THE ISTAT–MATIS CORPORATE TAX MODEL

ANTONELLA CAIUMI AND LORENZO DI BIAGIO

ABSTRACT. In this paper we present a new corporate microsimulation model (ISTAT–MATIS) which combines a multi-period framework with the use of large complementary data set. The new ISTAT-MATIS is an algebraic framework that reproduces tax liabilities of Italian corporations and fiscal groups in accordance to fiscal rules. The multi-period framework allows for dynamic simulation and to consistently trace firm-level inter-temporal developments of fundamental tax base variables, like for example interests deduction add-backs (carry forwards), losses carry forwards and tax allowances carry forwards. The ISTAT–MATIS model is founded on corporate tax return data plus additional information drawn from other administrative sources on Italian corporations and ISTAT statistical archives. The database covers the whole population of limited-liability firms thus allowing for conclusions on the revenue impact of tax changes. The model framework incorporates all the complexities of the Italian tax regime, including the tax treatment of losses, the partial interest deductibility rule, the group taxation and the newly implemented 'Aiuto alla Crescita Economica' (ACE, Aid to Economic Growth). The model serves the dual purposes of dynamic forecasting and policy analysis. We illustrate the potential use in the distributional analysis of recent tax changes for Italian corporations.

1. INTRODUCTION

Microsimulation is a modeling technique typically used to simulate the behavior of the basic unit of analysis and provides a description of the whole population taking into account differences across individuals. The main advantage of microsimulation models in relation to economic policy analysis is that policy implications can be analyzed at the disaggregated level. Tax systems may impose a non-uniform effective tax rate on different businesses, depending on their size, ownership structure (standalone versus belonging to a group of firms, domestic versus foreign-owned), business activity and location. Corporate tax microsimulation models compute the net tax liabilities for individual firms and are used to forecast the revenue impact as well as the distributional consequences of tax reforms, and assess ex-ante whether policy initiatives had the intended or unintended effects.

The starting point for tax microsimulation models is a (large) microdata set which provides comprehensive information on the determinants of individual tax liabilities. In principle, corporate tax models require the use of two complementary company-level data sources — confidential corporate tax return data and accounting data — because usually corporate taxable income differs from economic income. Corporate tax returns allows to precisely determine the tax position of corporations in each fiscal year as well as to recover information on the use of non-debt tax shields, like capital allowances, losses carry forward and preferential tax treatments. Knowledge of loss offsetting and firms' ability to shift taxable profits over time are especially important for revenue forecasting. However, to completely identify heterogeneity in business activities other information are required. In particular, company accounts provides information of interest on the economic determinants of corporate profits.

Microsimulation models for firms are relatively rare compared to models for households (Ahmed 2006, Buslei et al. 2014). Firm models are more complex than household models both because firm behavior involves inter-temporal aspects and tax rules are usually more complex. In addition, access to firm data, especially tax, is more restricted compared to household data. Firm's models are usually static, thus disregarding behavior and time. A notable exception is the study of Finke et al. (2013) that provides an analysis of the German 2008 corporate tax reform based on a model that allows for behavioral responses of firms to tax changes.

To our knowledge this is the first study that documents a multi-period corporate microsimulation model founded on corporate tax returns. The approach developed in this paper is inspired by previous microsimulation models for Italy. A comprehensive corporate tax microsimulation model for Italy is MATIS (Modello per l'Analisi della Tassazione e degli Incentivi alle Società) developed under the aegis of the University of Bologna (Bontempi et al., 2001). The MATIS model is multi-period and based on accounting data for large manufacturing firms (Centrale dei Bilanci archive). Caiumi (2001) improves the design of the statistical archive of MATIS by selecting a representative sample with a stratified method from the universe of firms listed on the ISTAT firms register (Archivio statistico delle imprese attive, ASIA). Further, Caiumi (2005, 2006, 2007) develops a one period model based on cross-sectional confidential tax returns data. Balzano et al. (2011) develop a one period micro-based model that exploits numerous data sources, including published financial statements and survey data on Italian firms.

In this paper we present a new corporate microsimulation model (ISTAT–MATIS) which combines a multi-period framework with the use of large complementary data set. The new ISTAT–MATIS is an algebraic framework that reproduces tax liabilities of Italian corporations and fiscal groups in accordance to fiscal rules. The model framework incorporates all the complexities of the Italian tax regime, including the tax treatment of losses, the partial interest deductibility rule and the group taxation. The model serves the dual purposes of dynamic forecasting and policy analysis.

The multi-period framework allows for dynamic simulation and to consistently trace firm-level inter-temporal developments of fundamental tax base variables, like for example interests deduction add-backs (carry forwards), losses carry forwards and tax allowances carry forwards. This model approach is particularly suited to evaluate tax reforms that are gradually introduced into force. Tax changes often provides advantages partially offset by restriction in other provisions and the sign of the net effect on tax liabilities may vary over time.

The ISTAT–MATIS model is founded on corporate tax return data plus additional information drawn from other administrative sources on Italian corporations and ISTAT statistical archives. The available archives cover the population of corporations over a fairly long period of time (1998-2011). The integrated database used in this paper covers the years 2005-2011. The sources involved in the integration process are the company accounts database, the ISTAT archive on national business groups, the statistical register of Italian active enterprises (acronym ASIA), information on spin-offs and mergers, and business structural surveys, in particular the survey on foreign trade (COE), the survey on Italian enterprises controlled by foreign firms (Fats-inward) and the survey on resident firms with foreign subsidiaries (Fats-outward).

Being based on the entire population of corporations, our results allows for conclusions on the distribution of the tax burden among taxpayers as well as on the revenue impact of tax changes. Moreover, the richness of the database allows analyzing distributional effects across key variables, like economic sectors, technological intensity, size expressed both in terms of turnover and number of employees, location, export-oriented, and last but not least, property structure. The model does not account for behavioral responses by taxpayers to tax changes. Therefore its analytical capacity is limited to first round effects. We plan to develop the model further and incorporate the main effects that corporate taxes exert on the main corporations' decisions, in particular investment, financing and factor demand behavior, product supply and profit-shifting activities.

The objective of this paper is to describe in details the structure of the model and illustrate the potential use in the distributional analysis of tax changes and in the identification of the effects of tax provisions adopted in the aftermath of the economic and financial crisis up to 2014. On one side, several important feature of the

corporate tax system have been changed, such as the treatment of tax losses. On the other side, pro-growth provision have been introduced, like the expanded deduction of the labor component of the IRAP and the newly implemented 'Aiuto alla Crescita Economica' (Aid to Economic Growth). For an in-depth analysis of these tax reforms see Caiumi and Di Biagio (2015). In this paper we present the distributional impact of all tax changes on corporations over the course of the simulation years 2011-2014.

The paper is organized as follows. The next section overviews the current CIT system in Italy. Section 3 presents the ISTAT–MATIS model framework. Section 4 illustrates our measures for the effective average tax rates. Interpretation of results are discussed in section 5. Section 6 concludes.

2. The main feature of the Italian Corporate income Tax

This section overviews the structure of the tax system in force as an introduction to a more detailed analysis in the next sections.

2.1. **The tax treatment of losses.** The tax treatment of losses changed in 2011. According to rules previously in force, losses arising in a given tax period could be carried forward and deducted from corporate taxable income in subsequent periods up to a maximum of five years. Tax losses arising in the first three tax periods following the company establishment date could be deducted from taxable income in subsequent periods with no time limits, as long as losses concern a new business activity (e.g., the losses are not incurred in the course of a merger or business contribution). As from 2011, tax losses are no longer subject to a 5-year expiration period even for not-expired losses incurred in previous years. However, 20% of a year's taxable income cannot be offset against tax losses carried forward and will be subject to corporation tax. Losses incurred by a company during the first three taxable periods may be carried forward and entirely used to offset corporate taxable income, but, as before the reform, only if they arise from a new business activity. The reform of the tax treatment of losses leave unchanged the ban to losses carryback.

