reported income by altering discretionally the timing of the writedown of long-term equity investments. Companies' likelihood of writing down increased with the firm's marginal tax rate under the prereform regime (when such writedowns could be deducted from the tax base), whereas the marginal tax rate became nonsignificant in the postreform regime (after the repealing of writedown deductibility). On the other hand, by splitting the fiscal variable, we find a strikingly different pattern for the magnitude of writedowns: the marginal tax rate before 2004 is no longer significant in affecting the magnitude of writedowns of long-term equity investments, and continues its nonsignificance during the postreform period (column 3(b) of table 3).

Overall, these results are consistent with our hypothesis that fiscal considerations affect discretionary accounting choices. Moreover, we find that tax minimization has a different bearing on the probability of writing down long-term equity investments, and on the magnitude of those writedowns, conditional on the decision to write down. Taxes have a strongly significant, incremental effect on companies' likelihood of writing down, after controlling for the ef-

fects of other variables (columns 2(a) and 3(a) of table 3). On the other hand, we discover only limited evidence of the direct influence of tax minimization on the magnitude of writedowns, conditional on the decision to write down (column 2(b) of table 3).

5.2. Sensitivity and Robustness Checks

In this subsection, we test the robustness of our empirical results. Our first robustness check consists in estimating our model using the tobit regression, in order to allow a straightforward comparison with previous empirical studies (Riedl, 2004; Kosi and Valentincic, 2013). The empirical results (we report the estimated marginal effects calculated at the means of the independent variables on both the probability and magnitude of writedowns in columns 1(a) and 1(b) of table 4) confirm that fiscal considerations affect discretionary accounting choices in a fiscal regime allowing the possibility to deduct writedowns of long-term equity investments. The MTR is not statistically significant after the 2004 fiscal reform that repealed writedown deductibility. The tobit analysis does not allow us to find a different fiscal effect on the timing of discretionary writedowns of long-term equity investments and on the magnitude of such writedowns, conditional on taking the decision to write down.

We then proceed by estimating the empirical model on several restricted samples. We replicate the empirical analysis for a subsample of firms with positive pretax income prior to any writedowns. By focusing on such companies, evidence can be provided of the fiscal motive for a group of companies that needs to minimize taxes in the current year. The results of the probit analysis (column 2(a) of table 4) show that on limiting the analysis to profitable companies (prior to taxation and writedowns), the magnitude of the fiscal effect on writedown decisions increases in the presence of writedown deductibility: a mean-level unit increase in *MTR* increases writedown probability by about 24.6 % (almost 10 percentage points more than in the full sample). There are no substantial differences among the remaining control variables regarding the signs and significance level obtained by estimating the full sample. With regard to the writedown magnitude (column 2(b) of table 4), we find that if we focus on profitable companies, the marginal tax rate preserves its positive effect on the magnitude of reported income in the prereform period, though the significance is rather weak.

Companies' size could affect writedown behavior significantly. On one side, for smaller companies the choice to implement tax-minimizing strategies should not be affected by agency problems concerning ownership and management. On the other side, as suggested by literature, larger companies are more likely to strategically adjust the book value of their assets. Therefore, we limit the analysis to larger firms, dropping small private companies

