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Corporate Taxation and SMEs: The Italian Experience: The Italian Experience

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CORPORATE TAXATION AND SMEs: THE ITALIAN EXPERIENCE

Marco Manzo

1. Introduction

This paper focuses on the tax impediments faced by small and medium-sized enterprises in Italy. The fact that small businesses are characterized by financing constraints and have less access to bank loans is often emphasized as an argument in favour of a special tax treatment for small enterprises. On the one hand, however, the evidence that SMEs suffer severe financing constraints is not overwhelming; on the other hand, tax relief for SMEs is not necessarily the best response to financial market imperfections.

Tax measures that tend to encourage debt finance with respect to equity or retained earnings may amplify the distortions faced by small enterprises. Debt finance is taxed less than new equity or retained earnings in many OECD countries. In Italy, for instance, interest expenses are deductible from the corporate tax base and are taxed at the personal level at lower rates. This creates a disadvantage for small enterprises that are credit constrained.

Before the 2003-2004 corporate tax reform, Italy had a full imputation system for dividends. However, interest payments were not only fully deductible from the corporate tax base, but were also not subject to the standard personal income tax rate but were taxed at a lower tax rate (12.5% or 27%) instead. Moreover, the double taxation of capital gains (corporate tax rate on retained earnings plus the tax rate on realized capital gains) resulted in a tax burden which exceeded the the tax burden on distributed profits, which in itself was higher than the tax burden on interest payments. Therefore, the tax system in Italy was not neutral with respect to debt, retained earnings and new equity as sources of finance. The Dual Income Tax (DIT) reform of 1997 alleviated some of these distortions.

Our research consists of two parts: in the first part we analyze the impact of the corporate tax on the growth rate of technological progress (TFP); in the second part, we investigate the impact of corporate taxation on investment. The analysis will focus on small and young enterprises.

In Section 2 of this paper, we summarize the new theory of the firm's life-cycle and we focus on the effects of the corporate income tax. We will deduce that, under certain assumptions, the tax code offers mature and large firms a tax-induced competitive advantage compared to young and small firms. This is an important result as Italy has many small and medium-sized enterprises (e.g. micro enterprises represent 95% of the number of total businesses).

We then proceed with the TFP analysis and we evaluate the impact of the corporate income tax on productivity growth of Italian firms. We focus on the period between 1997 and 2004; we restrict our analysis to incorporated firms. In Sections 3 to 5, we develop a model that allows us to estimate the effect of the corporate income tax on TFP growth by taking account of the initial level of productivity and the role played by the technological frontier. Then, we estimate separate corporate tax rate coefficients for small enterprises and for large ones. The same analysis is carried out for young and old firms.

We find that the corporate income tax in Italy is particularly harmful for medium and old firms. This result is in line with the estimation results for 12 OECD European countries. However, our results also show that in Italy, the CIT impact on TFP growth is quite higher than in other EU countries, especially when small enterprises are considered. We also find that the corporate tax rate reductions in Italy between 1997 to 2004 were more favourable to small and young enterprises than to larger and older businesses. Moreover, we claim that the level of profitability may have a strong impact on the effects of tax on TFP growth for both small, medium-sized, young and old firms. In fact, differences in profitability across sectors may be less pronounced for small firms than for large firms as small firms have generally a lower level of profitability.

Sections 6 and 7 deal with the implementation of the Dual Income Tax (DIT) in Italy. The DIT in Italy was quite different from the DIT implemented in the Nordic countries, as it affected only capital income. The statutory corporate income tax rate was levied only on extraordinary profits; the normal return on capital was subject to a reduced tax rate. The normal return on capital was fixed by the government taking into account the average interest rates on bonds as well as a risk premium. This return was typically about 7%. The reduced corporate tax rate was equal to 19% - almost the same rate as the average tax rate on interest payments at the personal level.

Since the DIT reduces the taxes on capital income, it should mitigate the effects of the different tax treatment of debt, retained earnings and newly issued equity. In this way, it would alleviate the tax disadvantages faced by small enterprises. We show that many small and young firms enjoyed tax reliefs due to the DIT reform. In our empirical analysis we find that the DIT reduced the negative impact of the corporate tax on TFP growth, especially for small enterprises.

Tax policy reforms between 2001 and 2004 decreased the statutory corporate tax rate, without differentiating between the various sources of finance and without aiming at tax neutrality. We find that, despite the reduction in tax rates, the partial abolition of the DIT has harmed small-sized enterprises significantly. We therefore conclude that the DIT system is a more TFP growth-oriented policy for small enterprises than an undifferentiated decrease of the statutory corporate tax rate is.

In Section 8 we discuss the effect of the corporate tax on investment by briefly reviewing the user cost theory. In Section 9 we report our estimation results. The long-run user cost elasticity of investment is computed for Italy; we find a result equal to the value reported in the standard empirical literature. We find that the user cost of capital negatively affects the amount of investment which is undertaken by old firms. One possible explanation would be that young and mid-aged firms are less profitable than older firms, and are therefore less affected by the corporate tax adjusted user cost of capital.

When the user cost of capital is tax-adjusted by using the average DIT rate, the long run investment elasticity slumps by almost ten percentage points. As a result, the DIT contributed to reducing the impact of the corporate tax on investment. This effect is common to all firms, even if the user cost of capital remains significant only for medium and old enterprises.

However, the empirical evidence in Italy shows that applying the more rigorous user cost theory does not increase the explanatory power of our econometric tools, both with respect to aggregate investment fluctuations and the response of business investment to changes in tax policy. In fact, the tax-policy variables are often found to have no effects at all on investment, especially when cashflow or output variables are included in the estimation model. The basic accelerator model, which depends only on output, performs just as well as, if not better than, the user cost theory in forecasting the investment-to-capital ratio. These differing points of view inevitably harken back to the accelerationist debate.

Last but not least, the estimation of a dynamic optimization model based on the Euler Equation, such as the one developed by Bond *et al.* (2003), suggests the presence in Italy of financing constraints for small, young and mid-aged firms. This result may strengthen the arguments in favour of a special treatment of small and young enterprises.

In Section 10 we find that tax-policy variables have no significant effect on investment; this result is common within the accelerationist school. However, small and young firms are partly damaged by the corporate tax. This is probably due to the fact that the corporate income tax does not help small and young enterprises to remove some of the disadvantages that they face. The question remains whether the tax system should be used to alleviate the possible lack of access to credit.

Section 11 summarizes the paper's main results.

2. Taxation of Small and Medium-Sized Enterprises: Policy Issues

If we consider the importance of small enterprises in OECD countries, combined with the perceived presence of impediments to their existence and growth, there appears to be a case for government support. However, from a purely economic efficiency point of view, if the basic objective of government policy is to achieve a better allocation of resources by moving closer to a situation with well functioning markets, only those impediments that are clearly expressions of market failures or market malfunctions should be alleviated or neutralized by government initiatives [28]. The case for tax preferences for small and medium enterprises (SMEs) is far from being conclusive.

One approach is simply to assume that all or most of the obstacles confronting small businesses are expression of market imperfections. The other is to choose a neutrality criterion according to which Government intervention, unless market imperfections are clearly identified and means of remedy may be precisely targeted, should be minimized and allocation determined entirely by market forces [28]. As a general principle, the best response to a distortion is to act directly on the distortion itself. Second best considerations mean that this principle is not a formal proposition, but a useful guide for policy given the difficulties and risks in identifying more finely-tuned corrective policies. By taking into account this general principle, this section deals with the main market distortions that are perceived as involving the SMEs and tries to answer at the following question: 'Would there be any reason to tax SMEs any differently from larger enterprises?'[23]

Tax design to overcome perceived market failures in relation to SMEs distinguishes two main cases: first, when implementation is costless; second, when there are implementation costs that include compliance and administration costs. By beginning with the first case, i.e. no implementation costs, it is possible to identify three headings of potential disadvantages of small businesses.

A first argument for special tax treatment of SMEs could be to offset cost disadvantages that small enterprises may face. SMEs are probably not able to realize sufficient economies of scale to operate in world markets. However, the presence among large or international firms of non-increasing marginal costs should direct the tax authority in the opposite direction to that of the special treatment for SMEs. The key economic arguments concerning optimal size of businesses are traditionally founded on the concept of economies of scale. In addition, according to growth theory, the proliferation of new capital-intensive technologies should also favor large size [23].

Another perceived argument for special tax treatment of SMEs could be their particularly important role in employment generation and in developing new ideas. In other words, fiscal policy could exploit the positive externalities created by SMEs and enhance economic growth through R&D and innovation tax allowances, according to the policy implications of the endogenous growth theory. However, the suggestion that SMEs are particularly innovative is not supported by econometric evidence.[1] Economic theory suggests that any relative advantage in innovation is likely to be determined by the degree of market concentration, the extent of barriers to market entry, the structure of the industrial branch in terms of firm's size and the overall importance of innovative activity. Neo-Schumpeterian growth models suggest that firms in the R&D sector should be in an imperfectly competitive market in order to guarantee those profits from innovation (Romer, 1986 [37]).

A third consideration refers to the imperfections in capital markets, which imply financing constraints for small firms. The latter could find difficulty to access debt finance. These difficulties follow from the risk of failures. Banks may be reluctant to lend where there is limited collateral to secure a loan and where investment is not expected to generate revenues for a number of years. Hence, the tax system could implement a reduced rate of corporate income tax on smaller companies, so increasing the internal finance available to them. However, the above-mentioned second best principle suggests that if capital market imperfections are a genuine concern the wisest policy response is generally to act on that imperfection directly [23].

When compliance and administration are costly, compliance is likely to involve significant fixed costs (the costs of registering for the VAT is likely to be largely independent of firm size). Average compliance costs are consequently decreasing; smaller enterprises may thus find paying taxes especially burdensome. In a simple model with non-increasing marginal compliance costs and fixed marginal benefits, i.e. marginal social value of tax revenue (assumed greater than the private marginal one), it is possible to find a unique solution of an optimal VAT threshold [25]. It is not clear, however, why implementation costs should be considered separately from other non-increasing marginal costs. The difficulty to comply with tax regulatory obligations could be connected again to the inability of exploiting economies of scale. Moreover, compliance costs can also produce positive externalities, for example in finding it easier to access finance or insurance.

Therefore, the argument for active tax measures to mitigate market imperfections may be weak. However, measures that tend to amplify the distortions related to SMEs need to be avoided. This paper focuses on the possible taxation impediments of SMEs external financing and growth. Credit is generally more costly for small enterprises to obtain compared to larger ones. Given this, possible tax distortions of equity finance may be particularly problematic to the financing of SMEs [30]. A different tax treatment of debt and equity at the corporate level might result in an excessive use of debt as source of finance. This not only may make companies more prone to insolvency, but, most importantly, discriminates against small companies and start-ups, which often depend more on equity. Because *nominal* interest payments are deductible, the debt-equity distortions increase with inflation.

One approach to analyzing the efficiency implications of the corporate tax is the so-called "new" view of dividend taxation, and, more precisely, the "nucleus" theory of the firm.[2] This framework studies the life cycle of a firm, by analyzing the finance and investment decisions and endogenizing the equity injected into firms in the first period. This model is very stylized, but there are some relevant conclusions that may represent a useful starting point for our research. Two main hypotheses are assumed in this analysis: the first is that capital gains are taxed at lower rates than distributed dividends; the second refers to a limited amount of profitable investment opportunities[3]([7]).

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1 See Pagano and Schivardi, 2003 [33].

2 See Sinn, 1991 [38].

3 More precisely, it is due to the assumption of a concave production function.

According to the nucleus theory, there are at least three phases in the life cycle of the firm. In the first phase, new shares are issued to generate some equity to start with. Then a phase of internal growth follows during which the firm neither issues new shares nor distributes any profits. In the last phase, the firm will stop growing and distribute all its profits. Young and newly founded firms, which have not yet generated retained earnings, will have to issue new equity as a source of finance. Investment financed by young firms must yield a higher return than investment by mature firms, as external sources are assumed to be more expensive than internal sources.[4] Since young firms are largely small enterprises too, *the tax code offers mature and large firms a tax-induced competitive advantage compared to young and small firms*. This is a proposition that we will take into account in the empirical analysis.

This dynamic life-cycle model of the firm can be used to evaluate the efficiency implications of a change in the corporate tax rate. The corporate tax on distributed earnings affects the life-cycle of the firm. The slowing down of capital accumulation becomes less prominent if debt finance is available. However, if the share of the investment that can be financed with newly issued debt is very low the firm takes more time to obtain a substantial amount of retained earnings and requires more time to become mature, to grow and to start distributing dividends. Where access to bank loans is limited, corporate retained earnings may be a critically important source of finance [30]. Small and young firms would need much more retained earnings in order to offset the insufficient availability of the debt as source of finance. A relatively high basic statutory corporate tax rate may be seen as disadvantageous to SMEs and countries may be encouraged to apply a reduced corporate tax rate to SMEs.

3. The Baseline 'Tax and Growth' Model

In this section, we start our analysis by introducing the basic model and describing the dynamic behaviour of the growth rate of the total factor productivity at firm level. We extend the model in order to take into account the effect of corporate taxation on TFP growth, distinguishing between small and large enterprises. Successively, we relax in the basic model the core restriction represented by the so called "long run homogeneity" in order to obtain a more realistic result.

