THE EFFECTS OF THE ITALIAN TAX REFORM ON CORPORATIONS: A MICROSIMULATION APPROACH

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Abstract

In this study a microsimulation model for the business sector is presented and used to perform tax policy analysis and tax revenue simulation. The model herein proposed is innovative, in particular for its potential in showing the impact that tax policy has on firms choices concerning financial policy, localisation, investments and inputs allocation. As for the data used, it has become necessary to move from single survey data sets, which are insufficient for tax micro-modelling needs, to a comprehensive information system of "integrated and systematised" datasets on enterprises. The microsimulation model presented in this paper is based upon an integrated dataset built at ISTAT (Italian National Statistical Office) which combines survey data and published accounts data for corporations. To our knowledge, no similar effort has occurred yet in the field of the analysis of the effects of public policy on enterprises. Our model reproduces the Italian tax system on firms (corporate tax, regional tax on economic activity, social contributions) from the year 1998 onwards. At the present stage of development the model is static and does not include any firms' behavioural reaction. In this work, the model is used to estimate the effects of the fiscal policy changes designed in recent years by the Italian Government. Various changes of modelled taxes are analysed and discussed and results are shown. Simulation output includes tax due for every firm both in the baseline scenario and in the reformed regime and estimation of effective tax rates disaggregated by sectors, size and other characteristics.

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1. Introduction

This paper presents a microsimulation model for enterprises to perform simulations of the impact of different fiscal policies on firms. Tax policy analysis and tax revenue forecasting can be carried out using either macro or micro models. Macro models are typically based on the use of aggregate data. Simulations of fiscal policy changes and revenue forecasting are therefore usually provided by modelling economic relationships among institutional sectors as well as behavioural responses. Micro models (MM) are usually accounting models based on the use of large datasets of disaggregated data, such as household budgets (or consumption) surveys and firm surveys. Furthermore, they typically imply a partial equilibrium setting[1]. Another common distinction between these two categories of models - that macro models embody behavioural responses, whereas MM do not - is only partially true, as this refers to the common use of these models, rather than a technical obstacle to embody behavioural relationships in MM. The availability of disaggregated data, instead, marks the possibility of using MM. Microsimulation of public policy begins with a large survey of the relevant group, to which we add information about the rules and operations of the policies we are interested in and how the members of the populations affected by that program behave. However, microsimulation is much more than just the survey. To the survey is added considerable information from other sources, the program rules for the policies being simulated, interactions among these policies, and how people in the survey behave. Microsimulation models can be either static or dynamic. Moreover, static MM can be understood in two different ways: a) using only one cross-section, that is, without investigating the past and projecting the future; b) not including behavioural responses, that is, considering only the first-round impact of tax policies without investigating second-round effects. Dynamic MM can also be understood in two analogous ways: a) using either repeated cross-sectional data (time-series of cross-sections) or panels; b) considering agents' behavioural reactions.

There are some basic reasons suggesting the use of MM in fiscal policy analysis[2]:

- the first reason draws on the obvious possibility of having refined outcomes with respect to cases in which aggregated data are used. By having individual observations and large datasets, any policy can be analysed in great detail for every firm, by considering their own budget items. Aggregating data may cause a loss of details. This aspect is particularly important if one considers the possibility that contradictory results may derive from using either aggregated or disaggregated data. For example, aggregating a budget item with positive and negative values may lead to wrong interpretation of the effect of a specific tax policy. Aggregated data are therefore only a partial tool for analysing the effects of public actions on firms;

- as a consequence, aggregate results may be recovered by disaggregated data, whereas the reverse is not true. For example, a detailed micro-simulation analysis may end up with results divided by sector of activity, firm size, firm location, and the like. In principle, provided that the available information is included in the original dataset, there is a considerable possibility of aggregation;

- a micro-simulation model makes it easier to standardise the analysis over time. The dynamic effects of a given tax policy may therefore be analysed in a consistent way. This avoids the common drawback of using different methodologies in different times which makes for confusing results due to the real effect of tax policy as well as to effects of changing the methodology;

- when repeated cross-sectional data are available, it becomes possible to disentangle the "pure" effect of tax policies from the effects of a sample composition. Aggregate data do not allow for this kind of analysis;

- statistical large sample properties tend to generate results with lower standard errors. Under certain hypotheses about the distribution of the variables, confidence intervals of results may also be calculated.

Although microsimulation models are becoming a widespread tool for public policy analysis, most of the available and running micromodels are referred to households. This is mostly due to data unavailability and to the need of higher requirements for intertemporal and international comparisons. Therefore, the scientific challenge of building a microsimulation model for firms has this innovative aspect.

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[1] In the last decade, the literature on microsimulation models has become quite extensive. There are, among others, some book length reviews such as Harding (1996), Gupta and Kapur (2000), Mitton, Sutherland and Weeks (2000), Creedy (ed.) (2002). Some relevant articles are Merz (1991), Merz (1993), Merz(1994) and Creedy (2001).

[2] These considerations are drawn from Bardazzi, Gastaldi and Pazienza (2002).

This paper presents a model aimed at making a contribution that can serve to fill this gap. The development of microsimulation prototypes for the business sector herein proposed is thus innovative, in particular for its potential in showing the impact that policy has on firms' choices concerning financial policy, localization, investments and inputs allocation. The microsimulation model presented in this paper is based upon an integrated dataset built at ISTAT[3]. This dataset combines survey data and published balance-sheets for corporations. Data quality in terms of universe representation has proven to be very high. The microsimulation model reproduces the Italian tax system on enterprises (IRPEG, IRAP, social contributions) from 1998 onwards.

Our aim is to estimate the effect of tax policy changes on firms' balance sheets for different firm types. This analysis is very original as far as very small enterprises are concerned; scarcity of data has hampered until now empirical work in this field. Simulation output includes tax due from every firm both in the baseline scenario and in the reformed regime and estimation of tax revenue disaggregated by sectors, size and other characteristics.

The paper is organized as follows. In section 2 the tax reform is briefly explained, then the structure and the validation of the model is presented (sections 3 and 4). The final section is devoted to the presentation of scenarios designed for several simulations and describes our main empirical results.

The appendix contains an overview of the 1998 Italian fiscal reform and a description of the main characteristics of the taxes considered in our model.

2. The Tremonti reform

2.1 A general view

At the end of 2001, the Italian Government approved a Bill containing guidelines for a comprehensive tax reform affecting both direct and indirect taxation. Pursuant to Law April 7, 2003, no. 80 ("Enabling Law"), the Italian Parliament has then delegated the Italian Government to implement a tax reform in compliance with the principles set out in the Enabling Law.

The new tax system will be structured around five types of taxes (individual income tax, corporate income tax, VAT, tax on services and excise duties) and all taxes will be governed by a consolidated tax code. The main characteristics of the new system for firms are:

a) the abolition of the DIT system and IRAP[4]; as regards IRAP, at a first stage, the cost of labour will be excluded from the tax base;

b) the generalised exemption of corporate dividends and distributed capital gains, the abolition of the dividend tax credit and other measures on the tax treatment of capital gains and losses;

c) the introduction of an optional consolidated tax statement for groups that can be extended to foreign subsidiaries.