Table 3
Determinants of the Writedown Decision

Independent Variables		Expected Signs	1		2		3	
			(a)	(b)	(a)	(b)	(a)	(b)
Fiscal variable	<i>MTR</i>	+			0.143*** (0.040)	2.706* (1.090)	0.153** (0.051)	1.518 (1.094)
	<i>MTR-post</i>	N.S.S.					0.017 (0.053)	-1.367 (0.721)
Nontax factors	<i>LOSS</i>	+	0.005 (0.006)	0.250** (0.084)	0.024** (0.009)	0.655** (0.210)	0.027* (0.013)	0.360 (0.223)
	<i>EI</i>	+	0.451*** (0.017)	2.003*** (0.348)	0.450*** (0.017)	2.264*** (0.478)	0.450*** (0.017)	2.108*** (0.408)
	<i>DEBT</i>	?	-0.136*** (0.012)	-0.103 (0.170)	-0.135*** (0.012)	-0.171 (0.186)	-0.135*** (0.012)	-0.145 (0.171)
	<i>CASH</i>	+	-0.075** (0.026)	-0.745 (0.472)	-0.076** (0.026)	-0.963 (0.553)	-0.076** (0.026)	-0.903 (0.519)
	<i>TA</i>	+	-0.075*** (0.014)	-0.166 (0.239)	-0.074*** (0.014)	-0.127 (0.254)	-0.074*** (0.014)	-0.136 (0.242)
	<i>ZSC</i>	?	-0.030*** (0.004)	-0.035** (0.011)	-0.030*** (0.004)	-0.038** (0.014)	-0.030*** (0.004)	-0.038** (0.012)
	<i>S</i>	+	0.057*** (0.002)	0.050 (0.028)	0.057*** (0.002)	0.066* (0.030)	0.057*** (0.002)	0.063* (0.028)
	<i>EMP</i>	?	0.025*** (0.005)	-0.031 (0.022)	0.026*** (0.005)	-0.037 (0.023)	0.026*** (0.005)	-0.034 (0.022)
	<i>BATH</i>	?	0.245*** (0.065)	-0.347 (0.630)	0.242*** (0.065)	-0.186 (0.680)	0.241*** (0.065)	-0.005 (0.669)
	<i>SMOOTH</i>	+	0.245*** (0.034)	1.509*** (0.284)	0.248*** (0.034)	1.635*** (0.350)	0.249*** (0.034)	1.505*** (0.302)
	<i>SPC</i>	+	0.001 (0.006)	0.280** (0.097)	0.001 (0.006)	0.317** (0.115)	0.001 (0.006)	0.293** (0.103)
Industrial dummies			YES	YES	YES	YES	YES	YES
Yearly dummies			YES	YES	YES	YES	YES	YES
Observations			42,414	6,886	42,414	6,886	42,414	6,886
Pseudo R^2			0.127	0.144	0.127	0.142	0.127	0.144

Note: We estimated the models using Cragg's methodology with industry and yearly dummies. Columns (a) provide the marginal effects (calculated at the means of the independent variables) of the influence of tax and nontax factors on the probability of writing down; columns (b) provide the estimates of the influence of tax and nontax factors on the magnitude of writedowns, once companies have decided to write down. Regressions use as dependent variable *WOTA*, which is the ratio between writedowns of equity investments and previous-year total assets. *MTR* is the marginal tax rate computed using the Graham-Shevlin methodology up to 2003 and zero otherwise. *MTR-post* is the marginal tax rate firms should have been faced with after 2003 if the reform repealing writedown deductibility had not been implemented. *LOSS* is the dummy variable showing loss companies. *EI* is equal to the ratio equity investments/total assets. *DEBT* is the debt-to-equity ratio. *CASH* is the cash holdings as a proportion of total assets. *TA* is the share of tangible assets in total assets. *ZSC* is Altman's Z-score. *S* is the log of sales. *EMP* is the average number of employees (in thousands). *BATH* and *SMOOTH* show unusually low and high pretax and prewritedown income, respectively. *PFC* shows small private companies. All the regressions contain both yearly and industry dummies. In regression 1, we exclude the fiscal variable from the controls; in 2, we add *MTR* to the controls; in 3, we add *MTR-POST* to the controls. Estimated regressions are:

$$(1) \quad WOTA_{it} = \alpha + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it},$$

$$(2) \quad WOTA_{it} = \alpha + \beta_1 MTR_{it} + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it},$$

$$(3) \quad WOTA_{it} = \alpha + \beta_1 MTR_{it} + \beta_2 MTR-post_{it} + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it}.$$

Robust standard errors in parentheses. Superscript asterisks indicate statistical significance at 0.01 (***), 0.05 (**), and 0.10 (*).

from the sample. The results (column 3(a) of table 4) show that on restricting the sample to bigger companies, the effect of *MTR* on writedown probability increases slightly to 16.5 %. The signs and significance level of the remaining control variables are similar to those obtained for the full sample.