We follow Griffith *et al.* (2006) [15] in understanding how the distribution of productivity evolves over time. They use a formulation which captures convergence, but which also encompasses other observed empirical regularities: persistence in productivity levels at the establishment level over time and heterogeneity in productivity levels across establishments.

Following Griffith *et al.,* we allow for a more flexible specification of the relationship between non-frontier and frontier TFP, based on the form of an Autoregressive Distributed Lag, ARDL(1,1) model. We assume that the technology or Total Factor Productivity (TFP), $\ln A_{i,t}$, depends on its lagged level, an individual specific factor (γ_i) to reflect heterogeneity in innovable capabilities, and the productivity of the technological frontier, lnA_{Ft}. Equation (1) describes our starting point where *i* indexes establishments and *t* time:

$$\ln A_{i,t} = \gamma_i + \alpha_1 \ln A_{i,t-1} + \alpha_2 \ln A_{Fs,t} + \alpha_3 \ln A_{Fs,t-1} + u_{i,t} \quad \textbf{(1)}$$

Rearranging (1) yields a relation based on changes in Total Factor Productivity (TFP):

$$\Delta lnA_{it} = \gamma_i + \beta \Delta lnA_{Ft} - \lambda lnA_{it-1} + \mu lnA_{Ft-1} + u_{it} \quad \textbf{(2)}$$

[4] See Sinn, 1991 [38].

where $\beta = \alpha_2$, $\lambda = (1 - \alpha_1)$ and $\mu = \alpha_2 + \alpha_3$. We also include $u_{it} = T_t + \varepsilon_{it}$, a full set of time dummies, T_t (from 1997 to 2004), to control for common shocks to technology and macroeconomic fluctuations, together with an idiosyncratic error, $\varepsilon_{i,t}$.

If we impose long-run homogeneity ($\frac{\alpha_2 + \alpha_3}{1-\alpha_1} = 1$) the cointegrating relationship between non-frontier and frontier TFP will assume the standard form of the Equilibrium Correction Model (EqCM), such as in Griffith *et al.* In this case we assume that changes in TFP depend on the relationship between the individual firm's productivity and that of the technological frontier to capture convergence. Equation (3) derives the corresponding Equilibrium Correction Model (EqCM) where *i* indexes establishments and *t* time.

$$\Delta \ln A_{i,t} = \gamma_i + \beta \Delta \ln A_{Fs,t} + \lambda \ln \left(\frac{A_{Fs}}{A_i} \right)_{t-1} + T_t + \varepsilon_{i,t} \qquad (3)$$

The EqCM form of the model may be seen as comprising the short-run transitory effect and the long-run relationship, and describes how the long-run solution is achieved via error correction feedback. Convergence towards a firm's steady state equilibrium productivity relative to the frontier will occur gradually, depending on realizations of stochastic productivity shocks and the speed of productivity catch-up (λ). The intuitive interpretation of this specification is that the parameter γ_i captures an establishment's own rate of innovation through its underlying capabilities and the parameter λ captures the speed at which an establishments catches-up with the technological frontier.

It is useful to examine the implications of this empirical framework for the cross-section distribution of productivity within the sector. This clarifies the interpretation of the estimation results and makes clear *how productivity catch-up is consistent with equilibrium productivity dispersion*.

The technological frontier in sector *j* advances at a rate determined by innovative capabilities γ_{Fj} and a stochastic error u_{Fjt} $(T_{Fjt} + \varepsilon_{Fjt})$:

$$\Delta lnA_{Fjt} = \gamma_{Fj} + u_{Fjt} \qquad (4)$$

Combining the expression for the frontier above with the equation for TFP growth in a non-frontier firm *i* in equation (3), yields an expression for the evolution of productivity in firm *i* relative to the sector *j* frontier:

$$\Delta ln(A_{it}/A_{Fjt}) = (\gamma_i - \gamma_{Fj}) + \lambda ln\left(\frac{A_{Fjt-1}}{A_{it-1}}\right) + (u_{it} - u_{Fjt}) \qquad (5)$$

Taking expression in equation (5) prior to realization of the stochastic shock to technology, the error terms are equal to zero and the steady-state equilibrium level of technology relative to the frontier is:

$$Eln\left(\frac{\bar{A_i}}{A_{Fj}}\right) = \frac{(\gamma_i - \gamma_{Fj})}{\lambda} \qquad (6)$$

Intuitively, there is productivity dispersion within the sector because firms differ in their underlying potential to innovate ($\gamma_i \neq \gamma_{Fj}$) and it takes time to converge toward the constantly advancing frontier. It is worth noticing that the main difference between equation (2) and (3) concerns the convergence parameters, as we assume that the steady state equilibrium condition does not hold.

We extend Griffith *et al.*'s model by incorporating a variable that captures the role of the corporate income taxation (CIT). Therefore we include the statutory corporate tax rate in Italy for each year. As the effect of corporate tax rate is different across sectors, we interact the statutory tax rate with the relative profitability of the sector, to which the establishment belongs. In other words, it is reasonable to assume that the productivity of firms in sectors with higher profitability should be affected more strongly by corporate taxes than that of firms in low-profitability industries. The interaction term should synthesize this different role played by the corporate taxation [31]. The baseline model can thereby be rewritten as in the following equation:

$$\Delta lnA_{it} = \gamma_i + \beta\Delta lnA_{Ft} + \lambda lnA_{it-1} + \mu lnA_{Ft-1} + \rho CIT_t + u_{it} \quad \textbf{(7)}$$

We will refer from now on to this model as the baseline *tax and growth* model. In the next sections, we will enrich the model in different ways, by explicitly incorporating different interaction terms for the heterogeneity in the effects of the corporate taxes across young and old, and small and large firms. For simplicity we will omit the expression $relprof_{s,t}$, relative profitability, in the interaction terms.

4. Data and Measurement Issues

Before proceeding to discuss our baseline empirical results, it is useful to examine the data and give details about the measurement of the dependent and explanatory variables. The main results refer to a sample of firms extracted from the Amadeus (Bureau van Dijk) database for Italy over the time period 1997-2004. Except for 1997 and 2004, there are more than 5000 observations for each year and 8253 firms in the sample; the total number of observations is equal to $N = 42194$. Table 1 summarizes the empirical observations that are drawn from our sample.

Table 1: Number of Observations by Year

year	N	Empl<30	Empl<50	49<Empl<250
1997	889	312	573	287
1998	5880	2701	4399	1366
1999	6145	2736	4591	1431
2000	6347	2684	4681	1543
2001	6503	2219	4750	1648
2002	6625	1945	4720	1783
2003	5750	1514	3948	1684
2004	4055	1221	2581	1347

The data have been cleaned for outliers and obvious keypunch errors. Observations with negative values for any variable entering the production function (value-added, wages, capital stock, material inputs) or with depreciation above net capital stock were eliminated from the sample. Firms that report extreme year-to-year variation in ratios between production function variables and extreme reversals in one of the production function variables were not retained. Finally, outliers have been removed by eliminating the top and bottom percentile of productivity estimates and subsequently re-estimating productivity without these extreme observations.

The analysis is restricted to firms in the manufacturing and services sectors (Nace 15-93). The sectors recycling (Nace 37), refuse disposal (Nace 90) and utilities (Nace 40, 41) are excluded due to a high share of public ownership. Real estate (Nace 70) and holding companies (Nace 7415) are excluded due to different reporting standard in these sectors, as are public administration (Nace 75), education (Nace 80), health (Nace 85) and activities of membership organization due to the non-profit character of these activities. Finally, financial services companies (Nace 65-67) are not part of the Amadeus dataset.

Total Factor Productivity (TFP) is calculated as the residual from the estimation of a logarithmic Cobb-Douglas production function, where the input factors are labor and capital stock, using OLS estimation. Labor inputs are measured using total wage, while net capital stocks are used to account for capital inputs. Nominal values are deflated using sector-specific price indices from the EUKLEMS database[5], with the exception of capital stocks that have been deflated using deflators for gross fixed capital formation from the OECD Economic Outlook database.

Profitability of industries is defined as the share of profits in value-added and is calculated from the 1997 Input-Output matrix for the United States (Bureau of Economic Analysis, 1997). The profitability ratio of a given industry has been expressed relative to the profitability of the median industry; the relative profitability in the United States is applied to Italy, so avoiding the potential endogeneity between profitability and taxes, given that firm-level profitability is expected to be influenced by the statutory corporate tax rate.

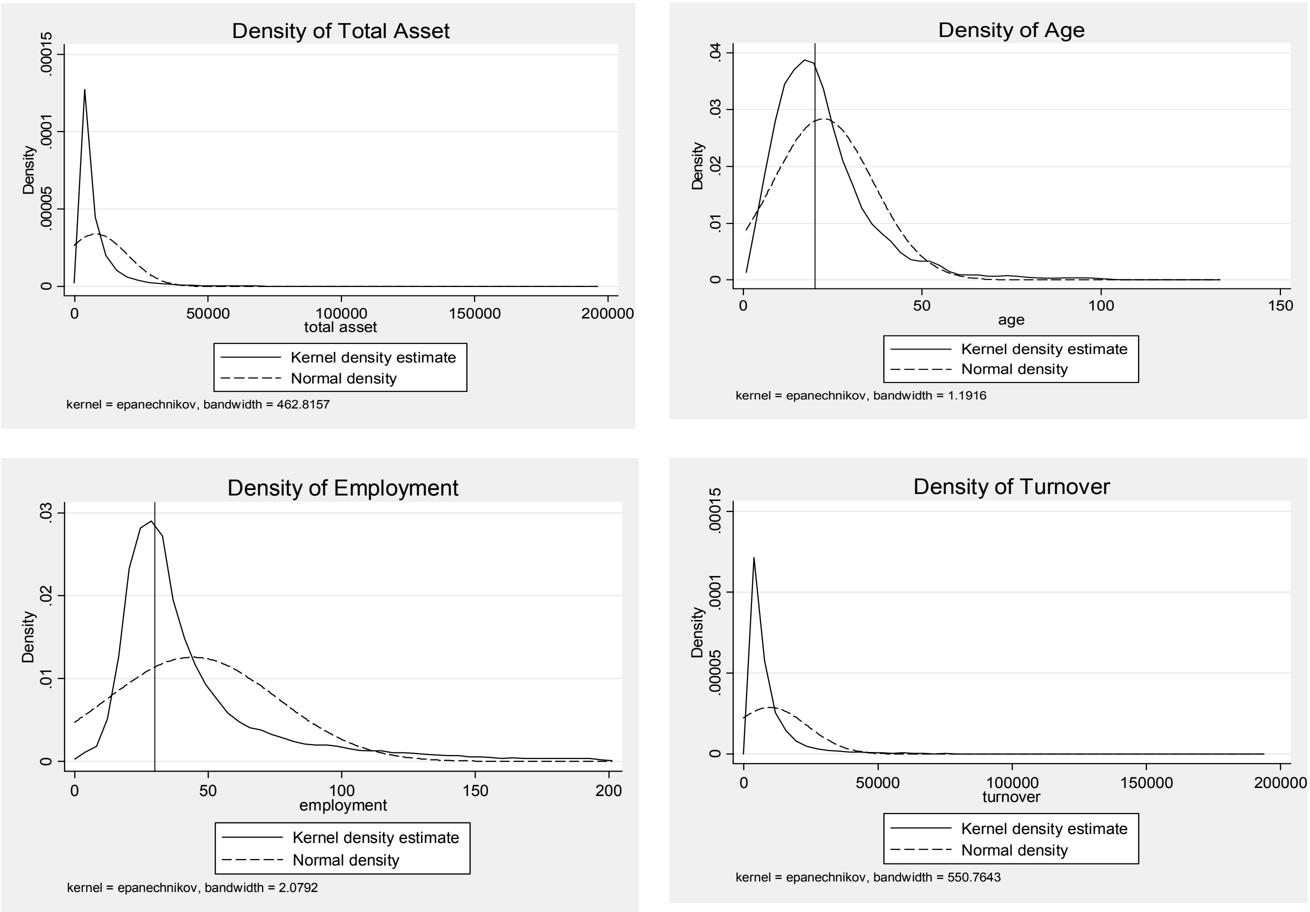
The TFP level at the technological frontier is measured as average TFP of the 5% most productive firms, by including in the sample the multinational enterprises; multinational companies are dropped only in order to estimate the model. Finally, the estimation is restricted to incorporated firms because only these firms are subject to corporate taxes.

There are various criteria of size that might be used to define an SME (turnover, number of employees, capital base, profits, extent of imports and exports). For the purpose of this paper, however, a definition based on employees is used. The World Bank and the European Commission, for instance, define as Micro the firms with ten or fewer employees; as Small firms between 10 and 50 employees; as Medium firms with more than 250 or 300 employees [8]. In our sample, following this definition, we have 1.3% micro firms, 72.5% small and micro firms, 98% micro, small and medium firms. The maximum of number of employees is 3346. Table 1 indicates the number of observations for each type of firm.

Figure 1 shows the density of the main characteristics of the firms in our sample. It is possible to observe that they are concentrated around small values of total assets and turnover. Moreover, we draw a line in correspondence to employment equal to 30 and the age of the firms' life equal to 20: these two thresholds will be explicitly considered in the following sections.