2.2. **Consolidated taxation mechanism.** After the major reform of 2004 the economic reality of corporate groups is formally recognized with the introduction of a formal group taxation system to the aim of further aligning the Italian tax system to the most efficient tax systems in force within the EU. In broad terms, the group relief recognizes to a business the same overall tax treatment of losses whether it operates as a single entity or as a group. Two different group taxation systems are in force; a national tax consolidation system and a world tax consolidation system. Consolidation for tax purposes is available to domestic groups, with each subsidiary in a group free to choose whether or not to consolidate. Consolidation is available to a parent and its resident companies that are under its direct or indirect control. The control requirement is met when the participation company holds more than 50% of the share capital of another company and is entitled to more than 50% of the profits of that company. Domestic consolidation may also be adopted if a non resident company is the controlling company but only if the company is resident in a country that has concluded a tax treaty with Italy and carries on business activities in Italy through a permanent establishment holding the participation in the controlled Italian companies. Domestic consolidation is not available to companies benefiting from a reduction of the corporate tax. It requires a minimum three-years commitment. Once an option for consolidation is made, it may not be revoked for three years unless the subsidiary ceases to be controlled by the parent company. The new domestic consolidation employs a 'pooling' approach. Exercising the consolidate taxation option therefore involves calculating a single taxable income for all companies included in the tax consolidation, by compensating income and losses within the consolidation scope (with adjustment for intra-group transactions). Taxable incomes are fully offset regardless of the controlling share. Tax losses realized previously to exercise the consolidation taxation option cannot be attributed to the parent company. The group taxation system provides additional opportunities and tax advantages such as the offsetting of tax credits and tax liabilities among group members, like for example the amount of the notional deduction in excess of the net taxable income as described in more detail below.

World tax consolidation effectively extends the group taxation treatment to foreign companies; incomes and losses realized by foreign subsidiaries are imputed to the Italian controlling company in proportion to the controlling share and calculated according to Italian tax rules.

2.3. **The Participation Exemption.** A central feature of the major tax reform of 2004 was the adoption of a participation exemption as a system to avoid the double taxation of revenues from participations in other corporations/partnerships in the form of dividends and capital gains. The PEX regime implies that 95% of capital gains realized by companies resident for tax purposes on the disposal of equity investments in corporations/partnerships resident in Italy or abroad are IRES-exempt. Equity investments eligible for such treatment are those classified as non-current financial assets, engaged in commercial activities, held continuously for at least twelve months and resident for tax purposes in a country or territory other than a tax haven (white list countries). Capital losses, write-downs and expenses related to the disposal of equity investments qualifying for the participation exemption are not deductible. Dividends received from corporations resident for tax purposes in Italy or a State or territory other than a tax haven are excluded from taxable income for IRES purposes in the amount (currently) of 95%.

2.4. **Interest deductibility regulation.** Corporations can fully deduct interest expenses and similar charges (not capitalized in the cost of assets) in an amount equal to interest income and similar revenues. The excess may be deducted up to a ceiling of 30% of Gross Operating Profit (GOP).[1] Interest expense that cannot be deducted (due to limit exceeding) can be carried forward to subsequent tax periods and added to the amount of interest expense and similar charges for such periods. To allow a gradual implementation of the new rule, the ceiling is augmented of an amount equal to 10,000 euros in the first year (2008) and 5,000 euros in the second year (2009). As from 2010, the GOP portion not used in a given tax period as it exceeds interest expense may be carried forward to increase GOP in subsequent years.

Specific rules apply in the case of companies participating in the consolidated taxation mechanism. The excess of GOP not completely used for interest deduction by the company that generated it, can be used to compensate interest expense not deducted by other entities belonging to the consolidation scope. This compensation is not allowed to interest expense carry forwards generated prior to the access to the consolidation. In addition, further restrictions apply to a consolidated company that holds both interest expense not deducted and loss carry forwards generated prior to exercising the consolidated taxation option. The aforesaid excess of interest expenses can be deducted from the consolidated taxable base up to the amount of the taxable income that the same company had conveyed to the consolidation. This is to avoid circumvent the rule that preclude loss carry forward generated prior to the access to the consolidation to be transferred to the consolidated taxable base.

2.5. **The newly implemented 'ACE'.** Starting from tax period 2011, taxable income is split into two components, ordinary and above-normal return. Ordinary income is exempt under ACE. The provision is aimed at spurring companies' own capitalizations by counterbalancing the tax advantage of debt.

The ordinary return is computed by applying a notional interest rate to new equity generated after 2010. [2] Specifically, the ACE base is computed from the algebraic sum of positive components (capital increases and allocations of profits to reserves) and negative components (the contemporaneous increase in equity investment qualifying for participation in related entities) due to anti-avoidance rules. The latter amount does not include any profits from that year. The notional interest is computed using a percentage set annually by the Minister of Finance. The percentage is set considering the Italian public debt securities' average return and a risk factor. The return is set at 3% for the first three fiscal years (2011–2013). It has been recently increased at 4%, 4.5% and 4.75% for the three subsequent years. Afterwards it will be based on Government bonds rate. The amount of the notional deduction in excess of the net taxable income can be carried forward to relieve future taxable income with no time limitation. The ACE relief is applied also to firms belonging to a fiscal

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[1]GOP is equal to the difference between item A (Production Value) and item B (Production Costs) in the income statement, increased by depreciation and amortization of property, plant and equipment, and intangible assets and lease payments.

[2]See Zangari (2014) for a comparison with the Belgian ACE system.

group. The ACE deduction is computed at the firm level up to entirely offset its taxable income. The amount of the notional deduction in excess of the net taxable income can be carried forward to relieve future taxable income or attributed to the parent company. As for tax losses, the overhang of the ACE deduction, arising before the access to a fiscal group, cannot be transferred to the fiscal unit.

2.6. **The local business tax.** The IRAP tax base is calculated by a direct subtraction method as the difference between gross receipts (sales revenues) and the cost of intermediate goods and services (purchases from other firms plus depreciation). Neither labor costs nor interest payments are deducible from the tax base.[3] However, the fiscal burden of the IRAP on the labor component of the tax base has been progressively reduced, mostly through the introduction of tax deductions in favor of permanent employees. Regional governments can levy an additional one (currently 0.92) percentage point or either reduce it to the same extent. The tax rate can also be differentiated according to the economic sector and the categories of firms.[4] Like the CBIT system, the IRAP seeks to eliminate the favorable fiscal discrimination of debt financed investment by disallowing a deduction for interest payments, but it is not neutral to investment given that outlays for capital goods are not immediately deductible (but only in accordance with normal income tax depreciation schedules).[5]

As of 2008 10% of the IRAP can be deducted from the IRES taxable base (and from income of firms subject to IRPEF) for firms that sustain financial and labor costs. After 2012, the total amount of the IRAP stemming from the labor component (net of applicable deductions) is deducible against the IRES. The lump sum deduction of the interest expenses component of the IRAP still applies. The overall deduction (lump sum and analytical) admitted to be offset against the IRES taxable base cannot exceed the amount of the IRAP tax debt. The share of unused deduction due to firm's tax-exhaustion can be carry-forward as a tax loss in future years.[6]

3. THE CORPORATE TAX MICROSIMULATION MODEL AND DATA

3.1. **The ISTAT–MATIS model framework.** The main determinant of income liable to corporate tax is corporate profits before taxes. However several adjustments reflecting allowances and requirements under the tax law are needed to establish the linkage between corporate profits before taxes and taxable income. The Italian corporate income tax (Imposta sul reddito delle società - IRES) envisages that the taxable income has to be determined by adding to profits (losses) before taxes stemming from company accounts, P(L), upward fiscal adjustments, Adj+, and by subtracting downward fiscal adjustments, Adj-, losses carried forward from previous tax periods, LCF, and other deductions from the tax base, like the ACE allowance:
CIT base = P(L) ± Adj − LCF − ACE.