The presence of foreign investee companies may affect the decision to write down long-term equity investments, since managers might have greater discretion power in that it is more difficult for shareholders and tax authorities to verify the real impairment of foreign investee companies. Therefore, we test the robustness of our results by excluding from the sample firms having foreign investee companies.¹⁴ The results (column 4(a) of table 4) show that the effect of *MTR* on writedown probability decreases to 12.8 %, and its significance becomes weaker. We have also verified that the results in table 3 are robust to the exclusion of listed companies and companies operating in the financial sector that may have started to adopt IAS/IFRS in 2005.¹⁵

One final issue is whether our results are distorted by the strategic reaction of companies to the announcement of the tax reform. The Italian tax reform that repealed the deductibility of writedown of long-term equity investment was approved in 2003 and implemented in 2004. Managers may have then decided to write down in 2003 despite a low *MTR*, knowing that writedowns will fail to bring about a tax reduction in following years. However, the anticipation effect, if any, would work against the significance of the prereform *MTR* in our regression. To further check the robustness of our results, we estimated the specifications in columns 2 and 3 of table 3 by dropping the observation in years 2003 and 2004 and found similar values and significance levels for the *MTRs'* coefficients. We also estimated equation (1) allowing a different slope for the *MTR* in each year. As to the probability of writedown, the estimated marginal effects are very stable in magnitude and highly statistically significant for all years from 1998 to 2003, while they are not statistically significant in any years from 2004 to 2006. The coefficients of the *MTR* in the truncated regression on the magnitude of writedown, conditional on the decision to write down, are not statistically significant in any year of the sample.¹⁶

Overall, the results of these robustness checks confirm the validity of our hypothesis that fiscal considerations affect companies' choice to write down discretionally the value of long-term equity investments. The positive effect of the *MTR* on companies' choice to write down long-term equity investments discretionally increases if we limit the analysis to profitable companies or to

¹⁴ We can only observe the presence of foreign investee companies in 2006, as the data set contains no information for previous years.

¹⁵ Results are available upon request.

¹⁶ Results are available upon request.

bigger ones, while it decreases if we drop from the sample firms with foreign investee companies.

In order to show that the MTR is the variable best fitted for accounting for the fiscal effect in writedown behavior, we compare our methodological approach with two alternative identification strategies.

Firstly, we employ an alternative proxy for the marginal tax rate, namely the taxable income dummy (*TID*), a variable based on the sign of the current period's taxable income before any writedown of equity investments (Graham, 1996b). It takes a value equal to the top statutory tax rate for those firms with positive pretax income prior to any writedowns, and a value of 0 otherwise. As we did for the MTRs, we split this variable into *TID* and *TID-post* in order to allow for a structural break due to the 2004 Italian tax reforms. The regression results (columns 5 of table 4) show that a simpler measure of the marginal tax rate fails to account for the presence of a fiscal effect affecting the probability and magnitude of writing down long-term equity investments.