5 EU KLEMS project aims to create a database on measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level for all European Union member states from 1970 onwards. The balance in academic, statistical and policy input in this project is realised by the participation of 14 organisations from across the EU, representing a mix of academic institutions and national economic policy research institutes and with the support from various statistical offices and the OECD. This project is funded by the European Commission, Research Directorate General as part of the 6th Framework Programme, Priority 8, "Policy Support and Anticipating Scientific and Technological Needs".

Figure 1: Kernel Density of Total Asset, Age, Size and Turnover



5. Estimation Results

Table 2 shows the statutory corporate tax rate in Italy from 1997 to 2004. In the first Column we have the tax rate set by the central government, while in the second column is the tax rate of the regional administration (named Irap tax). In the last Column there is the overall statutory corporate tax rate.

Table 2: Statutory Tax Rate in Italy

year	Corporate Tax Rate	Irap Rate	Overall Statutory Tax Rate
1997	53.2% (37%+16.2%)		53.20%
1998	37%	4.25%	41.25%
1999	37%	4.25%	41.25%
2000	37%	4.25%	41.25%
2001	36%	4.25%	40.25%
2002	36%	4.25%	40.25%
2003	34%	4.25%	38.25%
2004	33%	4.25%	37.25%

i) Irap is the local tax on corporate earnings, interest payments and labor cost (It is the acronym of “Imposta sul Reddito delle Attività Produttive”).

The estimation results of equation (3) are reported in Table 3. Columns (1)-(3) show the estimated coefficient for Italy. Columns (4)-(6) refer to the estimates of 12 European OECD countries (Austria, Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden and UK) and to estimation results reported in OECD (2008) [31]. The sample of firms is extracted from the Amadeus database as well. The data have been cleaned in the same procedure that has been performed for Italy.

In all regressions the estimated coefficients on frontier TFP growth and on the TFP gap have the expected signs and are significant at the 1% confidence level. However, in Italy firms' productivity dispersion seems much more explained by the unobserved effects as the productivity catch-up is faster than in EU countries. In fact, the estimated coefficient related to the leader's TFP growth is quite high compared to the values reported in regressions for EU countries.

By comparing Column (1) and Column (4), the estimated coefficient for the interaction between relative profitability and the statutory corporate tax (CIT) is slightly higher in Italy than in the 12 European OECD countries. Corporate taxation interacted with profitability reduces productivity by 0.32. This value implies that in the long run (*i.e at the steady state*) the effect of a reduction in corporate tax rate by 5 percentage points (for instance, from 0.35 to 0.3) would impact the annual TFP growth rate by 0.96 percentage point higher for firms in the sector with median profitability than in the sector with the lowest level of profitability. By contrast, this effect is equal to 0.68 when the European countries are considered. In Italy, profitable firms are significantly affected by corporate taxation.

Column (2) and (5) show the results when the interaction between relative profitability and corporate tax rate is split into a coefficient for firms with less than 30 employees and one for the remaining firms. The estimated coefficient for small firms is always closer to zero than for medium-sized and large firms. However, in Italy the highest effect of CIT on TFP growth is much more related to firms with less than 30 employees rather than to the remaining ones. In fact, while the value of the estimated coefficient for the firms with more than 30 employees in Italy is almost equal to that exhibited by the European countries, the estimated coefficient for smallest firms increases by 0.05 (from 0.24 to 0.29).

The comparison between Column (3) and (6) allows for heterogeneity in the effect of corporate taxes across size-age categories. In Column (3) only firms with more than 30 employees and more than 6 years of life are significantly and negatively affected by corporate taxation. This is more likely to occur because of the high standard deviation (probably, in its turn, due to the small number of the firms with less than six years of life in the sample and to the presence of outliers). However, the estimated coefficient for small and young firms in Italy, even if not significant, is much higher than in the case of the regression for the European countries.

Our findings, restricted for Italy, confirm the estimation results provided for European OECD countries: the largest and oldest firms are particularly and significantly affected by corporate taxation. However, in Italy the corporate tax effect is generally higher than in OECD countries, especially for small and young firms (see [31]).

Table 3: Corporate Taxes and TFP Growth – Fixed Effect – Catch-up Model

Dependent Variable: TFP Growth						
	Italy (1)	Italy (2)	Italy (3)	All countries (4)	All countries (5)	All countries (6)
Leader TFP Growth	0.295	0.294	0.294	0.173	0.173	0.173
	[8.20]***	[11.25]***	[11.91]***	[9.29]***	[9.27]***	[9.23]***
TFP Relative to Leader (lag)	- 0.278	- 0.281	- 0.282	- 0.19	- 0.19	- 0.19
	[16.29]***	[20.77]***	[21.07]***	[12.32]***	[12.28]***	[12.30]***
CIT	-0.322			-0.307		
	[-2.17]**			[-2.40]**		
CIT (Empl<30)		-0.291			-0.238	
		[-1.46]			[-1.86]*	
CIT (Empl>=30)		-0.338			-0.336	
		[-2.15]**			[-2.55]**	
CIT (Empl<30 & Age<6)			-0.436			-0.145
			[-1.44]			[-0.82]
CIT (Empl>=30 & Age<6)			-0.361			-0.275
			[-1.50]			[-2.12]**
CIT (Empl<30 & Age>=6)			-0.286			-0.285
			[-1.48]			[-2.25]**
CIT (Empl>=30 & Age>=6)			-0.33			-0.357
			[-2.10]**			[-2.66]***
_cons	-0.115	-0.054	-0.055	0.006	-0.042	-0.109
	[-2.54]**	[-0.78]	[-0.79]	[0.08]	[-0.64]	[-1.19]
Fixed Effects:						
Year (Country-Year)	√	√	√	√	√	√
Sector	√			√		
Size-Sector		√			√	
Size-Age-Sector			√	√		√
R-squared	0.151	0.151	0.151	0.102	0.103	0.105
N	42194	42194	42194	2.88E+05	2.88E+05	2.88E+05

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with FE iv) Countries in regression (4)-(6) are the following: Austria, Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden and UK.

The previous results rely on the catch-up model, such as that developed by Griffith *et al* (2006). However, the long run homogeneity assumption between frontier and non-frontier firms is far from settled. In Table 4 we report the estimation results for the model described in equation (7), when the TFP gap relative to the leader is split in two coefficients. We also report the F-test to evaluate the null hypothesis of a long run homogeneity. As it can be easily observed in Column (1) and Column (4), this assumption cannot be accepted. We should allow for heterogeneity in the rest of the paper.

Table 4 shows that, once heterogeneity is controlled for, the coefficients estimated through a fixed effect approach become no longer significant. We need to consider a more appropriate technique to estimate regression (7) without reducing the corporate tax significance.

Table 4: Corporate Taxes and TFP Growth – Fixed Effect

Dependent Variable: TFP Growth						
	Italy (1)	Italy (2)	Italy (3)	All countries (4)	All countries (5)	All countries (6)
Leader TFP Growth	0.166	0.168	0.166	0.086	0.086	0.084
	[4.02]***	[4.08]***	[4.01]***	[5.07]***	[5.08]***	[4.92]***
a) TFP (lag)	-0.301	-0.302	-0.302	-0.261	-0.262	-0.262
	[-26.24]***	[-26.62]***	[-26.65]***	[-13.77]***	[-13.81]***	[-13.81]***
b) Leader TFP (lag)	0.053	0.056	0.053	0.033	0.032	0.031
	[2.28]**	[2.48]**	[2.32]**	[2.55]**	[2.67]***	[2.57]**
CIT	-0.164			-0.121		
	[-0.97]			[-2.14]**		
CIT (Empl<30)		-0.113			-0.105	
		[-0.67]			[-1.00]	
CIT (Empl>=30)		-0.216			-0.121	
		[-1.27]			[-2.39]**	
CIT (Empl<30 & Age<6)			-0.293			0.068
			[-0.90]			[0.45]
CIT (Empl>=30 & Age<6)			-0.251			-0.078
			[-0.78]			[-1.19]
CIT (Empl<30 & Age>=6)			-0.12			-0.083
			[-0.72]			[-1.39]
CIT (Empl>=30 & Age>=6)			-0.218			-0.171
			[-1.29]			[-3.08]***
_cons	0.036	0.004	0.113	0.008	0.01	-0.102
	[0.40]	[0.04]	[0.65]	[0.23]	[0.37]	[-1.30]
Fixed Effects:						
Year (Country-Year)	√	√	√	√	√	√
Sector	√			√		
Size-Sector		√			√	
Size-Age-Sector			√	√		√
R-squared	0.154	0.156	0.158	0.135	0.135	0.137
N	42194	42194	42194	2.88E+05	2.88E+05	2.88E+05
F Test (a=-b)	0			0		

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with FE iv) Countries in regression 4-6 are the following: Austria, Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden and UK.

System GMM Estimation

A test of strict exogeneity induce us not to implement the within group estimator. We estimate the model with the GMM technique and we instrument relative TFP correcting for the inconsistency by using the lagged dependent variable dated t-2 as instrument. The GMM estimator is the one developed by Arellano and Bond (1998) [42].

Table 5 reports four regressions in which we consider the overall statutory rate. The estimated coefficients on the frontier TFP growth and on the lagged TFP have the expected signs and are significant at 1%. The interaction between relative profitability and the statutory corporate tax is negative and significant at 1%.

At the end of Column (1) it is possible to observe that a Wald test induces us to refuse the long run homogeneity assumption $(\lambda = \mu)$. In light of this, we avoid estimating the standard EqCM throughout our analysis. We obtain an average μ equal to 0.15. The coefficient β is equal to 0.19, in line with standard results as well. The estimated value of λ remains too high. This is probably due to the instrumenting. However, Griffith *et al*. found an estimated value equal to 0.4, which was very high as well. It suggests that, in Italy, productivity convergence among firms is very fast and that the TFP growth dispersion is much more explained by firms' unobservable effects.

For simplicity, we refer to small firms as firms with less than 30 employees, and medium for the rest. This definition includes micro firms and a share of small enterprises, equal to 40 per cent of the sample in the first term and 60 per cent of the firms in the second term. In doing that, we follow the similar procedure used by Rajan and Zingales (1998) [35]. While these authors test whether the effect of financial openness on growth differs across sectors with different degrees of financial dependence, the test here is whether the effects of corporate taxes differ across firms in industries with different degrees of profitability and different sizes [31]. Results in Column (2) show that corporate tax creates distortion and disadvantages for medium firms with more than 30 employees. The different impact is significant at 5% confidence level. We report the p-value of the Wald test at the end of each regression.

In the third regression difference between young and old firms is not significant. We define *young* the firms with less than six years of life, *old* the others. In the last estimation we split the interaction term in four ways. In such a way we can distinguish between small and medium, young and old firms. Large and old firms appear more negatively affected by the corporate tax rate.

There are two possible explanations for the reduced effect on small and young firms. First, differences in profitability across sectors may be less pronounced for small firms than for large firms if small firms have a generally low level of profitability. Secondly, small and young firms may enjoy exemptions from the corporate tax rate or reduced rates in some countries. Figure 2 seems to confirm that high profitability is much more related to medium firms than small ones; Moreover, Figure 3 shows the presence of outliers in TFP growth when the relative profitability is high (higher than 50^{th} percentile, in our case). However, at this stage of the analysis we cannot assess that, generally, small and young firms significantly enjoy exemptions of various nature.

Table 5: Corporate Taxes and TFP Growth –System GMM-

Dependent Variable: TFP Growth				
	(1)	(2)	(3)	(4)
Leader TFP Growth	0.193	0.193	0.193	0.193
	[9.55]***	[9.56]***	[9.55]***	[9.56]***
i) TFP (lag)	-0.619	-0.62	-0.619	-0.621
	[-39.49]***	[-39.60]***	[-39.51]***	[-39.62]***
l) Leader TFP (lag)	0.154	0.154	0.154	0.154
	[5.99]***	[5.98]***	[5.99]***	[5.98]***
CIT	-0.472			
	[-2.32]**			
a) CIT (Empl<30)		-0.453		
		[-2.23]**		
b) CIT (Empl>=30)		-0.478		
		[-2.35]**		
c) CIT (Age<6)			-0.443	
			[-2.18]**	
d) CIT (Age>=6)			-0.472	
			[-2.33]**	
e) CIT (Empl<30 & Age<6)				0.425
				[-2.08]**
f) CIT (Empl>=30 & Age<6)				-0.45
				[-2.21]**
g) CIT (Empl<30 & Age>=6)				-0.453
				[-2.23]**
h) CIT (Empl>=30 & Age>=6)				-0.479
				[-2.35]**
Fixed Effects:				
Firms	√	√	√	√
Year	√	√	√	√
Age*Sector	√	√	√	√
Model chi-square	2517.988	2526.82	2520.529	2529.715
N	32907	32907	32907	32907
Hansen J	0.151	0.147	0.149	0.145
Wald Test	(i/-l) 0	(a/b) 0.0123	(c/d) 0.1404	(e/f) 0.3763
				(e/g) 0.2412
				(e/h) 0.0281
				(f/g) 0.9154
				(f/h) 0.263
				(g/h) 0.0163

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Arellano and Bond iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected

Figure 2: Profitability and Size

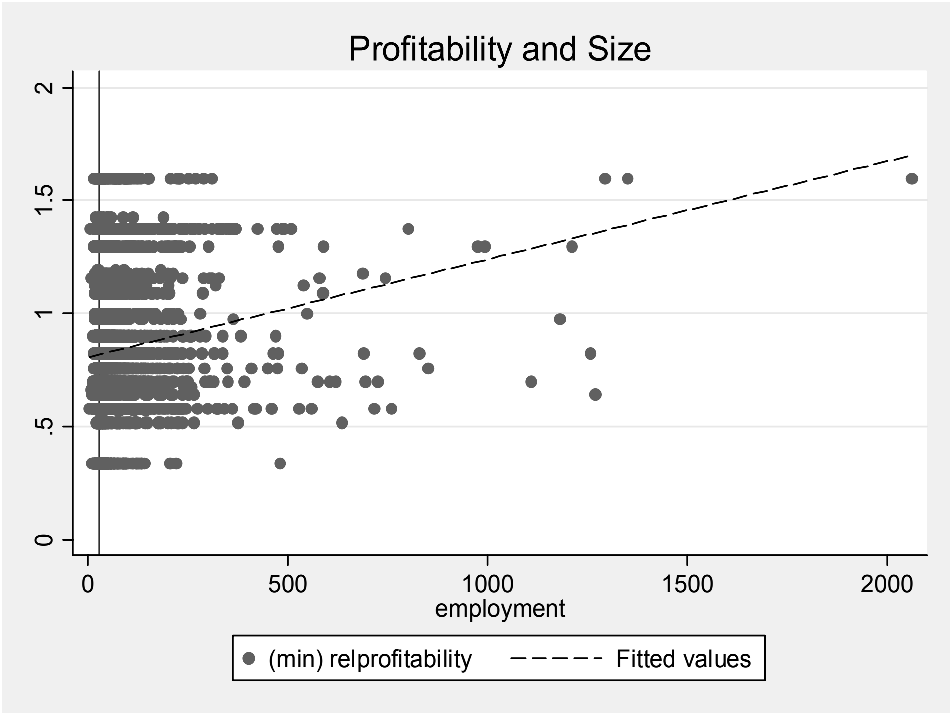


Figure 3: Box Plot: TFP Growth and Relative Profitability

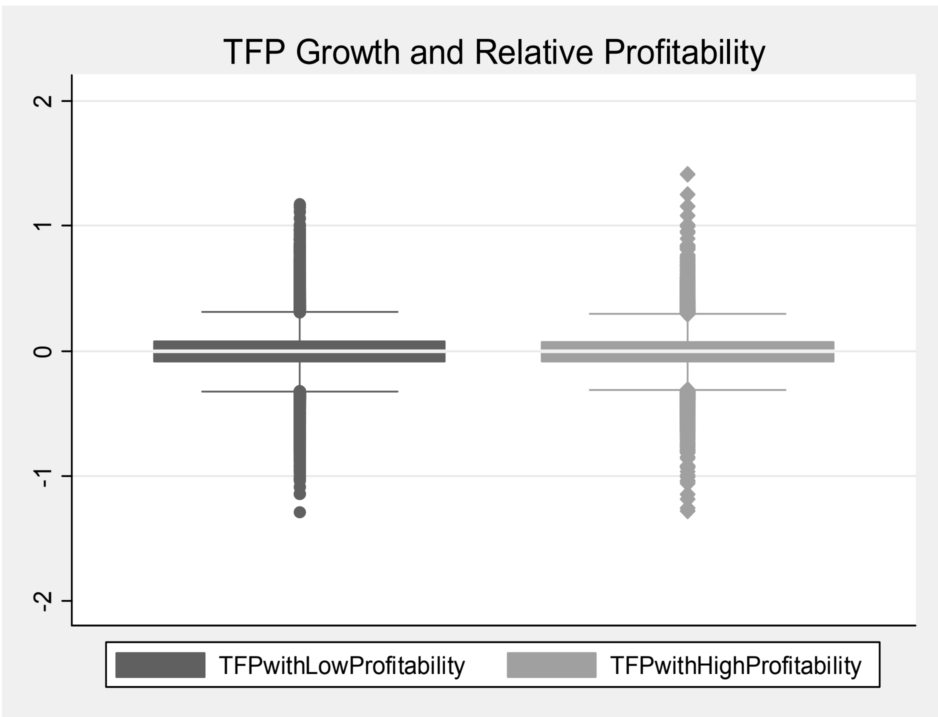


Table 6 shows the estimation results of the model described in the equation (7) when the CIT refers to the growth rate of the statutory tax rate. In such a way, we consider the interaction term between the growth of the corporate income tax rate and the relative profitability for each sector. The CIT growth is much related to corporate tax reforms during the period considered in the sample. In Italy, as it can be observed in Table 2, many changes occurred in tax rates during the period between 1997 and 2004. In such a way, we mainly focus on the effects of tax reforms.

In the first regression, by considering the sector with the median profitability, an increase by 1 per cent in the corporate tax rate implies a reduction by 0.23 per cent of the TFP. The second regression repeats the same estimation by including the dummy variables for each sector, interacted with the firms' age for removing collinearity.

Regression (3) distinguishes between small and medium enterprises. Our results show that, in Italy, changes in tax rates affect small enterprises more than medium ones, even if the Chi-squared test does not confirm that the estimated coefficients are significantly different. Regressions (4) allows for heterogeneity in the effect of corporate taxes across young and old firms. The results show that the estimated coefficient for old firms is closer to zero than the ones for the remaining firms and the difference is tested significant at 5 per cent. In Column (5), as previously performed, we split the interaction term in four ways allowing for small and medium, young and old firms. Small and young firms are particularly affected by corporate taxation

In Column (6) we distinguish firms'age by dividing the sample in two. It corresponds to classifying firms by distinguishing among those with less than twenty years of life and those above this threshold age. In such a way, we are more generally concerned about firms' age, without precisely emphazing the corporate tax impact on start-ups or venture capitals. Consequently, estimated coefficients should be differently interpretated. Medium and old firms are less affected by the tax rate changes rather than the others; by contrast, small and mid-aged firms were particularly and positively concerned by decreases in corporate tax rate. Tax reforms during the years between 1997 and 2004 were convincing.

Robustness tests suggest that these results are confirmed even if we exclusively focus on the corporate tax rate without regarding to the profitability. We also control by using the Italian relative profitability for each sector. This device conduces to overestimate the coefficients because of simultaneity bias between TFP and profitability, even we use lagged variables as instruments. Notwithstanding, the results are qualitatively similar to the previous ones, even though the corporate taxation remains significant only considering young and small firms. Moreover, the correlation between U.S relative profitability and Italian relative profitability is positive and tested significant at 1 percent. Therefore, we can use U.S relative profitability without loss of generality.

To sum up, our results show that in Italy, while the level of the statutory tax rate harms sensitively medium and old firms, changes in corporate tax rates affected particularly small and mid-aged firms from 1997 to 2004. This result is also robust to profitability effects.

Table 6: Corporate Tax Rate Changes and TFP Growth

Dependent Variable: TFP Growth						
	(1)	(2)	(3)	(4)	(5)	(6)
Leader TFP Growth	0.194	0.184	0.184	0.184	0.184	0.184
	[8.93]***	[7.66]***	[7.68]***	[7.65]***	[7.68]***	[7.66]***
TFP (lag)	-0.603	-0.608	-0.609	-0.608	-0.609	-0.608
	[-31.41]***	[-31.98]***	[-32.02]***	[-31.98]***	[-32.00]***	[-32.00]***
Leader TFP (lag)	0.136	0.12	0.12	0.119	0.121	0.119
	[4.74]***	[3.45]***	[3.47]***	[3.45]***	[3.49]***	[3.43]***
CIT Growth	-0.229	-0.233				
	[-2.48]**	[-2.51]**				
a -CIT Growth (Empl<30)			-0.304			
			[-2.87]***			
b - CIT Growth (Empl>=30)			-0.207			
			[-2.20]**			
c - CIT Growth (Age<6)				-0.287		
				[-1.89]*		
d - CIT Growth (Age>=6)				-0.232		
				[-2.49]**		
e - CIT Growth (Empl<30 & Age<6/20)					-0.567	-0.398
					[-3.24]***	[-3.50]***
f - CIT Growth (Empl>=30 & Age<6/20)					-0.046	-0.233
					[-0.22]	[-2.21]**
g - CIT Growth (Empl<30 & Age>=6/20)					-0.283	-0.158
					[-2.62]***	[-1.25]
h - CIT Growth (Empl>=30 & Age>=6/20)					-0.209	-0.188
					[-2.23]**	[-1.97]**
Fixed Effects:						
Firms	√	√	√	√	√	√
Year	√	√	√	√	√	√
Age*Sector		√	√	√	√	√
Model chi-square	1552.8	1793.348	1796.421	1797.699	1803.868	1804.632
N	24636	24636	24636	24636	24636	24636
Hansen J	0.631	0.744	0.759	0.745	0.748	0.753
Wald Test			(a/b) 0.1225	(c/d) 0.0477	(e/f) 0.0338	(e/f) 0.0508
					(e/g) 0.0886	(e/g) 0.0282
					(e/h) 0.0267	(e/h) 0.0098
					(f/g) 0.2241	(f/g) 0.4568
					(f/h) 0.3911	(f/h) 0.5113
					(g/h) 0.2589	(g/h) 0.7565

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Arellano-Bond; iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected

6. The Dual Income Tax (DIT) in Italy

Up to now, we considered the statutory corporate tax rate only cursorily. Nevertheless, different corporate tax reforms occurred in Italy from 1996 to 2004. Until 2003 a full imputation system for dividends was in vigour in Italy. However, tax integration among the different sources of finance was imperfect as interest payments were subject to low tax rates at the personal level, equal to 12.5% or 27%. Furthermore, retained earnings were not only subject to a high corporate tax rate, but also to a tax rate on realized capital gains. Therefore, the tax system favoured debt finance over newly issued equity or retained earnings.

An important reform of corporate taxation was provided by the government in 1996 and was implemented in 1997.[6] This reform was inspired by the Nordic Dual Income Tax. The Dual Income Tax, DIT, in the Nordic form, consists of a standard corporate income tax system based on a flat tax rate, which is the same tax rate levied on net personal income. Then, a second tax rate is levied on the additional personal income as a means of surtax for accommodating progressivity goals. By contrast, the Italian specification of the DIT concerns exclusively corporate income and the duality refers not to the distinction between personal and corporate income, but to the different returns on capital.

More precisely, the Legislative Decree (DLgs) 466/1997 distinguished between normal returns on capital and extraordinary returns such as rents, mark-ups or extra-profits. The DIT provided tax relief for the normal return element of capital income. In fact, the tax rate on corporate firms was reduced from 37% to 19% on the normal return, while the extraordinary profits were still subject to the standard tax rate. The normal return was computed by the Ministry of Economics as equal to the average return of government and corporate bonds plus a 3% risk premium. Corporate firms applied this coefficient (equal to 7%[7]) on the increase of capital stock in order to find the corporate income subject to the reduced tax rate. The reduced tax rate was further decreased by 7% on the firms that would have been listed in the stock market.[8] However, a minimum tax rate equal to 27% on the corporate income, and 20% for listed firms, was established by the government. In such a way, given the taxable base, the maximum share of the capital income subject to the reduced rate was equal to 55.56%.

In Italy interest payments are deductible from the corporate tax base[9] and are subject to low personal tax rates. The purpose of the DIT on corporate firms was to reduce the disadvantage of equity finance and retained earnings in comparison to debt finance. The reduced tax rate was established at 19% because this value is almost the average tax rate on interest payments [12]. Consequently, taxes on the normal return of capital income became similar to taxes on interest payments at the personal level.

The reduction in the corporate tax rate was not the only tax policy instrument adopted by the government to alleviate tax non-neutrality between debt finance, new equity and retained earnings. In fact, the introduction of the regional corporate tax, the so-called Irap tax, due to another important reform approved in 1997, went in this direction. Interest payments were not deductible from the Irap and, thus, the user cost of capital financed by debt increased. Furthermore, the personal income tax reform reduced the top marginal rate by six percentage points (from 51% to 45%). The implementation of these tax reforms

6 Law 662/96 (September 2006) and Legislative decree (DLgs) no. 466/97.

7 Art. 1 co. 2 DLgs no. 466/1997.

8 Art. 6 DLgs no. 466/1997.

9 In 2007 a new Tax Reform provided that interest rates are partly deductible from the corporate tax base. This base broadening was compensated by a decrease in the IRES tax rate from 33% to 27.5% and in the IRAP tax rate from 4.25% to 3.9%.

reduced the differences in the user cost of capital for the various sources of finance, as illustrated in Table 7 and Table 8.

In Table 7 we compute the user cost of capital for each source of finance and the effective marginal rate assuming an interest rate equal to 5%. We neglect personal income taxes on dividends, interest payments and capital gains. Before the Irap reform the tax rate on debt finance was equal to zero. The tax burden on retained earnings was higher than on equity finance (newly issued equity) because of the tax on net worth of 0.75%, which was abolished by the Irap tax reform.

The introduction of the DIT reduced the gap between the effective marginal rates and user costs of capital. In Table 7 we distinguish between two cases; the first case focuses on a firm that has a capital income share subject to a reduced tax rate in excess of the maximum threshold of 55.56%. In this case, the DIT rate corresponds to the minimum tax rate fixed at 27%. The second case assumes that this constraint is not binding.