Among the various declared objectives, simplification is attained trough standardisation of capital income taxation, the abolition of tax credits and group taxation. The IRAP abolition can be included in this goal if we recall the fact that the Government has stressed the peculiar nature of IRAP and the idea that it does not simplify the tax burden on firms. Actually, although this tax was introduced by the previous Government for the simplification task (indeed it substituted several other taxes and heath insurance contributions) and contributed to a significant reduction of tax burden (Lusignoli and Pazienza, 2000; Gavana, Majocchi, Marenzi, 2001), it found a strong resistance by interest groups. Another important point is the neutrality view: although many items of the reform are designed to reach neutrality and rationalisation of tax provisions, the idea behind the reform is that tax discrimination between different financing sources deeply rooted in the corporation tax must not be altered. The combined system of incentive for share capital

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[3] The model is developed under the DIECOFIS (Development of a System of Indicators on Competitiveness and Fiscal Impact on Enterprise Performance) project, financed by the *Information Society Technologies Programme* (IST-2000-31125) coordinated by ISTAT (Italian Institute of Statistics). The IRAP and social contribution modules were built by Rossella Bardazzi and Maria Grazia Pazienza, the corporate tax module by Valentino Parisi. The authors are grateful to Manuela Coromaldi and Mariangela Zoli for their contribution to the construction of the corporate tax module.

[4] For an overview of the 1998 tax reform, as well as a description of the DIT system and the IRAP tax, see the appendix.

(provided by DIT allowance) and taxation of interests (by IRAP) designed by the previous Government to balance fiscal discrimination is consequently eliminated. On the other side, the introduction of thin capitalisation rules will further this aspect.

2.2 The new Corporation Tax

As already said, the reform sets the abolition of the dual rate system and provides a uniform corporate tax rate of 33%[5]. One of the most important innovation is the introduction of a consolidated tax regime for Italian corporate groups. Under current legislation, Italy does not treat a group of companies as a single taxable entity[6]. In the new regime, companies belonging to the same group will be allowed to opt for a consolidated tax result allowing in this way to offset profits and losses among the members of the group. Consolidated financial statements can be applied also to non-resident subsidiaries, although in this case the consolidated financial statements must include all foreign subsidiaries[7] and foreign subsidiaries' income can be attributed to the holding company only to the extent of the percentage of ownership, while in the domestic case there are no such restrictions.

The second important innovation of the corporate tax reform is the introduction of a participation exemption regime, where inter-corporate capital gains are exempted from taxation, and the exemption of dividends along with the abolition of the full imputation dividend tax relief[8]. The general reason underlying these rules relate to avoiding double taxation of inter-corporate incomes (both capital gains as well as dividends) and, as it concerns dividend taxation, to international issues as the imputation system tend to favour domestic tax payers against non-resident ones (Giannini, 2003, Keen, 2002). Specifically, capital gains arising from the disposal of an interest in a company (either resident or non-resident) are exempted from taxation provided that: (i) interest is recorded as a long term asset and has been owned for at least one year; (ii) the subsidiary carries out a commercial activity; (iii) the company whose interest is disposed of is non-resident in a tax haven country. Symmetrically, capital losses are not deductible for tax purposes if the requirements hereinbefore specified occur. Dividends paid by the company (either resident or non-resident) to its shareholders, even in the case of liquidation, are excluded from the corporate tax base to the extent of 95% of their amount, while in the case of a consolidated fiscal unity a 100% exemption is granted[9].

Currently, Italy does not have any thin capitalisation regulations. According to the new system, a debt-equity ratio is introduced in order to prevent thin capitalisation of companies. When financial debts (such as loans, money deposits, etc.) granted or secured by the shareholders owning at least 10% of interest in the company and by related companies exceed such threshold, interest costs are deemed as paid dividends and cannot be deducted from the tax base. Should the debt-equity ratio be disallowed, the company must give evidence that the exceeding amount of the financial debt is based on the company's (rather than on the shareholder's) credit capacity.

2.3 The IRAP destiny

As already stressed, in the new Government's view IRAP will be completely eliminated. However, as IRAP still represents the basic financial source for the Regions and the National Health System, its abolition will be gradual. Article 8 of the Enabling Law provides that priority will be given to abolishing the non

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[5] As explained in the appendix, the previous regime set a statutory corporate tax rate of 36% and a reduced rate of 19% on company ordinary income which represents the opportunity cost of new financing with equity capital (either in the form of new capital subscriptions and retained earnings) compared to other forms of capital investments. This component of business income is computed with reference to year 1996. When the reform project was passed (2001), the DIT system was "sterilised", that is the reduced rate system still applies to company capital net increases evaluated at June 2001. This system will then be completely abolished when the new tax law will come in force. It is also important to note that the statutory corporate tax rate was then reduced from 36% to 34% with the 2002 Budget.

[6] Italy is one of the few countries (along with Belgium and Greece) in EU not providing a group tax regime.

[7] Option will last for at least three years in the case of domestic consolidation, five years in the regime for foreign subsidiary undertakings.

[8] These exemptions do not apply to unincorporated enterprises. In this case both dividends and capital gains must be partially included in the tax base.

[9] Again, such exemptions do not apply if the distributing company is resident in a tax haven country.

deductibility of personnel costs and, as an example, suggests that 20 per cent of personnel cost will be deductible from IRAP tax base.

Before the Enabling Law was passed, the 2003 Budget Law introduced some changes with the general aim of reducing the share of labour costs on the total tax base. To this purpose, all costs borne to hire personnel with training contracts are fully deductible (until 2002 only 70 per cent of these were deductible). Furthermore, amounts paid for scholarships and other funds not subject to personal income tax (IRPEF) are no longer subject to IRAP. The fixed deduction introduced in 2001 was increased to 7.500 Euros if the tax base is lower than 181.000 Euros. A new deduction of 2.000 Euros was introduced for small firms for each employee up to a maximum number of five[10]. Personnel with training contracts are not taken into account when computing this threshold.

3. The model

3.1 . Building the specific dataset

The simulation of IRAP, Social Contributions and IRPEG modules is based on a dataset called "**R**egional **T**ax and **S**ocial **S**ecurity" (RTSS).

Two ISTAT (Italian Statistical Office) surveys are combined in the RTSS: the Small and Medium Enterprises survey (PMI) carried out on firms with less than 100 workers and the survey on Large Enterprises (SCI) with more than 99 employees[11]. At present, the base year of these data is 1998[12].

These survey data are not completely adequate to build a model for these taxes. In fact, some computations cannot be performed using these data – too aggregate – and additional data sources are exploited. In particular, although the survey data collects the company balance sheet in some detail, we need to match information of our dataset with published accounts where some variables are recorded at a more disaggregated level. Therefore, for a selection of firms of the RTSS dataset the survey data is integrated with administrative data on balance sheets. This integrated dataset is specifically well suited for simulating corporate tax rules. Therefore, simulation of social contributions and IRAP is performed on the complete RTSS dataset, while the corporate tax is estimated on the subset of integrated microdata (8279 enterprises).

ISTAT has a statistical business register which files all active enterprises (acronym ASIA). In Table 1, a comparison between the model dataset and the population in the ASIA archive by legal status of firms is shown.