Secondly, we consider the approach of Kosi and Valentincic (2013), which relies on operating profits as a proxy for fiscal effect. We include profitability (before writedowns)¹⁷ rather than MTRs among the controls and estimate a tobit model over the two-year period 2003–2004, to see whether the relationship between (i) profitability before writedowns and (ii) writedowns changed following the 2004 tax reforms. We find that profitability before writedowns did not significantly affect writedown behavior either before or after the repeal of writedown deductibility. The marginal effect of operating profit was not statistically significant either in 2003 or in 2004. Moreover, in order to test the robustness of our results, we replicate the estimations for every two-year period from 1998 to 2006. The results remain virtually unchanged: in no one regression, and in no one fiscal year, is profitability (before writedowns) significantly linked to the writedown of long-term equity investments. However, as stressed by Kosi and Valentincic (2013), the results of the direct regression could be biased due to the error-in-variables problem. We therefore follow their suggestion and estimate reverse regressions (Cready et al., 2001; Leuz and Schrand, 2009), using the level of operating profits (before writedowns) as dependent variable and adding the share of writedowns in total assets to the independent variables. Given that *ADJ_OP* is a full-scale dependent variable, the reverse regression can be estimated using OLS. There is still no evidence that the profitability before writedowns is significantly affected by writedowns, either before or after the repeal of writedown deductibility. We

¹⁷ The profitability before writedowns has been computed as the ratio between *EBIT* and total assets of previous year (*ADJ_OP*).

only find a weak significant positive correlation between profitability before writedowns and writedowns, in the two-year period from 2000–2001.¹⁸

Overall, these results confirm that much could be gained from using an accurate proxy for a firm's tax status, such as the MTR, as alternative proxies fail to identify the fiscal incentive in writedown decisions, even within a framework like the one considered in this paper, where the tax benefits of writedowns are sizable.

5.3. Effective Tax Rates and Earnings Informativeness for Future Cash Flows

In the last step of our empirical analysis, we test if the strategic management of financial statements affects companies' effective tax burden and earnings quality.

In order to measure the tax saving stemming from opportunistic reporting of writedowns, we should compute the ratio between actual taxes paid and the income net of the managers' best estimate of the impairment of long-term equity investments.¹⁹ Given that we cannot observe managers' valuations, we have considered several proxies for net income, such as net income before taxes and before writedowns, actual net income before taxes, and *EBIT*. Another relevant issue is the treatment of observations with negative income or tax refunds. Gupta and Newberry (1997) suggest setting *ETR* equal to zero when taxes are negative and equal to one when the taxes are positive and the denominator is negative. Richardson and Lanis (2007) recommend dropping such observations from the sample.

We therefore estimate equation (2) using different definitions of the *ETR* and subsamples. First, we compute *ETR* as the ratio between current taxes and net income before taxes and before writedowns. Following Gupta and Newberry (1997), we proceeded to set *ETR* equal to zero when firms receive tax refunds and equal to 1 when the denominator (net income before taxes and before writedowns of equity investment) is negative. Then we apply the same approach to two alternative proxies of *ETR*, namely the ratio between taxes and actual net income before taxes, and the ratio between taxes and *EBIT*. Finally, we reestimated the first regression by dropping from the sample companies with tax refunds or negative denominator (as suggested by Richardson and Lanis, 2007).

We do not find any significant effect of the 2004 reform in any specifications but the one where the *ETR* is computed as the ratio between current

¹⁸ Results are available upon request.

¹⁹ The literature has long debated on the appropriate definition of the effective tax rate. See Richardson and Lanis (2007) for a survey.