In 2000 the minimum tax rate was abolished[10], the DIT continued to be based on the increase in capital stock, while the normal return on capital increased with a factor of 1.4. Table 7 shows the evolution of the user costs of capital for the different sources of finance. The results show a decrease in the user cost of capital of equity-financed investment; the latter value moves towards the user cost of debt-financed investment.

In Table 8 we include personal income taxes rates (taxes on interest payments, the tax credit for distributed profits as well as capital gains taxes). We compute for each source of finance the maximum and minimum value for the user cost of capital (depending on the rate of the personal tax on interest). Table 8 shows that including personal income taxes significantly reduces the user cost of capital for investment financed with retained earnings and newly issued equity.

The new government in 2001 changed the structure of the corporate tax system. The DIT was partially abolished in 2001[11]. The coefficient of the normal return on capital was reduced from 7% to 3%. A further reform in 2002 increased the reduced tax rate on the normal return from 19% to 30.8%.[12] However, the statutory tax rate declined rapidly from 37% in 2000 to 33% in 2004. The philosophy of the new government was, in fact, to reduce the corporate tax in a general way, so without distinguishing between different sources of finance, and, thus, without removing the special tax treatment of debt finance.

Furthermore, the 2004 reform abolished the DIT entirely as well as the imputation system.[13] Instead, government introduced a partial inclusion (PI) tax system.

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[10] Legislative Decree DLgs 9/2000, art. 2.

[11] Law 383/01, the so-called "Tremonti-bis". The DIT was abolished for all the investments made after 30th June 2001.

[12] See Giannini S. [14].

[13] Legislative Decree DLgs 344/2004.

Table 7: DIT Reforms, the User Cost of Capital and the Effective Marginal Rate

Sources of finance	User Cost	Effective Marginal Rate
Ante-Reform		
Debt	5%	0%
Retained Earnings	12.29%	59.30%
Equity	10.68%	53.20%
1998 (DIT with minimum tax rate constraint)		
Debt	5.36%	6.70%
Equity	6.98%	28.40%
1998 (DIT without constraint)		
Debt	5.36%	6.70%
Equity	7.45%	32.90%
2001		
Debt	5.36%	6.60%
Equity	6.95%	28%

i) interest rate is assumed to be equal to 0.05 ii) Ante Reform: Irpeg (corporate income tax) rate = 37%, Ilor (local corporate income tax) rate = 16.2%, Net worth tax rate = 0.75%; iii) 1998 after the DIT Reform with the constraint of the minimum rate, i.e. q (the share of returns on capital income subject to the reduced tax rate) >0.55: Minimum tax rate = 27%, Irap rate = 4.25%, normal return on capital is equal to 0.07; iv) 1998 after the DIT reform without the constraint of the minimum rate, i.e. q<0.556: Statutory Irpeg rate = 37%, Reduced Irpeg rate = 19%, Irap rate = 4.25%; normal return on capital is equal to 0.07; v) 2001 Reform: Multiplier = 1.4, Irpeg rate = 36%, Reduced Irpeg rate = 19%, Irap rate =4.25%

Table 8: DIT Reform and the User Cost of Capital Including Personal Income Tax Rates

	Ante Reform		*1998 (DIT without constraint)*	
	Minimum	Maximum	Minimum	Maximum
Debt	5%	6%	5.4%	6.4%
Issued Equity	6.7%	12.2%	4.9%	6.5%
Retained Earnings	11%	14.1%	6.4%	8.1%

i) interest rate is assumed to be equal to 0.05; tax rates on interest payments: 12.5%-27% ii) Irpeg (corporate income tax) rate = 37%, Irap rate = 4.25%; Reduced Irpeg rate = 19%; normal return on capital is equal to 0.07; iii) Personal income tax rates = 10%-51% ante reform; 19%-45% post-reform; tax rates on interest payments = 12.5%-27%; iv) tax credit = 58.73%; tax credit with reduced Irpeg rate = 19/81; v) taxes on capital gains = 12.5%/27%; vi) we report the minimum and maximum values that the user cost of capital can exhibit.

7. Assessing the Impact of the DIT on Small Enterprises

This section evaluates the impact of the DIT on TFP growth and assesses the impact of a reduced tax rate on the normal return of capital income (ROC) on small enterprises. We will show the results of the regressions of TFP growth on the DIT and on the DIT interacted with small and young enterprises.

Before analyzing the impact of the DIT on the TFP growth for small enterprises we model the DIT. As previously mentioned, the DIT is characterized by two tax rates on capital income. The first tax rate is fixed at 19%, while the second tax rate is the standard corporate tax rate.

The tax relief is related to the increase in capital stock financed by equity. The first step is to determine the income base subject to a reduced tax rate. In doing that, we compute the investment financed by equity for each firm. If we consider firms with non negative investment and positive increase in equity and the difference between the variation in equity and the amount of investment is positive we use the total amount of investment to compute the DIT base; otherwise, if the difference is negative we use the variation of shareholders' funds. Once DIT income base is determined, we compute the return rate of the DIT base equal to 0.07 (*i.e. the normal return on equity*). At this point, we distinguish the firms with a return rate higher than 7% from the other ones. Less profitable firms are subject to the minimum tax rate (equal to 0.27+0.0425 = 0.3125). For more profitable firms, for example until 2001, we adopt the following formula to model the Average Dual Income Tax rate (*AvDITrate*):

$$AvDITrate = 0.4125 * (1 - q) + 0.2325 * q \qquad \text{if } q < 0.5556$$
$$AvDITrate = 0.4125 * (1 - 0.5556) + 0.2325 * (0.5556) \qquad \text{if } q \geq 0.5556$$

$$\text{where } \boldsymbol{q} = \frac{0.07 * DITbase}{Profit\&Loss\ before\ Tax} \qquad \textbf{(8)}$$

In the next table we show the average values of q and the statistical details of the DIT so computed. The minimum tax rate should be equal to the minimum tax rate augmented by the Irap rate (0.3125). Table 10 indicates that the values of the average DIT rate are much more proximal to the values of the tax-profit ratio. Moreover, the positive correlation is significant at 1 percent level of confidence. It confirms that the statutory corporate tax rate is not a valid proxy of the effective tax rate because of the DIT reform in 1997. However, it is worth noticing that the DIT, so modelled, is only an approximation of the effective tax rate; thus, all next results are necessarily not much robust (as well as using the statutory tax rate). Anyway, this deep investigation gives us a further piece of information.

Table 9: Statistical Details of q and Average DIT Rate

q		Average DIT Rate	
Percentiles		Percentiles	
1%	0	1%	0.3125
25%	0	25%	0.3125
50%	0.02228	50%	0.3825
75%	0.086626	75%	0.4025
90%	0.36114	90%	0.4125
99%	0.708829	99%	0.4125
Mean	0.077216	Mean	0.379856
Variance	0.019235	Variance	0.001799
Smallest	0	Smallest	0.3125
Largest	0.995313	Largest	0.532

Table 10: Pairwise Correlation among Corporate Income Tax Rate, Average DIT Rate and Tax/Profit Ratio

	CIT	DIT	Tax/Profit Ratio
CIT	1		
DIT	0.5141***	1	
Tax/Profit Ratio	-0.0025	0.1474***	1

(i) *** denotes significant at 1%

Table 11 shows which type of enterprises enjoyed a reduced tax rate. Two-thirds of small firms enjoyed a reduced tax rate; almost three-fourth of small and young firms. Furthermore, we can observe that small firms enjoyed a reduced tax rate more than medium firms, and young firms more than old firms. However, by considering a difference higher than the 25th percentile, it appears less relevant, especially considering small and medium enterprises.

Table 11: Reduction in Corporate Tax Rate Due to the DIT Reform – Small and Medium, Young and Old Enterprises -

	CIT-DIT=0	CIT-DIT>0		Low CIT-DIT	High CIT-DIT (>25%)	
Small	3,962	7,883	**66.55%**	8,731	3,114	**26.29%**
Medium	8,350	11,804	**58.57%**	15,262	4,892	**24.27%**
Small & Young	252	697	**73.45%**	641	308	**32.46%**
Medium & Young	363	772	**68.02%**	730	405	**35.68%**
Small & Old	3710	7,186	**65.95%**	8,093	2,803	**25.73%**
Medium & Old	7987	11,032	**58.01%**	14,536	4,483	**23.57%**

On average, small firms use equity, rather than debt, as the main source of finance. Table 12 demonstrates that the debt/asset ratio for small firms is less than for medium firms. It confirms that small incorporated firms face debt financing constraints.

Table 12: Debt/Asset Ratio – Small and Medium Enterprises -

	Debt/Asset Ratio<50%		Debt/Asset Ratio>50%	
Small	9,880	**60.30%**	6,504	**39.70%**
Medium	11,008	**43.35%**	14,385	**56.65%**
	Debt/Asset Ratio<25%		**Debt/Asset Ratio>25%**	
Small	5,479	**33.44%**	10,905	**66.56%**
Medium	4,966	**19.56%**	20,427	**80.44%**
	Debt/Asset Ratio<10%		**Debt/Asset Ratio>10%**	
Small	2,404	**14.67%**	13,980	**85.33%**
Medium	1,774	**6.99%**	23,619	**93.01%**

We can now proceed to analyze the impact of the DIT on the TFP growth. We simply substitute the corporate income tax (CIT) rate with the dual income tax (DIT) rate. By replicating the same regressions, we can individuate the role played by the DIT on TFP growth at firm level.

Table 13 shows the impact of the average Dual Income Tax rate on TFP growth for small and medium enterprises. We keen to avoid endogeneity between DIT variables and TFP Growth. As the DIT is computed by using profits and investment, it is more likely that a simultaneity bias can emerge. At this scope, we study the impact of a change in corporate tax rate due to the DIT reform occurred in the previous year. Column (1) points out the role played by the changes in the tax rate due to the DIT reform

As in the previous estimation, in Column (2), a decrease in tax rates favours small firms more than medium ones on average; Column (3) shows that the impact of the DIT reform is associated to small and old firms. This is confirmed in Column (4) when the threshold age is equal to twenty years of life. However, all F-tests suggest no significant difference among the estimated coefficients. The Dual Income Tax was able to enhance productivity growth for small businesses; however, on average, mid-aged firms gained less in terms of productivity growth by the DIT reform with respect to the oldest firms. A possible explanation could be due to the fact that the possibility to enjoy the reduced tax rate is much more for more profitable businnesses, such as firms with many years of life; by contrast, young or mid-aged firms have not yet generated so much profits to be retained and re-invested. Therefore, the DIT may foster less TFP growth for young firms than for the oldest ones, even if the tax relief due to the DIT reform was relatively used more by young firms, as it has been shown in Table 11.

Finally, Column (5) points at evaluating the impact of the tax reform provided in 2003 to the TFP growth in 2004. We use a Difference in Difference (DID) technique to allow for the *counterfactual*. Results are little robust in individuating a structural breakpoint; notwithstanding, the interaction terms reveal a negative impact of the reform for both small and medium enterprises. Furthermore, an increase in tax rate, due to the partial abolition of the DIT in 2003, is more associated on average to small firms, which used shareholder's funds to invest. Hence, the effect of a positive growth rate in the corporate tax is more harmful for small enterprise by almost 9 percentage points (33%-24%). However, this difference is not significant at all.

Since the DIT reduces the taxes on capital income, it should mitigate the difference between debt, retained earnings and equity as sources of finance. In such a way it alleviates the tax disadvantages for small enterprises. In our empirical analysis we find that whether the DIT reduces the impact of corporate tax then it will enhance sensitively TFP growth, especially for small enterprises. Tax policy from 2001 to 2004 focused on a general decrease in the statutory corporate tax rate, without differentiating among the various sources of finance and without aiming at the tax neutrality. We find that, despite the reduction in tax rates, the partial abolition of the DIT in 2003 harmed small enterprises. Our conclusion is that the DIT system is a more TFP growth-oriented policy for small enterprises than an undifferentiated decrease of the statutory corporate tax rate.

Table 13: Dual Income Tax and TFP Growth – Small and Medium Enterprises -

Dependent Variable: TFP Growth					
	(1)	(2)	(3)	(4)	(5)
Leader TFP Growth	0.117	0.117	0.117	0.116	0.117
	[3.65]***	[3.64]***	[3.64]***	[3.62]***	[3.65]***
TFP (lag)	-0.554	-0.554	-0.554	-0.554	-0.544
	[-16.11]***	[-16.10]***	[-16.09]***	[-16.09]***	[-15.22]***
Leader TFP (lag)	0.08	0.079	0.079	0.078	0.08
	[1.42]	[1.41]	[1.40]	[1.39]	[1.41]
DIT Growth (lag)	-0.12				
	[-8.20]***				
a) DIT Growth (lag) (Empl<30)		-0.133			-0.157
		[-5.49]***			[-3.41]***
b) DIT Growth (lag) (Empl>=30)		-0.114			-0.133
		[-7.18]***			[-4.36]***
c) DIT Growth (lag) (Empl<30 & Age<6/20)			0.019	-0.121	
			[0.22]	[-3.70]***	
d) DIT Growth (lag) (Empl>=30 & Age<6/20)			-0.124	-0.101	
			[-1.40]	[-4.53]***	
e) DIT Growth (lag) (Empl<30 & Age>=6/20)			-0.136	-0.146	
			[-5.55]***	[-4.64]***	
f) DIT Growth (lag) (Empl>=30 & Age>=6/20)			-0.114	-0.123	
			[-7.10]***	[-6.49]***	
dummy 2004					-0.014
					[-1.24]
g) DIT Positive Growth (lag) (Empl<30) * dummy 2004					-0.319
					[-2.36]**
h) DIT Positive Growth (lag) (Empl>=30) * dummy 2004					-0.24
					[-2.91]***
Fixed Effects:					
Firms	√	√	√	√	√
Year	√	√	√	√	√
Age*Sector	√	√	√	√	√
N	10137	10137	10137	10137	10137
Hansen J	0.017	0.015	0.016	0.015	0.021
Wald Test		(a/b) 0.4701	(e/d) 0.8954	(c/d) 0.5969	(a/b) 0.5833
			(e/f) 0.3928	(c/e) 0.5541	(g/h) 0.5630
				(d/e) 0.2161	

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Arellano-Bond; iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected.