The tax code reckons on a large number of fiscal adjustments. Some of them have temporal nature, by deriving from the possibility to partition specific income components over several tax years (for example, the taxation of capital gains); other adjustments respond to the need of avoiding double income taxation (i.e., dividends received); finally, other adjustments entail more substantial changes in the taxable income, i.e., the add-backs of non deductible interest expenses, or the allowance of tax bonuses. The losses carry forward allows a company to deduct from the taxable income the negative tax base accrued in the previous years. Related entities are free to choose, satisfied some requirements, whether or not to file a consolidated tax

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[3]The IRAP is essentially a net income type of value added tax on an origin basis (cfr. Ceriani and Giannini, 2009). Its peculiarity consists in the fact that it is levied not on income when taxpayers receive it, but before its distribution, on the value of production generated in each tax period by subjects engaged in business activities. The misunderstanding of this characteristic is at the root of the perception by taxpayers as a particularly oppressive tax.

[4]Under certain conditions, since 2013, regional governments can even set the rate to zero.

[5] Moreover, it probably favors capital over labor because tax depreciation allowances exceed economic depreciation (Bordignon et al., 2001).

[6]In practice, the tax code allows to offset first the IRAP deductions and then, on the residual taxable base after tax loss deductions, the ACE deduction.

declaration. Exercising the consolidate taxation option, therefore, involves calculating a single taxable base for all companies included in the tax consolidation, by compensating income and losses within the consolidation scope. Taxable incomes are fully offset regardless of the controlling share. Also losses carry forward of the fiscal group from previous tax period are subtracted, as well as the ACE allowance that pertains to the fiscal group. Tax losses and ACE leftovers realized previously to exercise the consolidation taxation option cannot be attributed to the parent company. For each fiscal group, the taxable income is determined as follows:
$$\text{CIT base}_\text{FG} = \sum \text{CIT base} - \text{LCF}_\text{FG} - \text{ACE}_\text{FG}.$$

The microsimulation tax model ISTAT–MATIS is an algebraic framework that reproduces tax liabilities of Italian corporations and fiscal groups in accordance to fiscal rules. The microsimulation tax model ISTAT-MATIS is founded on fiscal declarations both at the company level and the fiscal group. As known, the majority of the adjustments required by law cannot be inferred on the basis of accounts data. An important advantaged of return data with respect to balance sheets and P&L accounts is the possibility to take into account all unpredictable tax adjustments in the computation of the taxable base in order to precisely determine the tax position of the corporation. All fiscal variables are based on information drawn from the tax archives. The sources involved in the computation of the corporate taxable base at the firm level include data from the "UnicoSC" form and the "IRAP" form filed by each corporation, and tax declarations filed by the controlling companies ("CNM" form). Other available archives at the firm level are used as complementary data as described below.

Tax adjustments that are not explicitly modeled in our simulation procedures are drawn from corporations' tax declarations data (table RF of the UnicoSC form). Next, we offset losses brought forward from earlier tax years against taxable base. We explicitly model the tax treatment of losses according to tax rules. For the first year of our panel and for all records that enter the panel in subsequent years, loss carry forwards from earlier periods are taken from corporations' tax declarations (table RS of the UnicoSC form). For newborn firms, the procedure sets loss carry forward equal to the tax loss incurred in the first year it occurs. In addition, we model the tax treatment of national tax consolidation. Information on consolidation group structure is drawn from the communications of adherence to the group taxation merged with all tax declarations filed by the controlling companies ("CNM" form). Specifically, we model the "pooling system" currently in force by computing the taxable income of each group member at the individual level; individual profits or losses are then transferred to the parent company and aggregated at the group level to determine the consolidated taxable base of the group. Pre-consolidation losses are offset against the taxable income of the subsidiary before consolidation. Losses carry forwards at the group level are initialized as described above for the computation of the company's taxable base. After computing the taxable base at company and group level, ISTAT-MATIS computes tax liabilities for all taxpayers by applying the statutory tax rate.

Corporations are also liable for the local business tax, levied on an adjusted profit measure which exclude financial flows and extraordinary items of income, at a rate which varies across regions. The model draw information on the components of the IRAP taxable base from "IRAP" form and update deductions allowed on permanent workers according to more recent tax provisions. An implicit tax rate is applied in order to account for regional variations in tax rates. This is computed as the ratio between the IRAP tax charge and the taxable base. An indicator of the tax incidence of IRAP on the cost of labor for permanent workers is computed on the basis of information on the cost of labor drawn from the P&L statement, the number of dependent employees from the ASIA register and the amount of allowed deductions and the associated number of permanent workers from table IS of the "IRAP" form.

3.2. **Simulations using ISTAT-MATIS.** We follow the conventional approach in microsimulation modeling to consistently assess the effects that tax policy has on firms cash flow as opposed to other drivers, such as broader economic changes as well as changes in firms' economic and financial structure and in demographic composition (firm age, firm size, location etc.). This methodology consists in simulating a set of counterfactuals on the basis of the same information dataset in order to evaluate what the impact would be on firms cash flow if alternative provisions where to be applied.

The current version of the ISTAT–MATIS model reproduces the CIT system in force in year 2008 and subsequent tax changes until year 2014, as illustrated below, on the basis of historical firm data. Given that data on firms are available with time lags, it is not possible to simulate the most recent tax reforms starting from the year of entry into force. Simulation results are obtained by slipping backwards the simulation year as if the reforms were introduced in year $t-3$, such that the legislation in force in year t is simulated on the basis of information for the year $t-3$. In this paper, the tax year 2008 is used to simulate tax rules in force in 2011 and so forth.

The drawbacks of this approach are obvious in the presence of significant changes both in the tax structure and in the economic conditions underlying the simulation period in comparison to the year of reference for the tax rules. However, this doesn't seem of a major concern here. After the major tax reform in 2008, the broad structure of the Italian corporation tax system has remained relatively unchanged. Also, the economic downturns, that have so heavily affected the profitability of firms since the financial crisis in 2008, still persists. Thus, the chosen time span 2008-2011 seems suitable to be deployed for distributional analysis of recent tax reforms.

An important feature of our microsimulation procedure is that it does not require the underlying data panel to be balanced, therefore our simulation results are not affected by selection bias.

A first simulation implements in detail the tax structure in 2008 and all tax changes until the end of 2010. This outcome is used as term of comparison for all further simulations so as to compute changes in firms cash flow stemming from the tax change (*benchmark simulation*). Our benchmark simulation incorporates the 2008 tax reform that saw a significant drop of the main statutory corporation tax rate from 33% to 27.5% and of the IRAP tax rate from 4.25% to 3.9% and the broadening of the tax base through the abolishment of accelerated and anticipated capital depreciation allowances and the introduction of a stronger restriction to interest deductibility in replacement of a thin-cap rule as described above (section 2).