Table 4
Robustness

Independent Variables	Expected Signs	1		2		3		4		5		
		(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	
Fiscal variable	<i>MTR</i>	+	0.134** (0.049)	0.140** (0.051)	0.246** (0.075)	6.494* (3.234)	0.165** (0.050)	2.184 (1.306)	0.128* (0.050)	0.389 (1.308)		
	<i>MTR-post</i>	N.S.S.	0.009 (0.051)	0.010 (0.053)	-0.057 (0.087)	-1.072 (1.589)	0.034 (0.052)	-1.469 (0.867)	0.054 (0.052)	-3.217 (1.958)		
	<i>TID</i>	+									0.074 (0.186)	-0.878 (1.032)
	<i>TID-post</i>	N.S.S.									-0.005 (0.205)	-2.676 (1.410)
Nontax factors	<i>LOSS</i>	+	0.024* (0.011)	0.025* (0.012)			0.028* (0.013)	0.348 (0.238)	0.027 (0.014)	-0.342 (0.383)	0.021 (0.073)	-0.257 (0.393)
	<i>EI</i>	+	0.408*** (0.015)	0.426*** (0.015)	0.458*** (0.018)	2.461*** (0.626)	0.443*** (0.017)	2.244*** (0.488)	0.295*** (0.019)	3.309* (1.319)	0.450*** (0.017)	2.038*** (0.382)
	<i>DEBT</i>	?	-0.130*** (0.012)	-0.136*** (0.012)	-0.140*** (0.013)	-0.085 (0.195)	-0.117*** (0.012)	0.042 (0.181)	-0.092*** (0.012)	0.557 (0.503)	-0.136*** (0.012)	-0.150 (0.170)
	<i>CASH</i>	+	-0.073** (0.025)	-0.076** (0.026)	-0.065* (0.026)	-0.934 (0.599)	-0.063* (0.025)	-0.677 (0.504)	-0.031 (0.025)	0.055 (0.773)	-0.075** (0.026)	-0.840 (0.493)
	<i>TA</i>	+	-0.068*** (0.013)	-0.071*** (0.014)	-0.069*** (0.015)	0.014 (0.307)	-0.063*** (0.014)	0.254 (0.259)	-0.052*** (0.013)	0.577 (0.438)	-0.075*** (0.014)	-0.152 (0.239)
	<i>ZSC</i>	?	-0.029*** (0.003)	-0.030*** (0.004)	-0.029*** (0.004)	-0.034 (0.018)	-0.030*** (0.004)	-0.030* (0.013)	-0.026*** (0.003)	0.046 (0.051)	-0.030*** (0.004)	-0.039*** (0.012)
	<i>S</i>	+	0.055*** (0.002)	0.058*** (0.002)	0.057*** (0.003)	0.112* (0.047)	0.056*** (0.002)	0.062 (0.032)	0.030*** (0.003)	-0.058 (0.058)	0.057*** (0.002)	0.059* (0.028)
	<i>EMP</i>	?	0.005** (0.002)	0.005** (0.002)	0.032*** (0.006)	-0.100* (0.051)	0.029*** (0.005)	-0.037 (0.025)	0.030*** (0.006)	0.003 (0.062)	0.025*** (0.005)	-0.033 (0.021)
	<i>BATH</i>	?	0.229*** (0.062)	0.241*** (0.065)	0.370*** (0.081)	0.768 (1.459)	0.216*** (0.065)	-0.336 (0.795)	0.147* (0.060)	-0.892 (1.985)	0.246*** (0.065)	-0.161 (0.624)
	<i>SMOOTH</i>	+	0.221*** (0.030)	0.231*** (0.031)	0.237*** (0.036)	1.593*** (0.384)	0.245*** (0.034)	1.485*** (0.339)	0.196*** (0.035)	1.840* (0.911)	0.245*** (0.034)	1.471*** (0.285)
	<i>SPC</i>	+	-0.002 (0.005)	-0.002 (0.006)	0.002 (0.006)	0.417** (0.156)	0.003 (0.006)	0.320** (0.124)	0.007 (0.005)	0.081 (0.140)	0.001 (0.006)	0.280** (0.100)
	Industrial dummies		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Yearly dummies		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations		42,414	42,414	38,000	6,172	41,737	6,499	27,142	2,965	42,414	6,886	
Pseudo R ²		0.091	0.091	0.132	0.098	0.117	0.138	0.083	0.115	0.127	0.145	