8. Taxes and Investment: *User Cost* Theory

In this section, we review simple prototypical dynamic neoclassical investment models to derive and explain effects of taxation on business investment in the short run. In the next section, we describe and evaluate empirical tests of neoclassical channels in Italy, and we conclude that the empirical evidence is consistent with neoclassical intuition, but strongly robustless.

While there is a consensus about the nature and magnitude of tax policy on investment demand considerable uncertainty remains regarding the structure of adjustment costs and the short-run dynamic effects of tax reforms; ascertaining the effects of tax policy on equilibrium investment requires additional research to examine responsiveness of interest rates, output and stock market to tax policy changes (Hassett and Hubbard, 2002 [18]).

By distorting factor prices, taxes can lead to an inefficient allocation of factor inputs and lower productivity. Despite this conventional view of the distortive effects of taxation, the empirical macro-level analysis does not provide a strong consensus on the relationship between taxes and investment or GDP per capita, given the difficulty in distinguishing between the effect of taxes from that of government expenditure. By contrast, a disaggregate approach based on micro-data analysis has the advantage of providing information on how taxes can affect the behaviour of firms operating in different sectors and obtain much more convincing results. Moreover, it can also shed some light on whether tax effects are similar for different sectors.

Economists have long argued that significant reforms of corporate taxation can have large effects on firms' investment decisions. Many of the more recent investment models are based on the neoclassical theory, where a representative firm maximizes its present value, *i.e.* the discounted value of its expected profits. The solution to this maximization problem gives rise to optimality conditions, corresponding to the *q* and *user cost* terms frequently used in neoclassical investment models.

The simplest argument is that a firm weighs the costs and the benefits of purchasing a machine today and holding it for one period. The firm invests when the benefits exceed the costs. The economic logic underlying the user-cost concept leads us to the familiar formula derived by Hall and Jorgenson (1967) [16]:

$$UC_a = \frac{p_a}{p}\left(\rho + \delta_a - E(\Delta p_a / p_a)\right)\frac{1-\tau Z_a}{1-\tau} \quad \textbf{(9)}$$

where a denotes an asset and $\frac{p_a}{p}$, ρ, δ_a and $E(\Delta p_a / p_a)$ the asset price relative to the output price, the required rate of return, the rate of economic depreciation and the expected change in the asset price, respectively. τ and Z_a denote the corporate tax rate and the present value of depreciation allowances. This tax-adjusted user cost suggests that increases in corporate taxes (capital depreciation allowances) will reduce (increase) investment and capital stock.

Empirical research on business fixed investment has a long history. Jorgenson (1963) [24] investigated whether the neoclassical theory, relied on the fact that the demand for investment can simply be derived from the demand for capital, could be used to describe aggregate fluctuations in business investment in United States (building off of the user-cost formula above). Moving from this equilibrium relationship to an empirical model, however, required a few more steps. Jorgenson defined a firm's desired capital stock, K^*, as output, divided by the user cost, Y/UC, and then assuming that a firm gradually approached this desired stock over time. As opposed to relying on adjustment costs, Jorgenson assumed that the rate ω, at which the firm closed the gap between its actual and desired stocks, was given exogenously and did not affect the level of "desired" stock. Hall and Jorgenson [16] originally used such a model to explain aggregate investment and concluded that it described the data well.

Later, many applied economists pointed out that the model they estimated, recognizing that K^* was the ratio of output to the user cost, could be capturing accelerator effects, which had long been known to be strong explanatory factors for investment, as we will clarify below. The time-series evidence always revealed that lags of output were highly correlated with investment, while interest rates generally provided very limited additional power. Many economists became convinced that interest rates and the other component of the user cost, such as corporate taxes, do not help predict investment behaviour because firm do not pay attention to these variables.

Motivated by the hope that the simplest neoclassical models failed to explain investment fluctuations, energy was devoted to the task of extending these models to incorporate more realistic assumptions. The most significant step occurred when theorists explicitly incorporated costs of adjusting the capital stock into their models. According to these new theories, firms face very large costs if they attempt to make very large instantaneous changes in their production technologies, and such costs fall significantly if the firm changes its capital stock gradually. This new assumption provided a link between what the firm was doing yesterday and what it plans to do tomorrow that was absent in the first neoclassical models; thus, investment is forward-looking and based on rational expectations of future variables that affects profit at the margin, but it also depends on how much capital is already on hand (Hassett and Hubbard, [18]).

Such new investment models emphasizing the net return to investment, but with adjustment costs, have yielded complementary empirical representations. The first-order-conditions with respect to investment and capital lead to two dynamic equations. The first one refers to the dynamics of the state-variable, *i.e.* the capital stocks. The second one describes the dynamic behaviour of the control-variable, the so-called *Tobin's q* representing the shadow value of capital stock. We refer to this equation as the Euler Equation describing the period-to-period optimal path of investment, via *Tobin's q*.

Disregarding on taxes, inflation and depreciation, the q is equal to the ratio between the required rate of return for investors and the marginal product of capital; it is equal to one in the stationary state, when marginal product of capital and opportunity cost of capital coincide. Generally, investment is positive if q is greater than one, negative in the opposite case, and zero investment in the steady state when q is equal to unity. Therefore, investment depends positively on q and negatively on the *user-cost*.

The q-theory suggests that the firm will invest if the market value of an additional unit of capital, *i.e.* the shadow value, exceeds the cost of purchasing it, taking into account that there are costs associated with the adjustment of capital to its desired level. Thus, the firm's marginal investment decision is determined by the ratio of the market value to the replacement cost of capital, called the marginal q.

This model offers a convenient way of estimating the responsiveness of investment to neoclassical variable, but the complication lies on the fact that the marginal q is unobservable. Under certain assumption, *i.e.* when the production function exhibits constant returns to scale, the marginal q can be shown to equal the ratio of the total value of the firm to the replacement value of its total capital stock, the so-called average Q, which can be measured using stock market information on the value of the firm (Tobin, [40] and Hayashi [19]). Both the user cost and the Q- theory can be adjusted for taxes, as in equation (9).

Researchers usually estimated such models using either OLS or GMM techniques with IV (instrumental variables). When used to explain the time-series movements of investment, parameter estimates for the new models tended to be wildly implausible. If the estimated q coefficient in Euler Equation is very small, then investment does not respond quickly to q values different from the long-run equilibrium value. The very small q coefficient reported in the literature often implied that the costs of adjustment incurred when installing a new machine were larger than the purchase price of the machine itself (Hassett and Hubbard, [18]).

The second wave of responses to the neoclassical failure explored alternative specifications, especially using much richer data sources than had generally been used in the past. One reason the data do not appear to favour neoclassical models is a simultaneous-equation problems as the theory does not relate the capital stock to a set of exogenous variables; rather, it expresses a relationship among endogenous variables that holds in equilibrium. If, on the one hand, the data were dominated by exogenous increases or decreases in the real interest rate, then the user-cost movements would lead investment to decrease or increase, respectively. If, on the other hand, investment rises with positive “animal spirits”, then higher investment demand puts upward pressure on the real interest rate. As highlighted by Hassett and Hubbard in their survey, to the extent that data incorporate both exogenous changes in the real interest rate and in the intercept of the investment function, the positive relationship function may dominate the hypothesized negative relationship between investment and user cost of capital. Controlling for these simultaneity effects has been the goal of the second wave of research.

In principle, the simultaneity problem in the estimation of neoclassical models can be tackled by the use of IV. Conventional instrumental variables (including lagged exogenous variables or sales-to-capital ratios) have not proven very helpful. Alternative estimation approaches argued that the presence of measurement error strongly affects results based on time series variation.

To summarize, a variety of empirical implementations of the neoclassical model with convex adjustment costs have attempted to mitigate measurement error and other econometric problems in conventional OLS and GMM estimates using panel data. The methods described above generally yield estimates that imply marginal costs of adjustment in the range of $0.10 per dollar of additional investment (Cummins, Hassett and Hubbard, 1995, [8]) and elasticities of investment with respect to the user cost of capital between -0.5 and -1.0.

In light of this, in the next section we implement a theoretical model based on tax-adjusted user cost of capital in order to estimate the investment long-run elasticity by using our panel data for Italy in the time period from 1997 to 2004.

The advantage of the *q*-theory is that it takes into account the observation that adjustment in the capital stock is costly and takes time whereas the user cost theory often assumes that adjustment is costless and takes place immediately. On the other hand, the *user-cost* theory has the advantage that it can, in principle, be measured for all types of firms, while the *q*-theory can only be used in empirical applications with data on firms that are quoted in the stock market. Therefore, studies based on this theory cannot assess the determinants of investment decisions in unlisted firms.

Due to these drawbacks, the empirical approach used in the following section relies on the *user cost* theory. However, the empirical investment model is extended to capture the potential persistence in investment and adjustment process.

9. Investment Results

The methodological approach used in this section to model the potential effect of taxes on investment relies on the *user cost* theory, with taxes increasing the user cost of capital, thereby affecting firms’ investment decisions. Our specification allows for dynamics due to the adjustment costs of capital. First, we hypothesize a simple quadratic convex function of adjustment costs, *i.e.* by assuming investment, rather than investment-to-capital stock ratio, as independent variable. In such a way, we include only a one-lagged dependent variable in the following sector-level specification of the investment-to-capital stock ratio dynamics:

$$\frac{I_{ijt}}{K_{ijt-1}} = \alpha\frac{I_{ijt-1}}{K_{ijt-2}} + \beta UC_{ijt-1} + T_t + \gamma_s + u_{it} \qquad \textbf{(10)}$$

where I/K, and UC are respectively the investment-to-capital ratio and the user cost of capital. The terms T_t, and γ_s capture time dummies and sector dummies; while u_{it} is the error term.

The data for the user cost of capital, as described in formula (9) is mainly obtained from the OECD Productivity Database, while information on statutory corporate tax rates comes from the OECD Tax Database. We compute different tax wedges for equipment and structures investment for each year between 1997 and 2003. The sector-specific user cost of capital is obtained as the asset-weighted sum of asset-specific user costs by sector. Data on asset shares are from the Bureau of Economic Analysis (BEA). Asset and output prices, rates of return, economic depreciation are extracted from the OECD Productivity Database and data on the tax adjustment are obtained from the Institute for Fiscal Studies (IFS).

The estimation of the empirical model is based on the GMM estimator developed by Blundell and Bond. The first difference dated t-2 and higher are used as instruments for the transformed differenced equation. The serial correlation test suggests that there is first order autocorrelation in the disturbance term, while no second order correlation is detected. The p-value of the Hansen J statistics is reported at the end of each regression.

Table 14 reports the main results when considering the impact of tax-adjusted user cost of capital on the investment-to-capital ratio. The specification in Column (1) shows that all the coefficients have the expected sign: the lagged investment-to-capital ratio enters positively and significantly, while the tax adjusted user cost negatively. The average long run user cost elasticity of the investment-to-capital ratio is estimated to be -0.68. The OECD estimation results give an investment elasticity of user cost equal to -0.69.[14]

Column (2) is particularly effective in demonstrating that the tax adjusted user cost of capital affects enterprises in Italy. A test of significance reveals that only medium enterprises are affected by the user cost of capital. This result seems to be in line with the theoretical issue that small firms are financing constrained, they have less access to debt finance and are generally less profitable than medium firms. As a consequence, the user cost of capital is not a strategic variable for planning investment when the firm's size is small.

In Column (3) it appears more evident how the user cost of capital does not involve young and mid-aged firms. Column (4) shows that the distinction between firms of different size classes does not seem particularly relevant here. Our results for Italy are in line with the results obtained for the OECD countries. Again, if the negative effect of the user cost at firm level investment is partly driven by the tax adjustment component, one possible explanation is that old firms are more profitable than mid-aged ones and therefore less affected by corporate taxation.

At this stage of the analysis we can evaluate the impact of the user cost of capital on investment by taking account of the Dual Income Tax reform. To do it, we compute the user cost of capital by replacing the statutory tax rate in formula (9).

[14] See [32].