Table 1 – Comparison between the model dataset and the population: breakdown by legal status of non financial and non agricultural firms - 1998

	Number of firms	% in Model Dataset	% in Asia archive
Sole Entrepreneurships	2.607.031	66,3	66,7
Partnerships	854.897	21,8	20,1
Corporations	421.262	10,7	11,6
Co-operatives and others	46.925	1,2	1,6
Total	3.930.115	100,0	100,0

Source: Authors' estimations

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[10] This amount is modified if part-time contracts are involved.

[11] The acronyms PMI and SCI stand respectively for the Italian "Piccole e Medie Imprese" (Small and Medium Enterprises) and "Sistema dei Conti delle Imprese" (Large Enterprises). Exhaustive information is available for large enterprises that have at least 100 workers, while for small and medium ones data are collected from a sample of enterprises. From the population of SMEs a theoretical stratified sample is selected accounting for roughly 3% of the population. Then, the methodology for the inference about the population is based on bounded weighting estimators.

[12] The surveys are carried out every year, thus new datasets for 1999 and 2000 should soon become available. However, the SMEs sample changes over time thus a time-series of cross-sectional data will be built, while for large enterprises the dataset will become a panel.

From the following figure, we observe that in terms of output the SMEs produce 62% of the total and a quarter of the workers is employed in large enterprises, although they only represent 0.2% of total enterprises.

Figure 1 - Some characteristics of the Italian Enterprises population (RTSS dataset), 1998
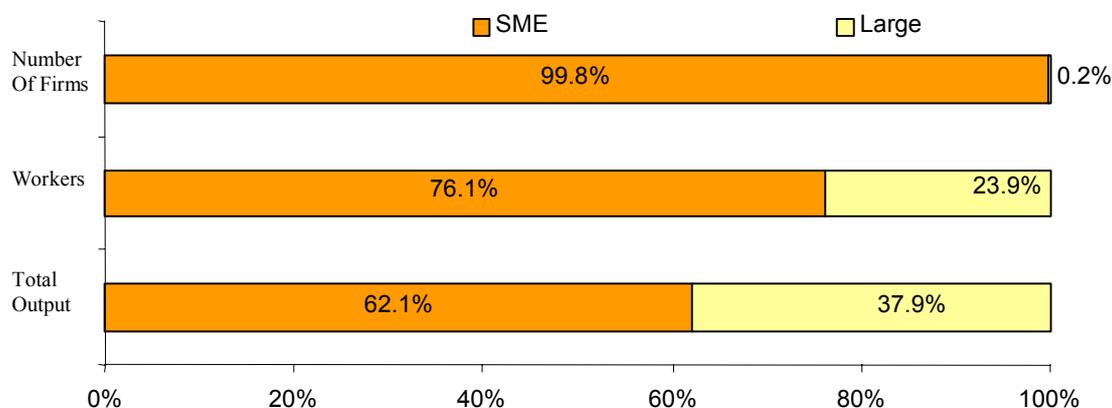
Source : Denk, Oropallo (2002).

The dataset covers almost all sectors of economic activity (NACE classification): Mining (C); Manufacturing (D); Energy (E); Constructions (F); Trade (G); Hotels (H); Communications (I); Other services (K); Education (M); Health (N) and other social services (O except division 91). The dataset excludes Agriculture and Fishing (AB), Financial services (J). Table 2 shows the percentage coverage of the survey data for selected economic activities.

Table 2 – Dataset Coverage by Sectors of Activity, 1998

Sector of activity (2 digits classification)	% (*)
Retail trade, except of motor vehicles and motorcycles	18,79
Other business activities	12,17
Construction	12,07
Wholesale trade and commission trade	10,25
Hotels and restaurants	5,81
Health and social work	5,22
Other service activities	4,21
Sale and repair of motor vehicles and motorcycles	4,14
Land transport; transport via pipelines	3,41
Real estate activities	3,41
Manufacture of fabricated metal product	2,33
Manufacture of food products and beverages	1,75
Activities auxiliary to financial intermediation	1,60
Computer and related activities	1,53
Manufacture of furniture; manufacturing n.e.c	1,40
Manufacture of wood, except furniture	1,32
Recreational, cultural and sporting activities	1,30
Manufacture of wearing apparel	1,28
Manufacture of machinery and equipment	1,06

Notes: (*) Shares are ranked in descending order. Shares below 1% are not reported (33 sectors out of 53)
Source: Authors' estimations

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3.2. The model structure

The microsimulation model used in this paper is at its early stage of development. As the dataset available at present is just one cross-section, the model is static. In the simulation scenarios presented here, we consider only the direct impact of policy changes not including firms behavioural responses. The basic structure of the model is presented in the following chart[13]. Firstly, a procedure to check and substitute missing values is undertaken and a preliminary consistency check is performed[14]. Then, the social contributions are modelled and their revenue is estimated. As a third step, the IRAP tax base is computed and the tax yield is estimated as some labour deductions from the IRAP base are calculated in the SC module. Finally, the IRPEG module is run to estimate the corporate tax on a selection of the overall dataset.

Obviously, some important interactions are implemented in the model. For examples, some deductible labour costs for IRAP are computed in the social contributions module and therefore endogenous to the model. Moreover, social contributions are - as a component of labour cost - deductible from the corporation tax base. With all modules working together, an interaction between labour cost policy (specifically a change of social contribution rates) and IRPEG due from a firm can be estimated.

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[13] The model consists of a set of STATA programs which can be executed either in separate steps or with a compact procedure.

[14] Although most of the variables are collected both for small and large enterprises, some data are found in only one survey and are missing from the other. Moreover, we need to preserve both disaggregated information and accounting consistency when the impact of some fiscal reforms or some minor changes in the tax rules are simulated. A microsimulation model is indeed the most adequate tool to give a comprehensive picture of this matter provided that the microdata are available and reliable at a disaggregated level. Therefore, the checking procedure must be accurate and our dataset has been continuously revised to eliminate eventual inconsistencies.

Figure 2 – The Model Structure

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                          ┌─────────────┐
                          │   DATASET   │
                          └─────────────┘
                                 ↓
                    ┌──────────────────────────────┐
                    │ Preliminary Procedure        │
                    │ - checking accounting        │
                    │   consistency and statistical│
                    │   discrepancies              │
                    └──────────────────────────────┘
                                 ↓
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- Social Security
Data (Π, Λ, matrices)

- SC rates (Γ matrix)   →

Social Contribution (SC) module

- computing the SC base
- computing the SC revenue

↓

- Fiscal and Social Security
Data (Π, Λ, Y matrices)

- IRAP Rates (Γ matrix)   →

IRAP module

- converting some survey data to fiscal
variables
- computing tax deductions
- computing gross and net tax bases
- computing the tax yield

↓

- Parameters (tax
legislation)
- Corrective
parameters   →

Corporate Tax module

- simulating fiscal adjustments of
(some) balance sheets variables
- simulating taxable income, gross
corporate tax, dividend tax credit,
tax reliefs, corporate tax due

↓

SIMULATION
RESULTS

3.2.1 The SC module

At present, our analysis refers to social contributions paid by employers for dependent workers classified in our dataset as executives, white-collar workers, manual workers and apprentices. For these categories, it is possible, despite some difficulties, to reconstruct the tax base using the data available in the dataset with some additional information and assumptions, as described below[15]. At a quick glance, while data on the number of workers by category are satisfactory, those on the labour costs are largely incomplete or too aggregated. Therefore, we turned to alternative sources to fill the information gap and estimate the missing variables.