The simulation procedure reproduces the main dynamical components of the tax base for single firms and fiscal groups. Among tax adjustments, we model the computation of the interest add-backs as well as the deductions of IRAP from IRES (both the lump sum deduction and the analytical deduction). All remaining tax adjustments are algebraically added.

As for the interest deductibility rule, we follow straightly the regulation in place both before 2010 and after the reform occurred in 2010. Information required to compute net interest expense and the limit to interest deductibility are drawn from tax declaration (table RF "UnicoSC" form) combined with accounting data. Net interest expense exceeding the GOP rule are added to the taxable base. The amount of net interest expense carried forward from previous years that can be deducted in the current year is subtracted from the tax base. Non-deductible interest expense are carried forward to subsequent years. As from 2011, the unused GOP limit is carried forward to subsequent years without limitation. In the case of presence of both losses carried forward from previous years and unused GOP, as stated by law, we compute first the share of deductible interests carry forward from previous years and then the deduction of losses carry forward from previous years. Moreover, we model the additional tax advantages provided by the domestic group relief that allows the offsetting of non deductible interest expenses of a company with the unused ceiling arising from another company of the same fiscal group.

In what follows of this section we describe the implementation of recent tax reforms: the new tax treatment of losses introduced in 2011, the expanded deduction of the labor component (net of deductions) of the IRAP against the IRES in year 2012 and the newly implemented ACE regime introduced in year 2011.

The simulation denoted *"Reform of tax losses"* reproduces the new treatment of losses. As from 2011, tax losses are no longer subject to a 5-year expiration period even for not-expired losses incurred in previous years. However, only 80% of a year's taxable income can be offset against tax losses carried forward, thus the residual 20% will be subject to corporation tax. Losses incurred by a company during the first three taxable periods

may be carried forward and entirely used to offset corporate taxable income, but, as before the reform, only if they arise from a new business activity. The reform of the tax treatment of losses leave unchanged the ban to losses carryback. We suppose that it is convenient for the firm to use first the losses that can only be used to partially offset the taxable income and then the losses that can be used to fully offset the residual 20% of the taxable income.

The simulation named *"expanded IRAP deduction"* takes into account the complete system of IRAP deduction from IRES and allows to quantify the differential effect of the new deductibility rule with reference to the pre-existent lump-sum IRAP deduction described above. The expanded IRAP deduction is computed as the amount of the labor cost, as results from the profit and loss account, net of applicable deductions drawn from the "IRAP" form (table IC and IS). We follow the tax rule by applying first the expanded IRAP deduction and then the lump-sum deduction and limiting their total amount to the whole IRAP tax due. The unused deductions is added to losses carried forward and used to offset taxable base in subsequent years.

The simulation of the new *"incremental ACE"* regime accounts for the deduction of a notional return to equity - from 2011 to 2014 (2008-2011 simulation years) - obtained by the product of the net positive variation of equity as for the end of 2010 and the notional ACE rate set at 3% in the first three years 2011-2013 and recently increased to 4% for 2014, respectively. Anti-avoidance rules are also applied. The net variation of equity is computed by adding net increments observed for contributions in cash and retained profits feeding available reserve provisions (table RF "UnicoSC" form) and subtracting the increments of control participations as well as the increments of loans granted within a group (accounts data). In contrast, it is not possible to account for cash contributions within a group on the basis of the available data. This gives rise to a potential source of overestimation for the simulated ACE allowance. Anti-avoidance rules against the "refreshing" of the old capital are approximated by excluding from the benefit firms that are involved in transformation events (mainly cessation for transformation in a new firm). In addition, we exclude firms that are subject to insolvency proceedings (i.e. failure, liquidation and extraordinary administration) based on the Statistical Register (ASIA). Then the upper limit of the qualified ACE base is set equal to the net worth of the company existing at the end of the tax year with the exclusion of the reserves for own shares (accounts data). For newborn firms the computed deduction reckons on the entire amount of equity (net of participations and loans within a group). The ACE relief is entirely offset against the company's taxable income. The amount exceeding the taxable base is brought forward and added to the ACE allowance of the next periods or attributed to the fiscal group. Unrelieved ACE deductions against the group taxable income are carried forward, proportionally, by the same companies that generated them. As for tax losses, the surplus of ACE allowance accrued prior to exercising the option for the consolidation are strictly used to offset the company taxable income of the next periods.

Given the complexity of our microsimulation framework and because of the use of a large database that melt together a variety of data, it is necessary to test the ability of the model to provide reliable analysis of policy changes. See Appendix A for some insights.

3.3. **Data description.** Our database combines corporate tax return data and additional information drawn from other administrative sources on Italian corporations and ISTAT statistical archives, providing extensive information for various taxpayer groups with different characteristics relevant to policy analysis. The sources involved in the integration process are the company accounts database, the ISTAT archive on national business groups, the statistical register of Italian active enterprises (acronym ASIA), information on spin-offs and mergers, and business structural surveys, in particular the survey on foreign trade (COE), the survey on Italian enterprises controlled by foreign firms (Fats-inward) and the survey on resident firms with foreign subsidiaries (Fats-outward). The available archives cover the population of corporations over a fairly long period of time (1998-2011). The integrated database used in this paper covers the years 2005-2011.

The number of tax returns filed by corporations has constantly increased in recent years (see Table 1). Most of them are standalone corporations. The number of fiscal groups has also grown. In 2008, 4,936 group tax

returns were filed (about 84 percent of which were from corporate groups with five or fewer corporations) - almost two thousand more than in 2004 when the national tax consolidation was introduced - whereas the number of tax returns for corporations not participating in the group taxation system was 1,020,833. In 2011 5,624 group tax returns were filed (about 83 percent of which were from groups with five or fewer), while 1,074,013 corporate tax returns came from corporations not participating in the consolidation.

The simulation exercises encompass all corporations that filed the tax return module at least once over the years 2008-2011. Simulation results illustrated in Section 5 are based on a subsample of about 860,330 corporations selected by excluding firms belonging to agriculture, financial sector, health, education, as well as firms showing non-positive turnover that are not active (with the only exception of newborn firms). This subsample accounts for approximately the 75% of the total corporate tax revenue.