Note: The model in column 1 has been estimated using the tobit methodology with industry and yearly dummies. Column (a) provides the marginal effects (calculated at the means of the independent variables) of the influence of tax and nontax factors on the probability of writing down; column (b) provides the marginal effects (calculated at the means of the independent variables) of the influence of tax and nontax factors on the magnitude of writedowns once the decision to write down has been taken. The models in columns 2-5 have been estimated using the Cragg's methodology with industry and yearly dummies; column (a) provides the marginal effects (calculated at the means of the independent variables) of the influence of tax and nontax factors on the probability of writing down; column (b) provides the estimates of the influence of tax and nontax factors on the magnitude of writedowns once the decision to write down has been taken. All the regressions use as dependent variable *WOTA*, which is the ratio between writedowns of equity investments and previous-year total assets. *MTR* is the marginal tax rate computed using the Graham-Shevlin methodology up to 2003 and zero otherwise; *MTR-post* is the marginal tax rate firms would have been faced with after 2003 if the reform repealing writedown deductibility had not been implemented. *TID* is the alternative marginal tax rate, equal to the statutory tax rate for companies having positive income before taxes and writedowns, zero otherwise, up to 2003; from 2004 on it assumes the value zero. *TID-post* is the alternative marginal tax rate firms would have been faced with after 2003 if the reform repealing writedown deductibility had not been implemented. *LOSS* is the dummy variable showing loss companies. *EI* is equal to the ratio equity investments/total assets. *DEBT* is the debt-to-equity ratio. *CASH* is the cash holdings as a proportion of total assets. *TA* is the share of tangible assets in total assets. *ZSC* is Altman's Z-score. *S* is the log of sales. *EMP* is the average number of employees (in thousands). *BATH* and *SMOOTH* show respectively unusually low and high pretax and prewritedown income. *SPC* shows small private companies. All the regressions contain both yearly and industry dummies. Regression 2 is limited to companies having positive income before taxes and writedowns; in regression 3, we exclude listed companies from the sample; in regression 4, we exclude firms having equity investments in foreign companies from the sample; in regression 5, we insert as fiscal variable the alternative marginal tax rate *TID*. Estimated regressions are:

- $WOTA_{it} = \alpha + \beta_1 MTR_{it} + \beta_2 MTR-post_{it} + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it}$
- $WOTA_{it} = \alpha + \beta_1 MTR_{it} + \beta_2 MTR-post_{it} + \gamma_1 EI_{it} + \gamma_2 DEBT_{it} + \gamma_3 CASH_{it} + \gamma_4 TA_{it} + \gamma_5 ZSC_{it} + \gamma_6 S_{it} + \gamma_7 EMP_{it} + \gamma_8 BATH_{it} + \gamma_9 SMOOTH_{it} + \gamma_{10} SPC_{it} + \text{dummies} + \epsilon_{it}$
- $WOTA_{it} = \alpha + \beta_1 MTR_{it} + \beta_2 MTR-post_{it} + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it}$
- $WOTA_{it} = \alpha + \beta_1 MTR_{it} + \beta_2 MTR-post_{it} + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it}$
- $WOTA_{it} = \alpha + \beta_1 TID_{it} + \beta_2 TID-post_{it} + \gamma_1 LOSS_{it} + \gamma_2 EI_{it} + \gamma_3 DEBT_{it} + \gamma_4 CASH_{it} + \gamma_5 TA_{it} + \gamma_6 ZSC_{it} + \gamma_7 S_{it} + \gamma_8 EMP_{it} + \gamma_9 BATH_{it} + \gamma_{10} SMOOTH_{it} + \gamma_{11} SPC_{it} + \text{dummies} + \epsilon_{it}$

Robust standard errors in parentheses. Superscript asterisks indicate statistical significance at 0.01 (***), 0.05 (**), and 0.10 (*).

taxes and net income before taxes and before writedowns.²⁰ The comparison between the coefficients estimated in the prereform period and those estimated in the postreform period shows that the relationship between *ETR* and firm-specific characteristics is stable. As in Richardson and Lanis (2007), *ETR* is on average lower for larger and more capital-intensive firms. *ETR* also declines with increasing profitability (before writedowns). Our findings diverge from Richardson and Lanis (2007) with respect to leverage that is positively correlated with *ETR*. This result can be explained by the fact that Italian companies' current taxes include the so-called "Irap" – a value-added tax that does not allow the deduction of interest expenses.