Table 14: Investment to Capital Ratio – Tax-Adjusted User Cost -

Dependent Variable: Investment-to-Capital Ratio				
	(1)	(2)	(3)	(4)
Investment-to-Capital Ratio (t-1)	0.082	0.081	0.082	0.081
	[8.11]***	[8.03]***	[8.11]***	[8.03]***
User Cost (t-1)	-0.347			
	[-1.96]*			
User Cost (t-1) (Empl<30)		-0.279		
		[-1.57]		
User Cost (t-1) (Empl>=30)		-0.389		
		[-2.19]**		
User Cost (t-1) (Age<20)			-0.191	
			[-1.07]	
User Cost (t-1) (Age>=20)			-0.375	
			[-2.13]**	
User Cost (t-1) (Empl<30 & Age<20)				-0.121
				[-0.67]
User Cost (t-1) (Empl>=30 & Age<20)				-0.251
				[-1.40]
User Cost (t-1) (Empl<30 & Age>=20)				-0.345
				[-1.94]*
User Cost (t-1) (Empl>=30 & Age>=20)				-0.395
				[-2.23]**
cons	0.25	0.252	0.245	0.247
	[12.43]***	[12.54]***	[12.22]***	[12.32]***
Fixed Effects:				
Year	√	√	√	√
N	33303	33303	33303	33303
Hansen J	0.63	0.621	0.622	0.619
Long Run Tax Adjusted UC Elasticity	-0.68			

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Blundell and Bond iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected.

Table 15 shows the investment results for the DIT-adjusted user cost of capital. This table is quite similar to the previous one. What is interesting in this table is the fact that the DIT reduces the impact of the user cost of capital on investment both for small and medium, mid-aged and old firms. The long run investment elasticity of user cost of capital slumps from -0.68 to -0.55. We can deduce that the DIT contributed to reduce the corporate tax impact on investment.

Until recently, the standard approach of the neoclassical models was to isolate firms' real decisions from financial concerns. This approach was based on the so-called *Modigliani-Miller Theorem*, which states that in the absence of taxes firms' financial structure and policy are irrelevant for their investment decisions (Modigliani and Miller, 1958 [27]). The necessary assumption underlining this theorem is the existence of perfect capital markets and the absence of tax shield. Under the assumption of imperfect capital markets with adverse selection and moral hazard, using external funds to finance investment project becomes relatively more expensive than financing with internal funds (Hubbard, 1998 [21]).

Table 15: Investment to Capital Ratio –DIT-Adjusted User Cost -

Dependent Variable: Investment-to-Capital Ratio				
	(1)	(2)	(3)	(4)
Investment-to-Capital Ratio (t-1)	0.082	0.081	0.082	0.081
	[8.11]***	[8.04]***	[8.11]***	[8.03]***
DIT User Cost (t-1)	-0.282			
	[-1.73]*			
DIT User Cost (t-1) (Empl<30)		-0.208		
		[-1.27]		
DIT User Cost (t-1) (Empl>30)		-0.326		
		[-1.99]**		
DIT User Cost (t-1) (Age<20)			-0.13	
			[-0.79]	
DIT User Cost (t-1) (Age>20)			-0.326	
			[-2.01]**	
DIT User Cost (t-1) (Empl<30 & Age<20)				-0.055
				[-0.33]
DIT User Cost (t-1) (Empl>30 & Age<20)				-0.192
				[-1.16]
DIT User Cost (t-1) (Empl<30 & Age>20)				-0.292
				[-1.77]*
DIT User Cost (t-1) (Empl>30 & Age>20)				-0.346
				[-2.12]**
cons	0.242	0.244	0.238	0.241
	[13.22]***	[13.34]***	[13.07]***	[13.17]***
Fixed Effects:				
Year	√	√	√	√
N	33303	33303	33303	33303
Hansen J	0.63	0.62	0.623	0.619
Long Run Tax Adjusted UC Elasticity	-0.55			

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Blundell and Bond iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected.

One important limitation of the baseline specification, such as that estimated in Table 14, is that it does not control for firms' financing constraints. Several studies have tested this assumption and found that proxies for internal funds, such as cash flow, have explanatory power after controlling for the average *Q*, *user cost* or *accelerator* variable. The interpretation is that firms with low internal funds or net worth are financially constrained and cannot carry out all profitable investment projects.

In the presence of taxes there may, thus, be an additional effect on firms' investment decision and hence the availability of internal funds to finance future investment. Furthermore, tax policies may have an effect on the financial structure of firms by affecting their choice between debt and equity financing.

Investment sensitivity to cash flow at firm level is used to identify financing constraints. The theoretical literature based on the new theory of the firm's life cycle has established that firms tend to invest more when they have more internal resources available. This has been also interpreted as a signal that external finance is not available for all firms.

In line with the past literature, we identify financial constraints with investment to cash flow sensitivity at firm level. This means that we take firms to be more financially constrained if their investment responds largely to internal cash flow. It was first suggested by Fazzari, Hubbard and Petersen (1988) [11]. Empirically, Fazzari *et al.* argue that user cost captures investment opportunities and that cash flow captures internal resources. They find that cash flow often predicts investment, but that user cost often does not. A large literature has followed these early findings (see *e.g.* Bond and van Reenen, 2006, [5] for a recent survey).

Our specification is, as before, based on an Euler Equation derived from a dynamic optimization model, assuming a quadratic adjustment cost. We partly follow Becker and Sivadasan (2006) [2] in adding cashflow-to-capital stock ratio and output-to-capital stock ratio. Differently from Becker and Sivadasan [2], Table 16 shows that the tax-adjusted user cost does not predict investment, as emphasized by Fazzari *et al*. In Italy, when a more detailed neoclassical specification is followed, the user cost of capital is unambiguously insignificant and presents the wrong sign in case of young firms (see Column (2)).

Table 16: Investment to Capital Ratio – Tax-Adjusted User Cost – Introducing Cash Flow and Output

Dependent Variable: Investment-to-Capital Ratio				
	(1)	(2)	(3)	(4)
Investment-to-Capital Ratio (t-1)	0.055	0.054	0.065	0.064
	[5.36]***	[5.30]***	[6.29]***	[6.27]***
User Cost (t-1)	0.001		0.047	
	[0.01]		[0.27]	
User Cost (t-1) (Empl<30 & Age<20)		0.2		0.209
		[1.19]		[1.18]
User Cost (t-1) (Empl>30 & Age<20)		0.086		0.12
		[0.51]		[0.68]
User Cost (t-1) (Empl<30 & Age>20)		-0.012		0.026
		[-0.07]		[0.15]
User Cost (t-1) (Empl>30 & Age>20)		-0.038		0.009
		[-0.23]		[0.05]
Cashflow-to-Capital Ratio (t-1)	0.086	0.085		
	[18.05]***	[18.01]***		
Output-to-Capital Ratio (t-1)			0.002	0.002
			[8.00]***	[7.90]***
cons	0.19	0.188	0.186	0.185
	[10.01]***	[9.91]***	[9.19]***	[9.14]***
Fixed Effects:				
Year	√	√	√	√
Model chi-square	724.969	813.425	415.932	481.827
N	33303	33303	33303	33303
Hansen J	0.598	0.613	0.704	0.715

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated including with GMM System developed by Blundell and Bond iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected.

The introduction of cash flow creates bias in the estimated user cost coefficient as the cash flow and the user cost of capital are correlated. However, as we show in Table 16, the omission of this covariate is really not recommended. The introduction of the output-to-capital ratio not only eliminates the explanatory power of the adjusted-tax user cost of capital, but also contributes to contradict the expected sign (see Column (4)). In this case, it is due to reflect the accelerator theory.

We must conclude that our investment results, in Italy, are extremely lacking in robustness by the virtue that, once output or cash-flow variables are included in the estimation, the user cost variable becomes irrelevant and the neoclassical model fails to represent the optimal investment path.

So far, we have aimed to find the significant role played by the user cost and, indirectly, by the corporate taxation. However, it is also important to investigate the role played by financial factors. The main focus of the next investigation is to accurately estimate the Euler equation specification including additional cash flow and profits terms.

We now follow the version of the Euler equation derived by Bond and Meghir (1994) [4] and Bond *et al.* (2003) [3]. Assuming competitive markets, a production function with constant returns to scale and by specifying an adjustment cost function in the investment-to-capital ratio, the resulting empirical specification includes: the square of the lagged investment-to-capital ratio, which enters negatively; the lagged output-to-capital ratio, which may be introduced either by non-constant returns to scale or by monopolistic competition in the product market; the cash-flow ratio, which enters negatively. As it also captures the effect of financial market imperfections, the prediction of a negative sign on this term may be expected to fail in the presence of financial constraints.

We also follow Bond *et al.* by replacing the cost of capital by time effects and firm-specific effects. This device can be useful to interpret the empirical results in a neoclassical context, but in such a way we do not have the possibility to assess corporate tax effects.

The model is estimated using GMM methods which controls for biases due to unobserved firm-specific effects and lagged endogenous variables. The instruments used are lagged values of the dependent variable. The validity of these instruments is easily accepted.

Column (1) in Table 17 shows the significant role both of cash-flow and output. What is interesting in this regression is the fact that cash-flow enters positively, by contradicting the neoclassical model based on perfect capital market and suggesting the presence of financing constraints. Column (2), (3) and (4) investigates the role of financing constraints splitting firms, as usual, by age and size. Small firms are significantly more constrained than medium ones (we report the p-value of the Wald test). There is no statistical significance along firms' age, as evidenced in Column (3). Fourth regression demonstrates that old and medium firms are more affected by cash flow ratio than mid-aged and medium ones. Moreover, small and mid-aged firms appear the most financing constrained, even if the difference in the coefficient compared to the small and old ones is significant only at 10%.

Last but not least, Table 17 emphasizes that business investment is highly correlated with changes in business output, providing support for the early accelerationist school. By contrast, neoclassical theory highlights the importance of the trade-off firms make at the margin between the cost of raising more money and the benefit of the profit generated by an extra machine.

The empirical evidence in Italy suggests that the more rigorous theory does not improve the econometrics ability to explain aggregate investment fluctuations or the response of business investment to changes in tax policy. In fact, the tax-policy variables are often found to have no effects at all on investment.

User cost models prove very disappointing as well. The basic accelerator model, which depends only on output, do just as well as, if not better than, the *user cost* theory in forecasting horse races. These differing points of view inevitably harken back to the accelerationist debate. In the next section, we address the role of corporate taxation by implementing an Accelerator Model Specification.

Table 17: Investment to Capital Ratio – Bond *et al.*'s Model-

Dependent Variable: Investment-to-Capital Ratio					
	(1)	(2)	(3)	(4)	(5)
Investment-to-Capital Ratio (t-1)	0.16	0.05	0.05	0.05	0.049
	[5.17]***	[4.82]***	[4.81]***	[4.82]***	[4.72]***
Investment-to-Capital Ratio Squared (t-1)	-0.12				
	[-3.63]***				
Cashflow-to-Capital Ratio (t-1)	0.063	0.064			
	[12.64]***	[12.75]***			
a-Cashflow-to-Capital Ratio (t-1) (Empl<30)			0.072		
			[11.78]***		
b-Cashflow-to-Capital Ratio (t-1) (Empl>=30)			0.058		
			[10.07]***		
c-Cashflow-to-Capital Ratio (t-1) (Age<20)				0.062	
				[10.95]***	
d-Cashflow-to-Capital Ratio (t-1) (Age>=20)				0.066	
				[10.84]***	
e-Cashflow-to-Capital Ratio (t-1) (Age<20 & Empl<30)					0.077
					[11.03]***
f-Cashflow-to-Capital Ratio (t-1) (Age<20 & Empl>=30)					0.051
					[7.55]***
g-Cashflow-to-Capital Ratio (t-1) (Age>=20 & Empl<30)					0.064
					[8.43]***
h-Cashflow-to-Capital Ratio (t-1) (Age>=20 & Empl>=30)					0.069
					[9.16]***
Output-to-Capital Ratio (t-1)	0.002	0.002	0.002	0.002	0.002
	[5.72]***	[5.76]***	[5.75]***	[5.81]***	[5.84]***
cons	0.115	0.126	0.242	0.079	0.08
	[4.34]***	[5.05]***	[4.22]***	[3.31]***	[3.33]***
Fixed Effects:					
Year	√	√	√	√	√
Sector	√	√	√	√	√
Model chi-square	1206.22	1157.661	1195.135	1169.17	1209.687
N	33303	33303	33303	33303	33303
Hansen J	0.07	0.592	0.591	0.591	0.599
Wald Test			(a/b) 0.0325	(c/d) 0.5356	(e/g) 0.0981
					(f/h) 0.0366

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Blundell and Bond iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected.

10. The Post-Keynesian Approach: Taxes and Accelerator Model Specification

A vast number of empirical and theoretical studies have looked at the determinants of fixed business investments. Accelerator models are one of the early theories in this field. They emphasize the role of demand conditions as the main determinant of the investment. The simple version of this theory suggests that the change in capital stock is equal to a fraction of the change in output. These models heavily rely on the empirical observation that investment is highly correlated with changes in output and despite their simplicity they are amongst the most successful empirical models of investment.

Beginning from the seminal works of Carver (1903), Afalian (1909), Bickerdike (1914) and Clark (1917), business investment was observed highly correlated with changes in business output providing support for the early accelerationist school. These stylized facts undoubtedly contradicted the Fisher's neoclassical theory.

These facts presented a challenge for economic research linking output and investment. Even though any benefit of investment occurs in the future, a theory which described why yesterday's output appeared to be important empirically needed to be derived.

The accelerator principle lies at the heart of the Keynesian business cycle theory of Harrod, Hicks, Goodwin and others. There are effectively two ways of thinking about investment. Following Jorgensen, we may refer to these as the *Hayekian* and *Keynesian* perspective. The Hayekian perspective conceives of investment as the adjustment to equilibrium and thus the optimal amount of investment is effectively a decision on the optimal speed of adjustment.