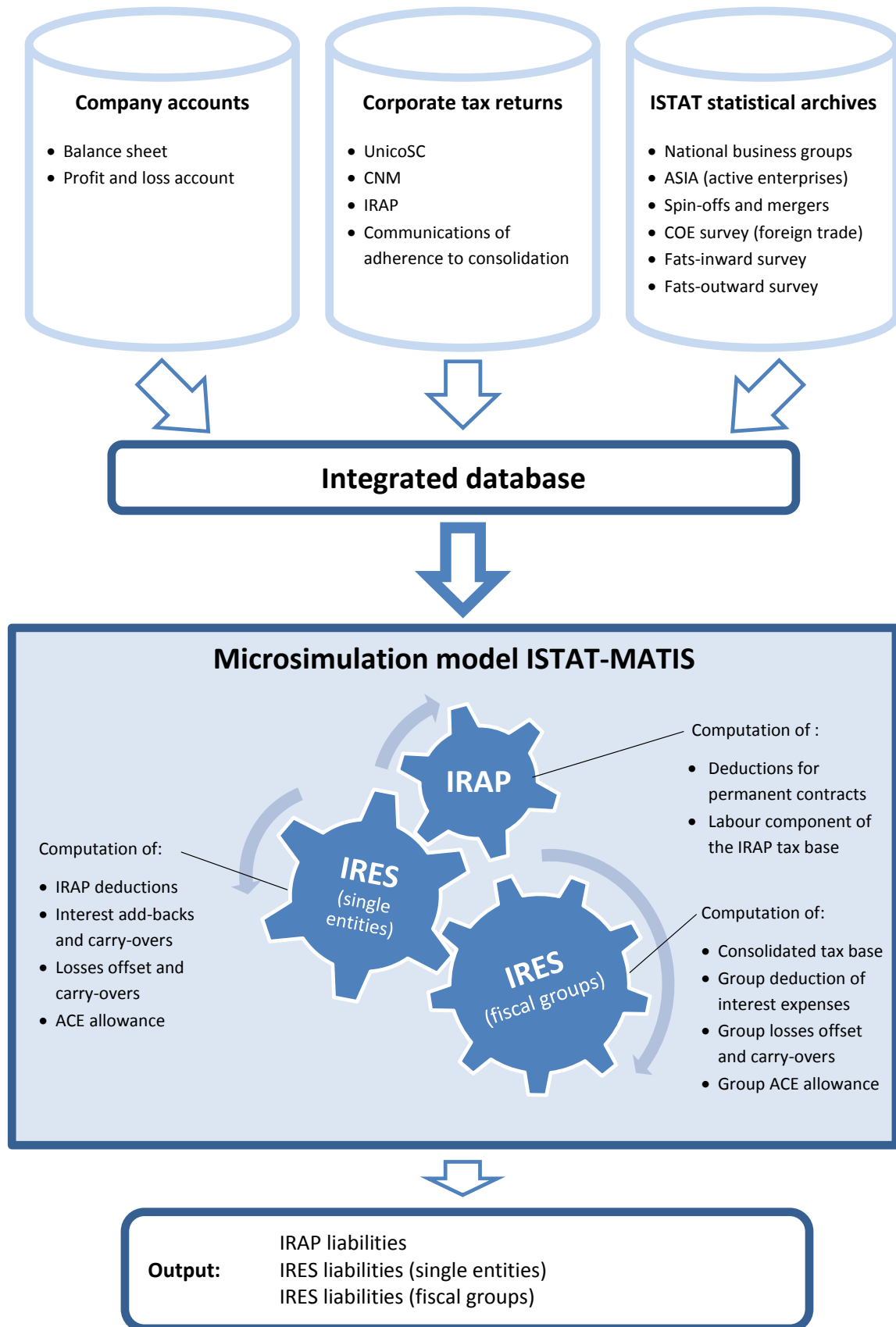FIGURE 1. The ISTAT-MATIS microsimulation model and data

TABLE 1. IRES Taxpayers

Tax year	Single entities	Companies in tax groups	Fiscal groups	Total
2008	1,021,276	20,033	4,936	1,041,309
2009	1,047,019	21,270	5,249	1,068,289
2010	1,067,386	21,789	5,314	1,089,175
2011	1,062,713	22,499	5,498	1,085,212

Source: tax return data

TABLE 2. Distribution of fiscal groups by number of companies

Tax year	Number of companies				
	2	3	4	5	≥ 6
	%	%	%	%	%
2008	42.9	20.2	12.8	7.3	16.8
2009	42.7	20.4	12.7	7.1	17.1
2010	41.5	20.9	12.8	7.5	17.3
2011	41.8	20.4	12.9	7.9	17.0

Source: tax return data

4. COMPUTING EFFECTIVE TAX RATES

The consequences of recent tax reforms on the tax burden borne by firms can be evaluated by computing effective tax rates indicators which exploit variations in statutory tax rates and tax base. The literature on public finance distinguishes two effective tax rate indicators, the average effective tax rate and the marginal effective tax rate. The average effective tax rate measures the ratio of business tax revenue to corporate profits for different groups of firms and allows to assess equity and efficiency aspects of tax policy reforms, whereas the marginal effective tax rate is defined as the present value of current and expected future taxes paid on an additional unit of income earned today (Graham 1996, Shevlin 1990). As known, marginal effective tax rates play an important role in determining the scale of the investment. In contrast, average effective tax rates are relevant as regards firms' location decisions. In the context of interest here, the computed indicators are ex-post ones, in that they reflect the current taxation of corporate profits resulting from past investment and financial decisions, then they are so called backward-looking.

While forward-looking measures are usually recognized non-exhaustive indicators of the relevant elements of the tax base that can affect effective taxation (Nicodème 2001, Caiumi et al. 2015), micro backward-looking indicators have the advantage that all the elements of taxation can be taken into account.[7] Besides, the use of a detailed microsimulation model enables to isolate tax provisions so as to look at their separate effects and overcome a well-known shortcoming of conventional backward-looking indicators.

The complexity involved in the computation of marginal tax rates goes beyond the purpose of this paper[8], henceforth we restrict ourselves to the computation of average effective tax rate. There are numerous ways of constructing measures of effective tax rates. While the numerator of a basic average tax rate includes tax accrued, the denominator can be defined as some measure of economic corporate profits, like profits before tax or net operating surplus. On one hand, one can argue that financial flows can be quite volatile then the net operating surplus is a more reliable measure than the alternative. On the other hand, a ratio of corporate

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[7]The main distinction between backward-looking and forward-looking approaches is based on the type of information used. Backward-looking measures are based on observed data on corporate profits or company accounts, while forward-looking measures are computed from the simulation of tax debt on the return of an hypothetical investment project taking into account fiscal parameters.

[8]See Arachi and Bucci (2013) for a recent analysis on Italy.

income tax to the gross operating surplus is an indicator of the tax burden on investment, but not a measure for the taxation of profits since it disregard the financing structure of the enterprise.

The option retained here is to compute the effective average tax rates as the corporate tax liability assessed in a year over before-tax profits earned in the same year.[9] To account for the dynamical components of the taxable base we consider the whole time span of the simulation period (2011-2014) as follows

$$\mathrm{ETR}_i = \frac{\sum_{t=2011}^{2014} T_{i,t}(1+r)^{T-t}}{\sum_{t=2011}^{2014} P_{i,t}(1+r)^{T-t}},$$

where i indexes the taxation rules, $T_{i,t}$ is the tax debt at year t, and $P_{i,t}$ are the profits before taxation at year t. We compute future value of taxes accrued and pre-tax profits by applying a real interest rate r set at 2.5%, the average real interest rate on bank lending to firms in the same period.

This measure is clearly undefined for zero profits. In addition, if the firm is in a loss position then a positive tax charge would generate a negative ETR implying a completely different interpretation. For these reasons the analysis below considers only observations with positive profits. In addition, we consider only companies that are present in our panel for all the quadriennium. Consistently, we set the numerator and the denominator at zero in periods when the firm is in a loss position. The ratio - given by total taxes accrued over a period of time on total pre-tax profits over the same period of time - returns a more reliable assessment of the tax burden borne by firms than a weighted average of yearly effective tax rates.

By construction, the average tax rate is comprised between 0 and 1, being not-defined for negative values of the denominator (firm in a loss position). In the case it is greater than 1 it is set equal to 1 to avoid excess sensitivity of the first moments of the distribution to outliers (e.g., tax due may exceed earnings because of upward fiscal adjustments). Earnings before taxes are computed from tax return data.

A measure of the total tax charge on profits, including the CIT and the local tax is obtained by adding to the IRES tax debt and the IRAP burden on the profits component of the tax base. This is computed by subtracting interest expense (from the income statement) and the labor cost (from the income statement) to the net production value (from the IRAP tax return), and then applying the effective IRAP tax rate borne by the firm as it results from the IRAP tax return (see section 2.6 above).