First of all, the number of executives and white-collar workers is computed by firm by splitting the RTSS single figure for the employed of these two categories with weights by sector of activity resulting from the INPS aggregate data published for 1998[16]. Moreover, data on wages and salaries by workers' categories are too aggregate and therefore they are not very suitable to compute the contribution tax base. The INPS source was also used for data on *average* wages and salaries by sector of activity to estimate the total earnings by firm for executives, white-collar workers, manual workers and apprentices. Data on average wages by type of worker *(k)* and by activity *(j)* are stored in matrix Λ and multiplied by the number of employed persons of each firm:

$$\textit{Total earnings}_{ijk} = \textit{Workers}_{ijk} * \Lambda_{ijk} \qquad (1)$$

The variable resulting from this procedure is checked with the survey data on the worked hours by firm compared with the average hours by sector of activity. Through these steps we estimate the total earnings by group of workers for each firm to be used as tax base for social contributions[17].

Given the tax base for SC, contribution rates are applied in order to compute the employers' social contributions. The rules for social contributions are fairly complex with specific rates for each sector of activity, firm size, type of contract and contribution. The main rationale of our module has been that of designing a flexible procedure in order to implement the 1998 rules in detail and, at the same time, to make the introduction of changes for the following years quite straightforward[18]. The SC yield due from employers for each *i-th* firm is computed as:

$$SC_{ik} = \textit{Total earnings}_{ik} * \Gamma_{ik} \qquad (2)$$

Where *k* denotes several types of social contributions. Finally, total employers' social contributions by firm are computed as

$$TSC_i = \sum_k SC_k \qquad (3)$$

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[15] For the residual categories of trainees, home workers, workers with short-term and part-time contracts, data on wages and salaries are either aggregated in a single figure or not available. Therefore, these groups deserve further inquires and data from additional sources is required.

[16] This procedure uses specific coefficients Π_j, calculated from INPS (National Institute for Social Security) data on a sectoral *(j)* basis, applied to the survey data to obtain estimation for those employed by the two categories for each firm *i*:

Executives$_{ij}$ *(White-collar workers*$_{ij}$*) = Survey data*$_{ij}$ * Π_j

The statistical archive of these data is the *Osservatorio sulle Imprese* available on the official INPS web site (http://www.inps.it/doc/sas_stat/main.html

[17] To some extent it was possible to check the result of this procedure with actual data. For instance, comparing the estimated value for wages of workers in small and medium enterprises with the microdata available in our dataset for this category, the average deviation amounts to 4%.

[18] Contribution rates by types of worker are stored in different matrices Γ which are filled in outside the program and therefore may be easily updated.

3.2.2 The IRAP module

Basically, we can describe the IRAP gross tax base as the value added of the firm, net of depreciations:

IGTB=Value of Production – Purchases of Goods and Services – Depreciations (4)

These values can be found in the firm's balance sheet and are collected in the RTSS Database. We have explored different proxies of each firm's tax base in order to best simulate the tax yield and obtain a good basis for incidence and more general economic analysis.

Building a tax base for 1998 is relatively straightforward, because no dimensional or sectoral allowances could be used in that year. The main problem is, therefore, the reconciliation of balance-sheet and fiscal values, that is, to reproduce in the model the changes that the Tax Authority requires for some items recorded in the balance-sheet. For an example of this matter, we can refer to the item "Consulting Expenses", a specific item of the Total Purchase of Goods and Services, that can be deducted from the IRAP tax base. However, in this specific cost item firms record, among other things, expenses for coordinated and continuative collaborators but, according to the Tax Code, this value cannot be deducted from the tax base. Differences between accounting and fiscal values can be found for many other items of the tax base. Therefore, we explored alternative methods to deal with this problem. In particular, we transform the accounting values into fiscal values using Tax Authority data for returns submitted in 1999 (Tax Authority, 2002a, concerning income for 1998) which represent the basic information needed for a reconciliation module between balance sheet and fiscal values.

This procedure uses specific coefficients Π_{jk}, calculated from Tax Authority data on a sectoral *(j)* and dimensional basis *(k)*, applied to the survey data to obtain estimation of the fiscal values for each firm *i*.

*Fiscal Values $_{ijk}$ = Survey data $_{ijk}$ * Π_{jk}* (5)

The gross tax base is computed according to definition (4), but every item is converted on a fiscal basis.

In order to obtain the net tax base, there are some labour cost components that firms can deduct. In 1998, deductible labour costs are[19]:

- expenses for employment injuries insurance (INAIL social contributions),
- total labour cost of apprentices,
- 70% of total labour costs for work training contracts,
- special allowance for social and labour co-operatives.

In 1998, total labour cost deductions reached 13 million Euros. At the aggregate level, the most significant variable is "expenses for training worker contracts", although for selected manufacturing sectors "Insurance contributions" are higher due to riskiness disparities.

In our model, the expenses for employment injuries insurance and the total labour cost of apprentices are endogenous as they are computed in the social contributions module, while the other components are determined from additional Sources. Therefore, the 1998 net tax base can be described as:

INTB=IGTB-Labour cost deductions (6)

Lastly, it is worthwhile to recall that, from the perspective of product distribution, the incidence of IRAP is on the value added components, such as labour costs, interest expenses and profits. For the purpose of economic analysis, one can define the tax base as an alternative of definition (4):

IGTB = Labour costs + interest expenses + profit (7)

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[19] In 1999, a special allowance for disabled workers was added.

However, the two definitions can lead to different results due to some income components which are not relevant for the tax base but are included in firm profits. Therefore, for operational purposes we conform to the Tax Code where definition (4) is prescribed.

Thus, the computation of the tax due by each firm is given by:

$$TAX_i = INTB_i * \Gamma_{ij} \qquad\qquad (8)$$

Where matrix Γ contains specific tax rates with regional and sectoral details for every year. This feature allows for a flexible revision of the model for the regional autonomy of manoeuvring tax rates applied from 2000 onwards[20].

3.2.3 The IRPEG module

The Corporate Tax module (CTM hereinafter) is built following a modular structure and the order in which these sub-modules are implemented in the model obviously reflects the structure of the corporation tax rules. The main building blocks of the CTM are the routines Fiscal Adjustment, Corporate Income, Corporate Tax which run sequentially[26]. Each module uses other programs basically to simulate tax instruments used in the main routines and representing specific provisions allowed or provided by the tax legislation (DIT system, tax allowances, losses from the previous periods than can be carried forward, tax credits, tax reliefs and so on).

The corporate tax base is obtained from the profit (loss) resulting from the company balance sheet adjusted for tax purposes. Usually, accounts data are not detailed enough to allow simulation of such fiscal adjustments and therefore to estimate the corporate tax base. The methodology used in developing the CTM is based on simulating the tax rules that define adjustments of the business income components (specifically: devaluation credits, depreciation of tangible and intangible assets, specific expenses for employees, maintenance work expenses, R&D expenses) that can be simulated according to the available information; fiscal adjustments of balance sheets variables that cannot be modelled are imputed using parameters computed on the basis of the aggregate corporate tax returns published by the Tax Authority (2002b) for the fiscal year 1998. The same procedure is used to impute other items, for instance provisions, deductions, tax, allowed by the tax law that cannot be modelled from the available data. Fiscal data are usually defined for activity sector or legal status of the company, and for specific income classes, that is corporate taxable income and some definition of the IRAP tax base. As some items are simulated before defining taxable profits, in order to improve the accuracy of imputation, non simulated instruments (adjustments of company profits/loss for tax purposes, deductions, tax) are imputed on the basis of parameters calculated by IRAP tax base classes, generated through the integrated model.