The Keynesian approach places far less emphasis on the adjustment nature of investment. Instead, it argues that investment is simply *what capitalists do*. Every period, workers consume and capitalists invest. This leads Keynesians to underplay the capital stock decision. Thus, when businesses make investment decisions, they do not have an optimal capital stock in the back of their mind. They are more concerned as to what is the optimal amount of investment for some particular period. For Keynesians, then, optimal investment does not concern *optimal adjustment*, rather *optimal behaviour*.

In *General Theory* Keynes proposed an investment function in the short run where firms were presumed to rank various investment projects depending on their internal rate of return, IRR, *i.e.* the marginal efficiency of capital, and, thereafter, chose those projects whose IRR exceeded the rate of interest. Abba Lerner, more accurately, rebaptized the marginal efficiency of *capital* as the marginal efficiency of *investment* (MEI). Investment depends upon rate of interest, MEI and profit expectations. The latter ones are crucial in the Keynesian theory as they concern the firm's behaviour based on psychological features. Saving and investment decisions are, as already discussed by Wicksell, completely autonomous and the real rate of interest is not, in principle, able to guarantee the ex-ante equilibrium. The equilibrium condition is obtained through the changes in the effective demand, rather than in the real interest rate.

The neoclassical theory was radically chocked by the Keynesian revolution and the role of the *marginal* user cost of capital became to be investigated together with profit expectations, self-fulfilling prophecies and *animal spirits* of investors. Modern post-Keynesian theorists have attempted to obtain a more complete macroeconomic theory, but have generally adhered to Keynes's strategy of subordinating capital stock consideration to investment decision.

The additional concern was the issue of *Wicksell Effects* in the Cambridge Capital Controversy. Sraffa (1960) [39] depicted the famous *reswitching* problem in capital theory for an industry as well as an economy, which inspired the Classical Revival and fuelled the Neo-Ricardian School. Therefore, the inverse relation between the demand for capital stocks and the interest rate was widely criticized in numerous aspects. A more troublesome critique was offered up by several post-Keynesians, such as Asimakopulos (1971) [1] and Garegnani (1978) [13]. Garegnani [13] questioned the possibility of a downward sloping MEI function in the presence of unemployment and pointed out that Fisher's theory can only be true if another factor (labor) is fully employed and cannot be increased.

In light of this, the post-Keynesian approach bases the theory of investment on uncertainty and *animal spirited* expectations of profits and returns. The role of the effective demand is crucial for firms' investment decisions. The intuition behind the accelerator principle lies in these convictions.

Accelerator models of investment can take many forms[15]. Following Harrod (1948) [17], Domar (1946) [9] and Kregel (1983) [26], according to the accelerator theory of investment, investment responds to changing demand conditions. This idea of the accelerator implies a relation in the following form:

$$I_t = K_t - K_{t-1} = v\left(Y_t - Y_{t-1}\right) \qquad \textbf{(11)}$$

where I_t is the investment, K_t the capital stock and Y_t the aggregate demand. v is a constant known as the "accelerator coefficient", and it is assumed to be $0 < v < 1$. Of course, v can be thought as the desired capital-output ratio. Thus, given a change in the aggregate demand, the accelerator gives us the change in capital needed to achieve the desired capital-output ratio. Since v is a fraction, a change in demand will require a smaller change in capital. The accelerator argument establishes the desired change in capital stock each period and it is intrinsically based on the uncertainty of demand movements.

Following Bond *et al.* [3], we can intuitively tie the accelerator with the theory of adjustment costs. In such a way, we can rewrite the formula (11) dividing by capital stocks and taking into account the inertia of investment-to-capital ratio, as in the following way:

$$\frac{I_t}{K_{t-1}} = \gamma \frac{I_{t-1}}{K_{t-2}} + v\left(\frac{Y_t - Y_{t-1}}{K_{t-1}}\right) \qquad \textbf{(12)}$$

Column (1) in Table 18 reports the estimation results of the equation (12). Growth in output may be correlated with shocks to investment. We allow for the endogeneity in estimation by using lagged values as instruments. The accelerator coefficient is quite small and equal to 0.02.

In order to assess the corporate tax impact on investment we implement a two-step analysis. In the first step, we estimate the accelerator coefficient as equal to the estimated residual of the logarithmic version of the equation (11). In other words, equation (11) can be written in logarithmic version, as in the following equation:

$$\ln\left(\frac{I_t}{K_{t-1}}\right) = \ln\left(\frac{Y_t - Y_{t-1}}{K_{t-1}}\right) + \ln v + \varepsilon_t \qquad \textbf{(13)}$$

The residual of a simple regression between the logarithm of the investment-to-capital ratio and the logarithm of the change in demand can be interpreted as equal to the logarithm of the accelerator coefficient plus the random error. We also control for the lagged value of the logarithm of the dependent variable. Estimation results are reported in Column (2) of Table 18.

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[15] See Jorgenson [24] or Eisner and Nadiri [10] for example.

Table 18: Accelerator Models

Dependent Variable	Investment-to-Capital Ratio	Ln Investment-to-Capital Ratio
	(1)	(2)
Investment-to-Capital Ratio (t-1)	0.246	
	[8.81]***	
Difference in Output-to-Capital Ratio (t - t-1)	0.024	
	[5.78]***	
Ln Investment-to-Capital Ratio (t-1)		0.11
		[7.56]***
Ln Positive Difference in Output-to-Capital Ratio (t - t-1)		0.053
		[4.01]***
Ln Negative Difference in Output-to-Capital Ratio (t - t-1)		0.05
		[3.65]***
cons	0.17	-1.477
	[5.53]***	[-11.22]***
Fixed Effects:		
Year	√	√
Sector	√	√
Sector*Age	√	√
Model chi-square	4060.497	731.463
N	14268	14268
Hansen J	0.151	0.12

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-statistics are reported in parentheses; iii) all regressions are estimated with GMM System developed by Blundell and Bond iv) the test of serial correlation suggests that there is first order serial correlation in the disturbance term, but no second order serial correlation is detected.

The second step consists in finding the principal components that could explain the behaviour of the accelerator coefficient. We transform the obtained residual by using the exponential operator. In the post-Keynesian approach, the accelerator coefficient must not be interpreted as a parameter but as representing firm's behaviour. We follow Robinson (1969) [36] in emphasizing the role of the profit rate as a stimulus to investments. In such a way, the function of the accelerator coefficient can be written as follows:

$$v_t = f\left(ROA_{t-1}; Y_{t-1}; \tau_{t-1}\right) \tag{14}$$

We investigate the corporate tax as a variable that affects the behavioural function of the estimated accelerator coefficient. Table 19 shows the standard finding in the accelerationist school that tax-policy variables have no effect at all on investment. In deciding investments, firms mainly look at the profit rate and at operative revenues, but not at taxes.

The estimation results are shown in Column (1). Note the importance of the lagged output demand, especially for small firms. Return on assets is very relevant for old and medium firms. These results are probably linked to the fact that newly founded and small firms have not yet generated retained earnings.

Column (2) drops the cases of positive losses, which strongly changes the tax-to-profit ratio. This implies wee restrict our analysis to firms that have positive profits and we investigate if taxes hinder investment growth. Our results are surprising. Corporate taxation harms small and medium firms. Furthermore, ROA (return on assets) becomes not relevant for young and mid-aged firms.

The intuition behind these results could go as follows: small and young firms cannot fully rely on the profit rate as their retained earnings are very small. Therefore, lagged operative revenues or the firm's turnover affect significantly the firm's investment decision. However, capital accumulation would require much more retained earnings in order to offset the insufficient availability of external funds. As a consequence, an increase in the corporate tax rate may impede the growth in investment. By contrast, the total amount of taxes seems not to hinder the investment decision of medium firms.

Table 19: Estimated Accelerator Coefficient and Tax-to-Profit Ratio

Dependent Variable: Estimated Accelerator Coefficient	(1)	(2)
ROA (t-1) (Empl<30 & Age<20)	0.229	0.172
	[2.17]**	[1.37]
ROA (t-1) (Empl>=30 & Age<20)	0.151	0.124
	[1.98]**	[1.40]
ROA (t-1) (Empl<30 & Age>=20)	0.234	0.286
	[2.46]**	[2.96]***
ROA (t-1) (Empl>=30 & Age>=20)	0.424	0.409
	[4.95]***	[4.04]***
Tax to Profit Ratio (t-1) (Empl<30 & Age<20)	-0.002	-0.003
	[-1.58]	[-1.73]*
Tax to Profit Ratio (t-1) (Empl>=30 & Age<20)	0.001	0
	[0.39]	[0.07]
Tax to Profit Ratio (t-1) (Empl<30 & Age>=20)	0.002	0.002
	[1.27]	[1.27]
Tax to Profit Ratio (t-1) (Empl>=30 & Age>=20)	-0.001	-0.001
	[-0.99]	[-1.02]
Output-to-Capital Ratio (t-1) (Empl<30 & Age<20)	0.021	0.025
	[3.84]***	[3.90]***
Output-to-Capital Ratio (t-1) (Empl>=30 & Age<20)	0.018	0.019
	[3.83]***	[3.60]***
Output-to-Capital Ratio (t-1) (Empl<30 & Age>=20)	0.033	0.03
	[7.41]***	[6.68]***
Output-to-Capital Ratio (t-1) (Empl>=30 & Age>=20)	0.02	0.018
	[4.05]***	[3.38]***
cons	0.87	0.55
	[1.86]*	[1.01]
Fixed Effects:		
Firms	√	√
Year	√	√
Sector*Age	√	√
R-squared	0.017	0.018
N	14268	12100

(i) * denotes significant at 10%; ** at 5%; *** at 1%; ii) t-values are reported in parentheses; iii) all regressions are estimated with FE estimator

11. Concluding Remarks

This paper examines two issues related to SME corporate taxation in Italy. The first is whether the corporate tax has an effect on TFP growth greater for small enterprises than larger ones. The second relates the corporate taxation to investment.

On the first, it shows that the productivity growth of small and young firms is more sensitive to changes in the corporate tax rate than that of larger and older firms. The reasons for this are not immediately clear although theory suggests that this could be due to the difficulties that small and young firms have in accessing debt finance.

Moreover, our estimation results show the role played by the DIT in enhancing TFP growth for small enterprises. We observe that the impact of the DIT on TFP growth was very high for incorporated small enterprises. We also found that the partial abolition of the DIT contributed to reverse the impact on small and medium firms. These findings suggest that tax policies aimed at reducing the distortions in the user costs of capital are also reducing tax impediments faced by small enterprises.

On the second, our estimation results show that the user cost of capital affects negatively the investment undertaken by old and medium firms. The estimated long run elasticity for Italy equals the value reported in the standard empirical literature. One possible explanation is that young firms are less profitable than older ones and therefore less affected by the corporate tax adjusted user cost of capital.

We also find that in the accelerator models tax-policy variables have no significant effect on investment. However, small and young firms are partly damaged by corporate tax. This is probably due to the fact that corporate taxation does not help small and young enterprises to remove some of any disadvantage that small enterprises suffer, although one can question if helping an alleged lack of access to credit is a suitable role for taxation.

A strong limitation of our analysis is the restriction to incorporated firms. In Italy almost two-thirds of small firms are unicorporated. Therefore, the main conclusions for small firms are strongly narrowed.

Moreover, in evaluating the statutory corporate tax rate, we neglect the other deductions and allowances, which can support small enterprises in a considerable way. In regards to tax allowances, an important tax reform (Law n. 383/2001, the so-called "Tremonti bis" after the Minister who proposed it) set out a series of important fiscal incentives in favour of professionals and enterprises. More precisely, it established that business income and income from professional work would have been exempt from taxation for an amount corresponding to 50% of the difference between the total amount of investment in capital goods made in the current fiscal period and the arithmetic mean of the investment made in the five preceding fiscal years, with the possibility of excluding from the calculation the highest of the five figures. The discipline was therefore aimed at easing the investments in patrimonial assets meant to be utilized on a long-term basis in the entrepreneurial or professional activity. The theoretical view behind it could be related to the *cash flow* tax system, in which purchases of capital goods are entirely deductible. It may have contributed to alleviate the tax advantage of debt as source of finance.

The Dual Income Tax in Italy, like a partial *Allowance for Corporate Equity* (ACE) tax system, was aimed at fostering the capitalization of corporations and, by favouring equity over debt, to alleviate tax non-neutrality between the different sources of finance. Parallel to the abolition of the DIT, a *thin capitalization* mechanism was introduced in 2004 that sets a threshold above which it is no longer possible to deduct interest expenses. It contributed to partly offset the effects of the abolition of the DIT.

Measures introduced by the financial law for 2008 have strengthened the limitations of the interest expenses (in addition to the thin capitalization rules). The corporate statutory tax rate has been lowered from 33% to 27.5% (last phase of the rate reductions over time); at the same time the tax base was broadened by limiting the deduction of interest expenses; i.e; only the interest expenses exceeding the amount of interest revenues up to 30% of Gross Operating Profit are deductible.

Our analysis has focused on tax policy implications from an efficiency perspective. Equity issues have not been covered. However, the Dual Income Tax might also be seen as a way to tax economic rents. However, differently from other tax measures like the so-called *Robin Hood Tax* implemented in Italy as of 2008*,* the DIT is not targeted at specific sectors and windfall profits.

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