5. The distribution of the effective tax burden on firms: a descriptive analysis

This section illustrates the main features of the computed average effective tax rates at the firm level. By including only observations for single companies and fiscal groups where the ETR is well defined, i.e., all companies and fiscal groups with positive profits and with no missing observations over the entire simulation period (2011-2014), the selected sample is reduced to 570,161 out of 860,330 units. Notice that the number of corporations with positive profits is always larger than the number of corporations with positive tax charge, because of losses brought forward or the usage of other tax deductions. Table 3 (first row) shows that this group of firms correspond to 13 percent of the selected corporations for the benchmark simulation. After the introduction of the new treatment of losses it decreases at 5.6 percent. Further by applying the extended IRAP deduction it raises at 6.6 percent. Finally, with the new ACE allowance the number of firms that have zero tax charge increases at 8.6 percent.

The mean of the ETRs is 31.5% for the benchmark simulation, to be compared, respectively, with 32.5% for the new treatment of losses, with 30.9% when also considering the extended IRAP deduction and with 29.2% when further accounting for the new ACE allowance. In all cases the mean is significantly above the median, indicating a right-hand side asymmetric distribution.

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[9]Tax credits are not considered in the numerator.

TABLE 3. Effective tax rates on Italian companies, 2011-2014 (percentage points)

	Benchmark	Losses	expanded IRAP deduction	ACE
zero tax charge	74,232 (13.0%)	31,952 (5.6%)	37,912 (6.6%)	49,094 (8.6%)
mean	31.5	32.5	30.9	29.2
median	29.1	29.3	28.1	27.1
CV	75.7	71.9	74.8	78.4

The dispersion in ETRs is quite high as the coefficient of variation is well above 70% in all cases. Average tax rates vary across firms due to differences in tax losses carried forward, differences in depreciation allowances as well as in tax planning strategies or the ability to shift profits over time. Differences in ETRs do not necessarily mean that the tax code is more favourable towards a specific group of firms than others, but it can for instance be due to the fact that those companies are more able to exploit the possibilities offered by the tax code to optimize the tax burden that companies have to bear. However, an important issue in the debate on the economic effects of the taxation on corporate profits is whether large corporations are paying their share of the tax burden. From a theoretical point of view, corporate income taxation that creates a favorable tax treatment for a specific categories of firms reduces its efficiency.[10]

Based on our results the tax burden on Italian companies seems not strongly related to size. Table 4 also splits companies according to two different variants of firm size: the turnover and the number of employees. The first one separates out companies that are considered small as their turnover is lower than 5 millions euros. The second criterion is based on a threshold of 20 employees. The distance in the effective tax rates between small firms and medium-large companies is fairly limited according to both criteria both for the benchmark simulation and the new treatment of losses. After the introduction of the expanded IRAP deduction the difference in the ETR increases. The tax burden is lower on firms with a turnover higher than 5 million euros of about 1.5 percentage points at the mean level, but it is negligible at the median level. However, the distance in the tax burden between small firms and the other firms is higher according to the second criterion. Tax liabilities for firms with less than 20 employees are of about 5 percentage points higher on average than for other firms. In contrast, small companies have mostly benefited from the ACE. By selecting only beneficiaries firms (about 36% of the total number of firms considered here) we observe that the reduction of the tax burden is significantly higher for smaller firms than larger ones under both size definition (Table 5). This finding is in sharp contrast with results for the Belgian ACE (Conseil supérieur des Finances, 2014) and may be possibly due to the incremental mechanism introduced in Italy. We will explore this issue more in depth in further analysis.

The following pictures detail the relationship between effective tax rates and the size of the firm by deciles of turnover and employees. Each graph depicts the trend in ETR at the mean and median level measured by the axis on the left, as well as the dispersion measured on the right hand side axis. We compare simulation results for the 2008 corporate tax reform (our benchmark simulation) with those for the current tax system after the most recent tax reforms. As we can see, the relationship between the ETRs and the turnover is quite stable for the most recent tax regime, while it shows a moderate upward trend in the former tax system (Figure 2). In contrast, in the current tax regime the relationship between the ETRs and the number of employees is quite stable up to the 8th decile, afterwards the profile changes becoming inversely related to size, while it was quite stable overall in the previous tax regime (Figure 3). Notice that the difference between mean and median is quite regular under both tax regime when firm size is captured by turnover. This is not the case when we consider the number of employees: the difference between mean and median values is higher for firms in the bottom side of the distribution, indicating the presence of very high ETR values for smaller

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[10]An extensive and growing literature deals with this topic. See for instance Zimmerman (1983), Santoro (2004), Nicodème (2007).

TABLE 4. Effective tax rates by small and other companies (percentage points)

		Benchmark	Losses	Extended IRAP deduction	ACE
by turnover:					
mean	small firms	31.5	32.5	31.3	29.6
	other firms	31.7	32.4	29.7	28.0
median	small firms	29.0	29.1	28.2	27.3
	other firms	29.5	29.6	27.8	26.7
by employees:					
mean	small firms	32.1	33.2	32.5	30.7
	other firms	30.4	31.3	27.8	26.3
median	small firms	29.0	29.2	28.7	27.6
	other firms	29.2	29.4	27.0	25.9

TABLE 5. Effective tax rates by small and other companies (percentage points) - only ACE beneficiaries

		pre-ACE	post-ACE	difference
mean	total	31.6	27.9	3.7
median	total	28.8	27.1	1.7
by turnover:				
mean	small	32.6	28.3	4.3
	other	29.6	27.1	2.5
median	small	29.3	27.3	2.0
	other	28.0	26.7	1.3
by employees:				
mean	small	33.5	29.0	4.5
	other	28.9	26.4	2.5
median	small	29.7	27.6	2.1
	other	27.7	26.4	1.4

firms than for other firms. It is also worth underlying that the dispersion is overall quite high and inversely related with firm size, according to both criteria.

6. CONCLUDING REMARKS

The measurement of effective taxation of companies is a difficult task. To address the complexities posed together from corporate taxation and the heterogeneity of firms, we need a considerable amount of information throughout the enterprise as well as advanced tools. This paper illustrates the new ISTAT-MATIS microsimulation currently used by ISTAT in the economic analysis of corporate tax reforms in Italy.

We use a unique database that combines information from corporate tax returns data, company accounts and statistical archives as a basis for the computation of the tax base. The merging of tax and accounting

FIGURE 2. Effective tax rates by deciles of turnover
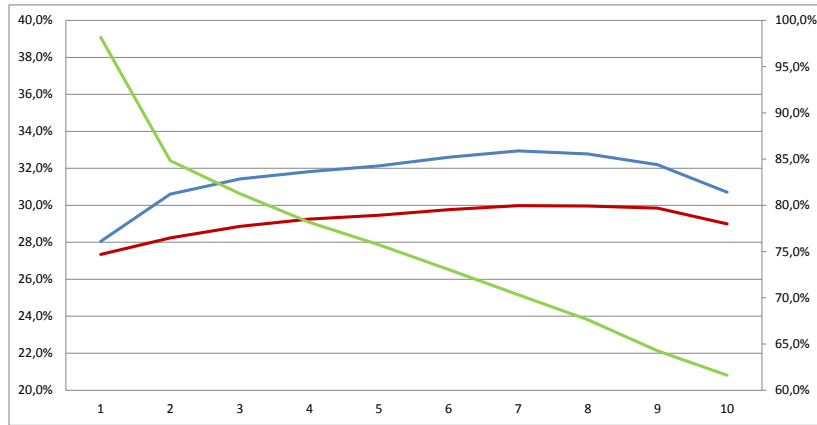
(a) benchmark
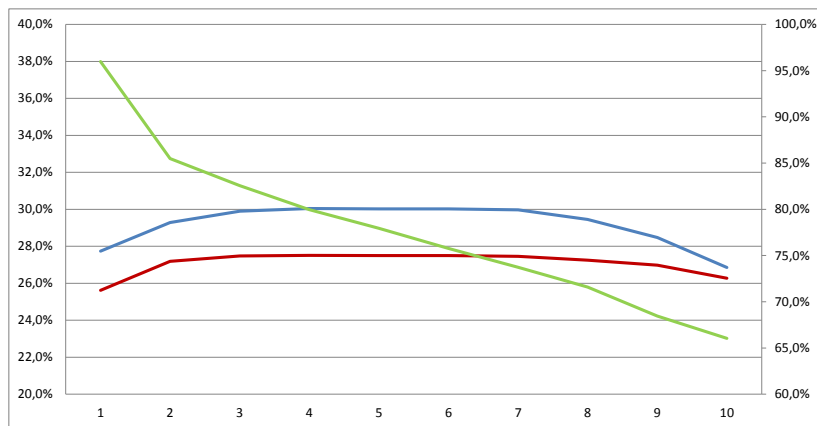
(b) ACE