Besides simulating fiscal adjustments of some balance sheets variables, in order the model estimates: profits eligible to the DIT allowance, the dividend tax credit, fiscal losses from the previous accounting periods brought forward and tax allowances, both imputed on the basis of parameters computed from the aggregate corporate tax returns data, the innovative investment tax relief, the tax relief granted for research expenses, the job creation tax relief, the tax relief for small enterprises of the commerce and tourism sector; non-simulated tax reliefs, which we believe are of minor importance as compared to the aforementioned ones, are imputed again using parameters calculated on the basis of the corporation tax returns data. Final output of the module contains the main variables generated within the corporate tax module, that is taxable income, allowable DIT income, tax credits, tax, gross tax, tax due. At intermediate levels, the model also generates variables reflecting eligible amounts of specific allowances that companies can bring forward to the next or the following years, in all cases where companies do not benefit for the full amount. This is the case of the fiscal loss of the year, income eligible to the reduced rate provided by the DIT system, tax reliefs.

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[20] In 1998 the IRAP tax rate was 4,25% for all sectors and regions considered in the model. For changes in more recent years, see the Appendix.

[26] For a more detailed description of the Corporate Tax Module and estimated results, see Parisi (2003).

4. Validation of the model: the 1998 representation

The three modules of the model (SC, IRAP and IRPEG) have been run on the complete RTSS dataset. Results shown in the tables below refer to the complete population as sample weights associated with the surveys have been used to go from the sample values to the population results.

4.1 Social contributions

The social contributions module gives an estimation of contributions due from firms for "regular" employees. Given the large number of social contributions types considered, for the purpose of readability of results and model estimation the contributions have been aggregated into four groups:

a) IVS - Old-Age, survivors pension scheme (IVS- INPS and INPDAI contributions);
b) Miscellaneous (Sickness, Maternity, Family benefits, Ordinary unemployment benefit..)
c) CIG Part time unemployment: Ordinary earnings complement (CIGO- *Cassa integrazione guadagni ordinaria*) and Extraordinary earnings complement (CIGS- *Cassa integrazione guadagni straordinaria*).
d) INAIL Employment injuries and occupational diseases (INAIL contributions).

In the case of "regular" employees, as opposed to apprenticeships, the social contributions due by firms for a) b) and c) cases could be computed multiplying statutory tax rate and annual wage paid. In the case of group d) (Employment injuries and occupational diseases), the model uses *sectoral* average implicit tax rates.

The social contribution module has been tested within the complete RTSS dataset. The model's fit can be considered very satisfactory in term of total contribution receipts. The SC module reproduces only contributions due from private employers for regular employees. Therefore, the total official revenue to be considered as a reference figure for the model validation is around 63 billion Euro for 1998, although this amount includes sectors not existing in the model (e.g. financial and insurance services), so the total reference amount to be considered should be smaller.

Table 3 gives details of the differences between contribution receipts and the model estimation.

Table 3 – Comparison between Model estimation and Social Contribution(*) Receipts: breakdown by category (millions of Euros)

	Receipts	Model	Difference (%)
IVS	41.058	42.001	2,3
Miscellaneous	11.892	13.267	11,6
CIG	2.516	2.942	16,9
INAIL	6.454	6.325	-2,0
Total	61.921	64.535	4,2

Note: (*)Social Contributions paid by employers
Source: Authors' estimations

The table shows that the model over estimates the total contribution revenue at 4,2, with a higher difference for CIG and Miscellaneous items. It does however have a very fitting assessment for IVS and INAIL contributions.

According to a dimensional breakdown, social contributions paid by SME are 58 of the total paid by firms included in the model, but this share changes for different worker types.

SMEs contribute more to all contributions, except CIG where rates are linked to worker category, sector of activity and firm size. SMEs pay 63 of total INAIL contributions as a consequence of the higher risk of work accidents.

The legal status breakdown shows that corporations (12 of total production units) pay 68 of total contribution due from employers, while sole entrepreneurships - representing over 66 of total firms in 1998 – have a share of 10. Finally, a distribution of social contributions paid by employers for each sector of activity shows that over 9 per cent of total contribution is paid by employers in the construction sector: this is to be linked to the very high risk of work accidents in this sector that has a share of 20 of INAIL contributions.

4. 2 The IRAP module validation

The response in terms of Government revenue for IRAP is very satisfactory: the model underestimates IRAP revenue at 0.2 per cent. Table 4 gives details of the difference between the model's estimation and the Tax Authority data for enterprise legal status. The table shows that the model has a good fit for corporations, entrepreneurships and partnerships. In the residual legal status row, a big difference can be found which is probably due to a misrepresentation in the dataset of a very heterogeneous set of legal bodies.

Table 4 – Comparison between model estimation and total IRAP revenue: breakdown by legal status-1998 (thousands of Euros)

	N	Model Estimation	IRAP revenue	Difference (%)
Sole Entrepreneurships	2.519.907	2.869.395	2.711.209	5,83
Partnerships	822.248	2.487.721	2.306.975	7,83
Corporations	390.636	11.225.783	11.222.787	0,03
Co-operative and others	38.393	757.749	1.142.258	-33,66
Total	3.771.184	17.340.648	17.383.229	-0,24

Source: Authors' estimation and Tax Authority (2002a)

It is worthwhile to recall that not all economic sectors are included in the RTSS dataset, and consequently the Tax Authority data showed in the fourth column of Table 4 do not include agriculture, finance, almost all of the public sector activity and the "not allocated activity", a residual sector in which General Government Bodies are prevalent. As a consequence, the total revenue reported here (17.383 million euros) is smaller than the effective receipts for 1998 (24.000 million Euro).

Moreover it is worthwhile to stress that the table includes only firms with positive tax base: Table 5 shows that the model is adequate also with regard to the distribution of taxpayers between positive and negative tax base

Table 5 - Positive and negative IRAP tax base

	Model Frequencies	(%)	Tax authority (%)
Null tax base	1.720	0,04	0,00
Negative tax base	157.210	4,00	3,0
Positive tax base	3.771.184	95,96	97,0
Total	3.930.114	100,00	100,0

Source: Authors' estimations

4.3 IRPEG module validation

This paragraph analyses the results obtained as regards estimated corporate tax revenue. At the moment this paper is written there are no available data that can be suitably used to validate model output. Indeed, official statistics for the year 1998 (Tax Authority, 2002), available for non-financial and non-agricultural firms, refer also to companies with less than 100 employees which are excluded from our estimation[21]. However, by comparing the model results with the tax returns aggregate amounts (profits, tax yield) it is still possible to draw some conclusions about the estimated tax variables.

While profits of our LE sample represent 68% of the profits of all non-financial and non-agricultural firms (Denk and Oropallo, 2003), comparison between profits of the survey data and profits resulting from the tax returns, on which tax computations by the companies are actually carried out, shows that our dataset overestimates profits with respect to the tax returns. Indeed, the percentage difference between the two aggregates amounts to about 5 percentage points and the result could be due to differences in timing between the collection of the survey and the filed tax returns for those firms having accounting periods different from the calendar year. Comparison between the model estimate and actual tax revenue shows that modelled corporate tax revenue is 3 percent higher than the actual corporate tax yield (Table 6). As the corporation tax can be roughly considered a proportional tax, this result is consistent with overestimation of profits for firms of our dataset and shows that the performance of the model in reproducing the corporate tax system is satisfactory.