The negative coefficient on the dummy *WDC* shows that companies that recorded at least one writedown of long-term equity investments in the pre-reform period had, on average, a lower *ETR* both in the prereform and in the postreform period. Further, in this case there is a significant difference between the two periods, suggesting that the 2004 reform may have produced an increase in *ETR* for this group of companies.

Given that this evidence is not robust to alternative specifications, we conclude that tax-driven opportunistic reporting of writedowns of long-term equity investments did not significantly alter companies' effective tax burden.

In contrast, the results of the estimation of equation (3) provide evidence that the tax-saving motive has a negative effect on earnings quality. We find a positive and statistically significant value for the coefficient γ_4 , showing that for those companies that had actually used writedowns when deductible, the link between current earnings and future cash flows became stronger, once the deductibility of writedowns of long-term investment was repealed by the 2004 reform. The other coefficients take plausible values. We find a positive and significant value for the coefficient γ_1 , confirming that current earnings are informative for future cash flows. The estimated coefficient γ_2 is not statistically significant, showing that there is no change, in the postreform period, in earnings informativeness of companies that did not write down before 2004. Earnings of companies that had actually used writedowns when deductible are on average less informative on future cash flow, as shown by a negative and significant coefficient γ_3 .²¹

6. Concluding Remarks

This paper investigates if there is a link between tax considerations and companies' opportunistic financial reporting. In particular, we focus on compa-

²⁰ Results are available upon request.

²¹ Results are available upon request.

nies' choice to manage reported income by using discretion in writing down the balance-sheet value of long-term equity investments, and we adopt a new identification strategy based on a proxy of the marginal tax savings accruing from an additional unit of deductible writedown expenses, calculated according to the Shevlin–Graham methodology. This proxy displays considerable cross-sectional and time-series variation, due to the considerable frequency of tax reforms and the nonlinearity of Italian corporate income tax.

We have clearly documented that tax minimization has a different bearing on the probability of writing down, and on the magnitude of writedowns, conditional on the decision to write down. We find that taxes have a strongly significant, incremental effect on the likelihood of a firm writing down long-term equity investments, after controlling for the effects of other variables. On the other hand, we discover only limited evidence of the direct influence of tax minimization on the magnitude of writedowns, conditional on the decision to write down.

Our analysis also provides some insights into the economic implications of tax-driven opportunistic reporting for the public and the private sector. We confirm the findings of previous literature by showing that tax-motivated earnings management, through writedowns of long-term equity investments, may have a negative impact on the private sector in that it reduces the earnings' informativeness for future cash flows, thus limiting the usefulness of financial statements to outside stakeholders. In contrast, we only find weak evidence of an effect on the public sector through a reduction of the effective tax rate.

Overall, our findings suggest that firms postpone discretionary writedowns of long-term equity investments in periods when the marginal tax rate is high. Once the decision to write down has been taken, firms seem to attach a low weight to tax consequences when evaluating the entity of asset impairment. The fact that taxes affect the timing of writedowns but not their magnitude may explain why we have documented a weak effect of taxes on the effective tax burden.

Finally, this paper offers a methodological contribution, in that it shows that much could be gained from using an accurate proxy for a firm's tax status, such as the MTR. We show that alternative approaches adopted by existing studies, such as the identification strategy based on profitability (before writedowns), or a simple proxy of the MTR, fail to identify the fiscal incentive in writedown decisions, even within a framework like the one considered in this paper, where the tax benefits of writedowns are sizable. We therefore provide additional support for the conclusion reached by Graham (1996b), according to which the MTR, although difficult to calculate, is the best available proxy for the actual marginal tax rate.

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