information provides comparative advantage in terms of precision for the tax base compared to other databases that only rely on accounting data. In addition, statistical archives allows us to link the variability in effective tax rates with some relevant firm's characteristics usually disregarded in this type of analysis, such as the degree of internationalization of the firm.

The model framework is multi-period in order to account for inter-temporal components of the taxable base, such as losses carried forward, group consolidation or tax allowances carried forward. In particular, the structure of the model allows us to account for all relevant interdependencies among tax provisions over time, as well as to trace the cumulative effects of the incremental ACE regime recently introduced in Italy.

In this paper, we describe the main features of the Italian Corporate Income Tax, the simulation methodology used and the computation of corporate effective tax rates. We also show some evidence based on our simulation results on the relationship between ETRs and firm size. From the empirical investigation, it appears no clear relation between the ETR and the turnover of the firm according to both the 2008 tax regime and the current one. The relationship between the ETR and the number of employees seems positive only in the upper deciles

FIGURE 3. Effective tax rates by deciles of employees
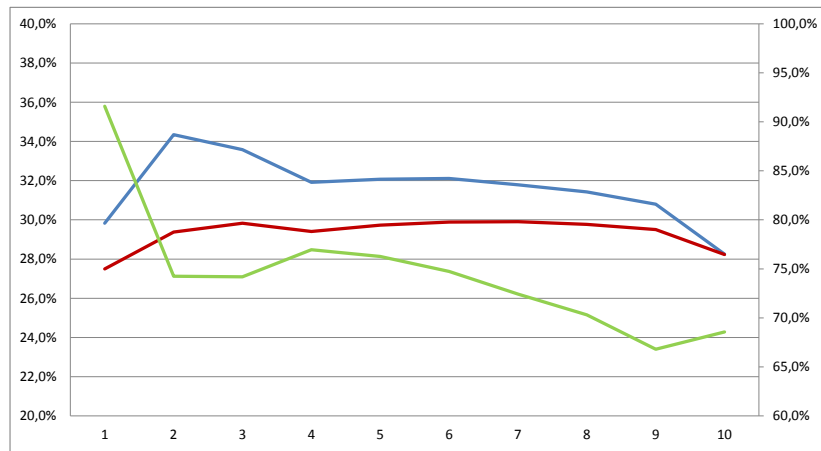
(a) benchmark
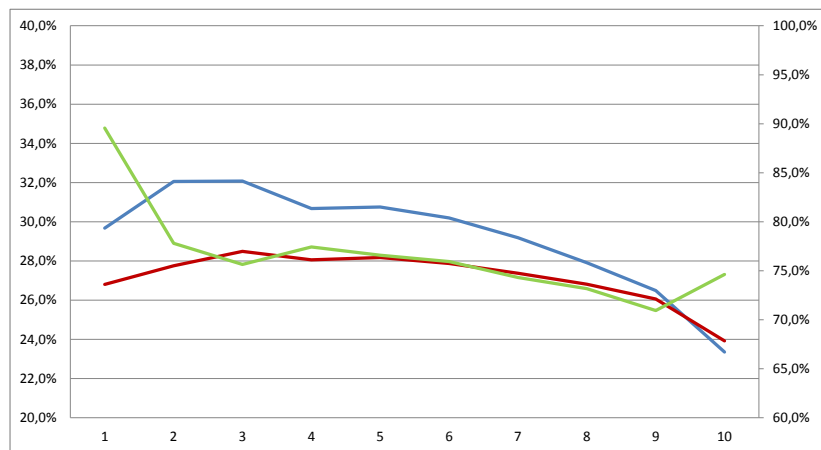
(b) ACE

after the introduction of the Irap deduction from the IRES tax base. Differently from the Belgian ACE, the Italian ACE regime reduces the tax burden to a higher extent on small firms than larger ones.

APPENDIX A. THE VALIDATION OF THE MODEL

In this appendix we assess the performance of the current model to consistently approximate the IRES tax base and to provide fine-grained policy information. In Table A.1 simulation results are compared with official data provided by the Department of Finance for the same tax years, 2008-2011. At the aggregate level the IRES tax due is over estimated by only 3% in all four years considered. Tables A.2-A.4 compare estimates of the main components of the taxable base with information drawn from tax declarations at the firm level for the last year of simulation (2011). As we can see, for losses carry-forward, losses used and the taxable base there are no systematic deviations of the ISTAT–MATIS microsimulation results: each variable is exactly predicted for more than 65% of companies in our database and the estimated deviation between simulated and actual data is lower than 2% on average (Tables A.2-A.4). The quality of our estimates drops for the ACE deduction. The distance with real data is on average equal to 11.2%. However, this does not seem to significantly affect the estimated distributional impact of the new ACE regime in terms of tax savings, beneficiaries and implicit tax rates as shown in Table A.5.

TABLE A.1. Comparison of ISTAT–MATIS simulation results with official tax return data. IRES tax due

Tax year	Single entities		Fiscal groups	
	simulation	Agenzia delle Entrate	simulation	Agenzia delle entrate
2008	23,954,612	23,589,293	14,766,116	14,124,477
2009	21,421,570	20,821,636	14,319,947	13,897,647
2010	22,808,730	22,143,140	12,782,185	12,292,081
2011	23,114,893	22,648,003	12,531,896	12,178,419