Table 6 - Comparison between model estimations and total corporate tax revenue (thousands of Euros), year 1998

	RTSS dataset	Tax returns	Difference (%)
Profit from balance sheet	42.873.624	40.713.492	5,31
Loss from balance sheet	9.967.343	28.534.064	-65,06
	Model output	Tax returns	Difference (%)
Corporate tax revenue	20.595.864	19.963.615	3,16

Source: Authors' estimations and data from the 1999 corporate tax returns (Tax Authority, 2002b)

5. Policy scenarios and results

In this section we analyse the effects of the main changes introduced to the modelled taxes in the period 1998-2003. To this purpose we divide the whole period into two sub-periods and we consider two different scenarios, 2001 and 2003. The first basically considers policy changes brought in by the previous Government before the new one came into effect (2001), while the second one considers the reform approved by the new Government. Results of the simulations are first presented mainly in terms of tax revenue changes, eventually defined for enterprise legal status, localisation. Finally, the effects of these reforms are discussed in par. 5.3 where ex-post implicit tax rates are described and estimates are presented.

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[21] Indeed, the survey for small and medium sized enterprises report only the economic statement of the firm and therefore it cannot be used for corporate tax modelling purposes.

5.1 2001 Scenario

For the 2001 scenario, the new provisions and rules concerning IRAP, social contributions and the corporate tax are implemented on the 1998 data.

As regards **IRAP**, some of this policy changes originated from the previous legislation: since 2000 Regions are allowed to change IRAP rates and to introduce allowances and exemptions for specific sectors of activity. At the same time, some **social contributions** rates changed as a consequence of a nominal adjustment (as for apprenticeship) or as a double dividend effect of the Carbon Tax introduced in 1999 (a reduction of some SC rates was financed through the new green tax). These policy changes are introduced in the model as an ordinary updating of tax rates matrices. Moreover, in the Budget Law for 2001 the previous Government introduced two innovations aimed at mitigating the labour cost as a component of the IRAP tax base: a full deduction of personnel cost for employed disabled people and a special deduction for small enterprises, linked to the tax base (only firms with IRAP taxable income no grater than 181000 euros were eligible)[22]. As regards the deduction for disabled people some hypothesis needed to be introduced as no statistical information on this matter can be found in the dataset: therefore, we assume that disabled people are employed in firms for a 50% of the law requirements as manual workers[23].

Concerning the **corporation tax**, we recall that this is the year when the new Government came into effect and introduced changes to the corporate tax structure actually anticipating some features of the forthcoming full reform. For instance, the DIT allowance was practically abolished[24] in 2001.
In the 2001 scenario the structure of the DIT allowance corresponds to its last version before this system was abolished by the new Government. Specifically, in 2001, when computing profits allowable to the preferential rate the constraint that the average corporate tax rate could not fall under 27% is removed[25] and, more important, allowable profits are increased by 40% applying a multiplier (1,4) to their amount[26]. We also recall that in 2001 the statutory corporate tax rate is reduced from 37% to 36%.
Therefore, under the dual rate system the "effective" corporate statutory rate ranges between the preferential rate (19%) and the statutory rate (36%), depending on the amount of profits eligible to the allowance. To estimate the effects of the DIT system on firms in 2001 we first compute "effective" statutory tax rates for enterprise activity sector[27]. Then the model is run on the original 1998 data, excluding the DIT system but

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[22] Specifically, the new deduction amounts are as follows:
- 5164,57 € if the tax base is below 180759,91 €
- 3873,43 € if the tax base is between 180759,91 and 180811,56 €
- 2582,28 € if the tax base is between 180811,56 and 180863,21 €
- 1291.14 € if the tax base is between 180863,21 and 180914,85 €

However, the simulation on 1998 balance-sheet has a key drawback: some firms that had a tax base lower than 181.000 euros in 1998 could have experimented such a rise in value added, to be no more eligible for the deduction in 2001.

[23] According to law n.68/99, firms are obliged to employ disabled people in relation to their size:
- from 15 to 35 workers: 1 disable person;
- from 36 to 50 workers: 2 disabled persons;
- more than 50 workers: 7% of total workers must be disabled.

However, according to unofficial and qualitative appraisal of the situation, firms show a very low compliance with the law.

[24] We recall that at present the DIT is still in force, but capital increases eligible to the reduced rate are evaluated at June 2001 with respect to the year 1996, while capital decreases undertaken after June 2001 must be taken into account. Moreover, in 2001 the nominal rate used to compute ordinary income on this component of corporate profits was reduced to 5%.

[25] Basically, in tax computations, before 2001 the law set that the amount of profits eligible to the DIT allowance could not exceed a certain threshold, representing the constraint that the average corporate tax rate could not be lower than 27%. In such cases, however, eligible profits which did not benefit from the preferential rate could be brought forward.

[26] Obviously, the idea behind these changes was, possibly, to extend the DIT system from the incremental regime, where allowable profits are computed on the basis of capital (retained earnings, subscriptions) increases, to a final regime where such profits are calculated on the basis of the entire company capital stock.

[27] To fully estimate the effects of the DIT system, ideally, the 2001 scenario simulation should be run using data updated to the same year. This is generally true for all simulations referring to tax legislation of different years where balance sheets of the same years should be used. The other possibility could be that of updating balance sheets variables, but

using the estimated "effective" statutory tax rates[28] to simulate the corporate tax actually paid by companies in 2001. This regime represents the 2001 scenario where the DIT allowance is formally abolished, but the statutory rate reflects the "effective" rates existing in 2001 for activity sector of the enterprise.

Tables 7 summarises the model results of this first scenario, as regards IRAP and social contributions changes. The simulation of SC and IRAP changes shows a revenue effect of -765 million euros, mainly concentrated on very small firms, sole entrepreneurs and partnerships, whose negative difference in tax due is, on average, 17,8% and 6,7% with respect to 1998. It is worthwhile to note, however, that the new deduction linked to the tax base represents 95% of the revenue difference and benefits 92% of firms.

Table 7 – IRAP results of 2001 scenario: revenue and loss position by legal status of firms

Legal Status	Revenue Difference 2001-1998 (thousand Euros)	Revenue Differences 2001- 1998 (%)	Companies that pay NO IRAP (negative tax base) 1998	Companies that pay NO IRAP (negative tax base) 2001	Companies that pay NO IRAP (absolute difference) 2001-1998
Sole Entrepreneurships	-510.792	-17,80	3,33	18,0	381.251
Partnerships	-165.365	-6,65	3,82	11,0	61.692
Corporations	-80.752	-0,72	7,28	10,4	13.065
Co-operatives and others	-7.520	-0,99	17,59	31,0	6.017
Total	-764.429	-4,41	4,04	15,8	462.025

Source: Authors' estimations

A very interesting result regards the number of beneficiaries of the new deductions: Table 7 shows that firms with negative tax base (4,04% in 1998) rose to 15,8% in 2001: over 80% of these firms are sole entrepreneurs.
Similar results can be drawn from the geographic breakdown: Table 8 shows that new deductions are concentrated mainly in Southern Italy, which economic structure is characterised by low sized firms[29]. Less than 1% of firms with more than 50 employees are eligible to this allowance. More than 25% of Southern firms have, after the new deductions, a negative tax base.

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this procedure would inevitably be imprecise and would introduce strong biases. Therefore, analysis are performed using 1998 balance sheets in all scenarios. However, the updating issue is particularly relevant in the case of the DIT system as using 1998 balance sheets variables would underestimate allowable DIT profits, while we expect the amount of allowable profits to be potentially higher due to greater capital increases undertaken by the companies up to the year 2001. Therefore, in computing the "effective" statutory rates we update all variables relevant to simulate the DIT allowance, as well as gross company profits, to the year 2001. This procedure uses parameters computed from the Centrale dei bilanci (2002) which report company accounts for various years. It is also important to note that when simulating the DIT system in the 2001 scenario, we implicitly assume that capital increases are computed at the end of 2001, while, we recall, the DIT system was "sterilised" in June 2001.

[28] These are defined as the ratio between the gross corporate tax and taxable profits.

[29] A dimensional breakdown highlights that almost all benefits are concentrated among firms with less than 50 employees)

Table 8 – IRAP results of 2001 scenario: revenue and loss position by localisation of firms

Geographic Area	Revenue Difference 2001-1998 (thousands Euros)	Revenue Differences 2001-1998 (%)	Companies that pay NO IRAP (negative tax base) 1998	Companies that pay NO IRAP (negative tax base) 2001	Companies that pay NO IRAP (absolute difference) 2001-1998
North West	-236.762	-3,39	2,67	9,7	82.865
North East	-169.491	-4,19	3,59	11,3	64.922
Centre	-157.246	-3,81	4,83	15,9	91.197
South	-200.930	-9,17	5,29	25,9	223.041
Total	-764.429	-4,41	4,04	15,8	462.025

Source: Authors' estimations

As for the corporate tax system, Table 9 displays the "effective" statutory tax rates for firm activity sector due to the DIT system in the 2001 scenario. Results are obtained running the model on the LE data.

Table 9 -"Effective" statutory corporate tax rates in the 2001 scenario. Breakdown by enterprise activity sector.

Activity sector	"Effective" statutory rates (%)
Manufacturing, mining	32,9
Electrical energy, gas, steam, water	26,6
Construction	32,8
Wholesale and retail trade services	33,5
Hotel and restaurant services	34,5
Transport, storage, communication services	28,9
Real estate, renting and business services	35,9
Education services	36,0
Health and social services	33,7
Other community, social and personal services	33,8
Mean	33,1

Source: Authors' estimations

The results show that, in 2001, the estimated mean "effective" statutory corporate tax rate is 33,1%, about 3 percentage points lower than the statutory corporate rate of taxation set by the legislation. The DIT allowance favours in particular enterprises of the Electrical, energy, gas, steam, water sector and of the Transport and communication sector, which exhibit "effective" statutory rates respectively about 6 and 4 percentage points lower than the mean rate. On the contrary, firms of the educational services sector seem not to benefit much from the dual rate system. It is interesting to note that benefits of the DIT system are higher for large enterprises (with more than 250 employees), which displays "effective" statutory rates ranging from 0,5 to about 1 percentage point lower than the mean one, and 4 percentage points lower than the statutory rate, as shown in Table 10.

Table 10 "Effective" statutory corporate tax rates in the 2001 scenario. Breakdown by classes of employees.

Classes of employees	"Effective" statutory rates (%)
100-199	33,4
200-249	33,3
250-499	32,5
500-1000	32,2
Above 1000	32,3
Total	33,1

Source: Authors' estimations

5.2 2003 scenarios: the Budget Law and the Fiscal Reform

As for 2003 scenario, we simulate the current legislation (law in force for the year 2003) and another scenario linked to the fiscal Enabling Law. In both scenarios, updated social contributions rates for all workers are applied and the labour cost for firms in the year 2003 is estimated [30].

The Budget Law for 2003 introduced some changes with the aim of lessening the labour cost tax wedge of IRAP, pursuing the principles drawn up in the Enabling Law. Specifically, as for **IRAP** we simulate the effects of a) the increase of the special deduction for small firms (to 7500 euros); b) the introduction of the new deduction of 2000 euros for each employee, up to a maximum of five, for SME; c) the full deduction of costs borne to hire personnel with training contract.

The cost of these changes amounts to - 416 million euros, 78% of which can be imputed to the increase of the special deduction for small firms (letter a) above)[31].

Table 11 – IRAP results of 2003 scenario: revenue and loss position by legal status of firms

Legal Status	Revenue Difference 2003-2001 (thousand Euros)	Revenue Differences 2003- 2001 (%)	Companies that pay NO IRAP (negative tax base) 2001	Companies that pay NO IRAP (negative tax base) 2003	Companies that pay NO IRAP (absolute difference) 2003-2001
Sole Entrepreneurships	-243.107	-10,31	18,0	27,0	235.373
Partnerships	-104.366	-4,49	11,0	15,4	37.822
Corporations	-61.001	-0,55	10,4	12,3	8.235
Co-operatives and others	-7.770	-1,22	31,0	33,5	1.162
Total	-416.244	-2,40	15,8	23,0	282.591

Source: Authors' estimations

Table 11 shows that this allowance is concentrated among small and unincorporated firms. Although the revenue effect is roughly half that of 2001, it can be stressed that the impact on the distribution of firms between positive and negative tax base is still large: the same number of enterprises is eligible for deduction

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[30] As for the 2001 scenario, the policy changes are simulated over the 1998 dataset.

[31] This simulation result is very close to the government official forecast (*Relazione tecnica per la Finanziaria* 2003). According to the government's forecast, the rise in special deduction (letter a)) would have had a revenue effect of 309 millions Euros, as opposed to the model estimation of 365. For the new deduction linked to the number of employees (letter b)), an effect of 82 millions Euros is forecasted by the general Government while our model estimate amounts to 99 millions Euros.

a) in the simulation for 2001 and 2003, while approximately 18% of total firms has the requirements to benefit of the b) type deduction introduced in 2003[32].

The results are completed by the geographical breakdown: Southern firms are once again the main beneficiaries of the new rules. It is interesting to note that more than one third of these enterprises have, according to our simulation, a negative tax base.

Table 12 – IRAP results of 2003 scenario: revenue and loss position by localisation of firms

Geographic Area	Revenue Difference 2003-2001 (thousand Euros)	Revenue Differences 2003- 2001 (%)	Companies that pay NO IRAP (negative tax base) 2001	Companies that pay NO IRAP (negative tax base) 2003	Companies That pay NO IRAP (absolute difference) 2003-2001
North West	-136.332	-2,02	9,7	15,8	71.886
North East	-95.864	-2,47	11,3	16,1	40.091
Centre	-86.944	-2,19	15,9	22,4	53.058
South	-97.104	-4,88	25,9	36,7	117.555
Total	-416.244	-2,51	15,8	23,0	282.591

Source: Authors' estimations

Lastly, a scenario is simulated to study the effect of the changes proposed by the fiscal Enabling Law. As regards **IRAP**, a reduction of 20% of labour cost from the tax base (without special deductions linked to the tax base and employment) is implemented: in this case the estimated revenue effect is -2 billion euros, but the impact is scattered among firms, since this general reduction of the tax base does not discriminate in size but is specifically linked to personnel costs.