Source: ISTAT–MATIS microsimulation model

TABLE A.2. Comparison of ISTAT-MATIS simulation results for the taxable base with tax return data: Losses carried forward, 2014

	companies	frequencies (%)			simulated values	UnicoSC	difference %
		over estimation	exact estimation	under estimation			
Total	860,330	14.8	76.1	9.1	103,459	104,893	-1.4
Sectors							
Manufacturing	134,109	15.1	73.9	11.0	229,820	236,063	-2.6
Public utilities	14,592	22.2	70.5	7.3	232,638	237,059	-1.9
Construction	157,251	13.0	76.4	10.7	49,278	54,534	-9.6
Trade	186,210	14.0	77.9	8.1	75,542	77,726	-2.8
Other services	368,168	15.6	76.1	8.3	89,573	87,123	2.8
Turnover							
< 1	38,908	31.8	55.0	13.2	156,986	144,681	8.5
1-500,000	511,420	15.6	74.9	9.4	52,983	54,750	-3.2
500,000 - 2 mln	187,143	11.9	80.2	7.9	66,368	66,968	-0.9
2 - 10 mln	93,140	10.8	81.1	8.1	154,285	153,908	0.2
10 - 50 mln	23,644	9.3	81.8	8.8	507,702	508,501	-0.2
>50 mln	6,075	6.5	86.5	7.0	2,800,010	2,917,239	-4.0
Localization							
North-West	253,432	14.4	76.2	9.4	147,870	147,937	0.0
North-East	178,603	14.3	75.9	9.8	94,831	99,550	-4.7
Center	215,603	14.6	76.4	9.0	87,277	88,807	-1.7
South	212,692	15.8	75.9	8.3	74,190	74,396	-0.3
Ownership structure							
Standalone	696,640	14.9	76.5	8.5	47,800	46,581	2.6
Belonging to a group	137,285	15.1	72.8	12.1	244,647	248,759	-1.7
Consolidated taxation	18,172	6.7	87.3	6.0	637,898	701,374	-9.1
Foreign controlled	6,479	16.6	70.0	13.4	1,425,454	1,464,731	-2.7
Multinational	1,754	12.5	73.7	13.8	738,903	801,454	-7.8

Source: ISTAT–MATIS microsimulation model

TABLE A.3. Comparison of ISTAT–MATIS simulation results for the taxable base with tax return data: Losses deduction, 2011

	frequencies (%)			simulated values	UnicoSC	difference %
	over estimation	exact estimation	under estimation			
Total	6.0	90.7	3.3	6,248	6,203	0.7
Sectors						
Manufacturing	7.1	88.2	4.7	13,946	14,195	-1.8
Public utilities	9.7	86.6	3.7	23,004	23,013	0.0
Construction	6.0	90.5	3.5	3,686	3,418	7.8
Trade	5.0	92.3	2.6	4,179	4,180	0.0
Other services	5.9	91.0	3.1	4,921	4,839	1.7
Turnover						
< 1	3.6	95.3	1.1	2,094	1,969	6.3
1-500,000	6.0	91.3	2.7	2,229	2,081	7.1
500,000 - 2 mln	6.3	89.3	4.4	4,920	4,732	4.0
2 - 10 mln	6.4	88.5	5.1	11,868	11,673	1.7
10 - 50 mln	6.2	88.5	5.4	41,902	42,599	-1.6
>50 mln	4.6	90.8	4.5	187,178	200,148	-6.5
Localization						
North-West	6.0	90.4	3.6	9,048	9,076	-0.3
North-East	6.0	90.3	3.7	6,691	6,671	0.3
Center	5.9	90.9	3.2	5,299	5,219	1.5
South	6.0	91.1	2.9	3,503	3,385	3.5
Ownership structure						
Standalone	5.8	91.2	3.1	3,284	3,131	4.9
Belonging to a group	7.1	88.3	4.7	12,428	12,483	-0.4
Consolidated taxation	3.8	93.3	2.9	39,013	42,899	-9.1
Foreign controlled	7.4	85.8	6.8	79,955	80,085	-0.2
Multinational	9.1	84.2	6.7	88,069	81,773	7.7

Source: ISTAT–MATIS microsimulation model

TABLE A.4. Comparison of ISTAT–MATIS simulation results for the taxable base with tax return data: aggregate, 2011

	frequencies (%)			simulated values	UnicoSC	difference %
	over estimation	exact estimation	under estimation			
Total	11.5	67.4	21.0	135,725	134,832	0.7
Sectors						
Manufacturing	16.4	58.1	25.5	294,425	293,124	0.4
Public utilities	12.5	59.6	27.9	1,013,578	1,006,772	0.7
Construction	13.6	65.3	21.0	54,680	52,664	3.8
Trade	11.3	68.0	20.6	102,975	102,597	0.4
Other services	8.9	71.7	19.4	94,303	94,012	0.3
Turnover						
< 1	5.3	90.7	4.0	12,275	11,017	11.4
1-500,000	6.9	77.9	15.2	15,438	15,310	0.8
500,000 - 2 mln	15.3	53.9	30.8	56,343	55,670	1.2
2 - 10 mln	24.1	39.6	36.4	185,103	183,345	1.0
10 - 50 mln	33.5	30.4	36.1	845,358	841,154	0.5
>50 mln	42.0	26.0	32.0	9,979,026	9,935,446	0.4
Localization						
North-West	13.3	64.8	21.9	206,922	206,323	0.3
North-East	13.4	67.3	19.3	141,165	139,969	0.9
Center	10.7	68.1	21.3	132,680	131,054	1.2
South	8.8	70.0	21.3	49,407	49,161	0.5
Ownership structure						
Standalone	10.3	69.3	20.4	46,572	46,146	0.9
Belonging to a group	15.4	61.0	23.7	182,716	180,484	1.2
Consolidated taxation	24.1	51.9	24.0	2,499,399	2,492,682	0.3
Foreign controlled	20.9	53.9	25.2	1,686,271	1,679,438	0.4
Multinational	34.6	35.7	29.6	1,650,815	1,651,520	0.0

Source: ISTAT–MATIS microsimulation model

TABLE A.5. Comparison of ISTAT–MATIS simulation results for tax savings, beneficiaries and implicit tax rate arising from the new ACE regime with tax return data, 2011

	ACE allowance (%)		beneficiaries (%)		27,5%-implicit tax rate	
	simulation	UnicoSC	simulation	UnicoSC	simulation	UnicoSC
Total					-0.25	-0.23
Sectors						
Manufacturing	32.8	39.4	21.5	24.4	-0.24	-0.26
Public utilities	8.9	6.8	2.2	2.4	-0.18	-0.12
Construction	8.9	6.6	16.1	14.1	-0.30	-0.21
Trade	15.6	15.6	23.0	22.4	-0.24	-0.22
Other services	33.7	31.6	37.2	36.6	-0.28	-0.24
Turnover						
< 1	0.3	0.2	0.4	0.3	-0.18	-0.11
1-500,000	10.4	9.5	34.5	29.8	-0.38	-0.32
500,000 - 2 mln	11.0	7.8	29.7	27.7	-0.30	-0.20
2 - 10 mln	17.9	14.6	25.0	27.7	-0.30	-0.23
10 - 50 mln	19.3	18.7	8.3	11.3	-0.28	-0.25
> 50 mln	41.1	49.2	2.1	3.2	-0.20	-0.21
Localization						
North-West	48.1	51.0	36.3	39.8	-0.27	-0.26
North-East	23.3	23.9	25.3	29.7	-0.27	-0.25
Center	18.8	18.2	21.7	19.4	-0.19	-0.17
South	9.9	6.9	16.7	11.2	-0.28	-0.17
Ownership structure						
Standalone	31.4	24.1	72.9	68.0	-0.28	-0.20
Belonging to a group	26.5	25.6	21.3	24.0	-0.31	-0.27
Consolidated taxation	33.9	40.7	3.7	5.2	-0.22	-0.24
Foreign controlled	5.7	6.9	1.5	2.0	-0.15	-0.17
Multinational	2.6	2.7	0.6	0.8	-0.26	-0.24

Source: ISTAT–MATIS microsimulation model

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(Antonella Caiumi) Division for data analysis and economic, social and environmental research, ISTAT - National Institute of Statistics, Via Tuscolana 1788, 00173, Roma, Italy

E-mail address: `acaiumi@istat.it`

(Lorenzo Di Biagio) Division for data analysis and economic, social and environmental research, ISTAT - National Institute of Statistics, Via Tuscolana 1788, 00173, Roma, Italy

E-mail address: `lorenzo.dibiagio@istat.it`