As already discussed elsewhere in this paper, the reform brings in some important changes to the **corporation tax system**. Besides the aforementioned abolition of the DIT allowance and IRAP, these basically regard the possibility for groups to opt for a consolidated regime, the reduction of the statutory rate from 36% to 33%, a different definition of the corporate tax base provided both by the introduction of a participation-exemption model and thin capitalisation rules, and by the dividend exemption (to the extent of 95% of their amount, or for the total amount for groups opting for the consolidated regime), the abolition of the dividend tax credit. Information available in our dataset is not detailed enough to model all these changes to the corporate tax system. Therefore, while it is not possible to identify companies belonging to the same group, the incidence of capital gains/losses potentially eligible to the exemption/non deductibility rule, of interest costs potentially subject to the thin capitalisation rule, are computed using data provided by the Technical Report on the Tax Reform presented in Parliament[33].

Regarding the corporation tax we run the model to simulate the impact of: i) the abolition of the DIT allowance and the introduction of a uniform tax rate system with a rate of 33%; ii) the exemption of capital gains on shares, owned for at least one year and recorded as long term assets, in other corporations carrying

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[32] The small number of beneficiaries is to be linked to the employment requirements: small firms usually do not have regular employees. Moreover, while no sizeable difference can be found in the number of beneficiaries looking at the geographic and exporting breakdown, some differences can be found in the investing breakdown, where 23 per cent of investing firms has taken advantage of this allowance.

[33] Besides discussing the general effects of the reform and offering estimates of the tax revenue changes, the Technical Report (Relazione Tecnica, 2003) displays the total amount of capital gains, capital losses, interest costs, eligible to the exemption or subject to non-deductibility from the tax base, derived from the official Corporate Tax returns data for the year 1999. As these amounts refer also to firms with less than 100 employees, excluded from our simulations, we compute, for corporations, the incidence of such amounts on the aggregate values of capital gains, capital losses, interest costs resulting from the combined SME and LE surveys of the year 1999. These estimated incidences are then applied to the relevant variables of our data-set.

out a commercial activity and not-residing in tax haven countries; the symmetric non-deductibility of capital losses if the same requirements occur; iii) the introduction of thin capitalisation rules limiting the amount of paid interest that can be deducted; iv) the exemption of 95% of dividends and the abolition of the dividend tax relief.

Table 13 provides the estimated corporate tax revenue change due to the modelled reform, against the 2001 scenario.

Table 13- Effects of the corporate tax reform (2003 scenario): tax revenue change for enterprise activity sector.

Activity sector	Tax revenue % variations
Industry	-2,2
Construction	1,5
Commerce	2,7
Services	10,0
Other social and private services	1,6
Mean	2,1

 Source: Authors' estimations

Results show a slight increase of tax revenue (about 2%). Moreover, tax revenue would increase in all sectors, except for companies of the Industry sector where we record a decrease, and the highest increase would occur in the Services sector.

5.3.1 The choice of Tax indicators

The choice of tax indicators is crucial for the conceptualisation and the empirical verification of the real incidence of tax systems. Tax burdens may indeed be calculated with different tools and for different aims.

The first rather obvious measure to consider is the statutory tax rate (STR), which gives a general idea of national tax policies. STR is widely used in international comparisons, however it does not give a reliable measure of the actual tax burden, especially in international, dimensional and intersectoral contexts, as the actual tax burden closely depends on the definition of the tax base which is far from being standardized.

For this reason, STR are often replaced by the *effective tax rates* (ETR), i.e. tax indicators that take into account how the tax base is determined and whether tax laws provide for tax incentives. Within ETR it is then possible to distinguish between ex-post ETR (backward looking) and ex-ante ETR (forward looking). The first group, henceforth *ex-post implicit tax rates* (EPITR), includes all those indicators calculated as the ratio between taxes actually paid and a reference economic aggregate (e.g. profits, capital, value added, etc.)[34]. Using taxes actually paid allows the analyst to summarize the specific rules underlying the determination of the tax base and the specific choice of the firms. In this perspective, they are useful when the aim of the analysis is to examine the income effects of taxation and compare the taxation levels of different groups of firms.

The second group, ex ante marginal tax rates (EAMTR), has a forward looking nature. It measures a theoretical incidence starting from tax laws applicable to a specific investment project at the margin, i.e. not producing extra-profits[35]. This kind of measurement is useful to understand how tax systems affect firms' decisions and to understand also the biases (non-neutralities) of tax systems among different alternative investments. EAMTR are calculated for different types of investment (for example, machinery, intangible

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[34] The implicit average tax rate can be calculated either on national accounts data or on the microeconomic data of individual firms.

[35] These indicators have been built following King and Fullerton (1984). Without going into details, it is worth stressing that the use of this methodology involves quite restrictive assumptions, among which perfect competition and the absence of extra-profits are the most striking. For a more detailed explanation, see Martinez and Mongay (2000).

assets, etc.) and different financial Sources (self-financing, debt issues, etc.)[36]. Marginal tax rates may be very far from statutory and average tax rates and it is possible for them to be negative[37].

In this paper, EPITRs are estimated in order to determine whether there are significant differences in the tax burden of companies of different characteristics[38]. With EPITRs we look for evidence of discriminations between firms operating in different sectors or having different size.

It is worthwhile to stress that the choice of the specific indicator is critical: this economic aggregate should summarize all the relevant information and, at the same time, minimize any possible systematic correlation with a particular sector or a particular firm size. The ratio computed with gross profit as denominator does not seem very informative because it could be very similar to the STR; on the other hand, the drawback of the use of turnover as denominator is that it implicitly assumes that the true profit margins are constant across sectors and size[39].

5.3.2 Implicit Tax rates

In this section we analyse the impact of the reforms described above. To this purpose, in order to quantify the direct tax burden on firms, we estimate implicit tax rates running the integrated model on the subset of medium and large corporations (more than 8.000 forms). EPITRs are computed using turnover as denominator.

Table 14 and table 15 display the EPITRs, as regards both the dimensional and the sectoral breakdown, in the base-line, 2001, 2003 (full reform) scenarios. These tables also provide the absolute differences of EPITRs respectively between the base-line 1998 and the 2001 scenario, between the 2003 and the 2001 scenario, both for the overall tax burden (IRAP and IRPEG) and for the corporation tax (IRPEG). In this way we can separate the effects of the corporate tax reforms.

As regards the baseline scenario, EPITRs highlight some differences in the tax burden for firms of different size. Although companies of the subset (corporations with more than 99 employees) are subject to the same general tax structure (IRPEG and IRAP), specific characteristics of the enterprise (production function) and features of the tax law (sectoral, depreciation rates, allowances, tax credits) result in different rates with firm size and for activity sector of the enterprise. In particular, tax rates are generally decreasing with the firm dimension (Table 14) in all scenarios[40].

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[36] Devereux e Griffith (1998) has developed this approach, by building a methodology to calculate theoretical tax rates for infra-marginal investments, the so-called effective average marginal tax rates (EAVMTR). The "average" derives from the fact that these indicators are obtained as the average of taxes due on hypothetical investments with different profitability levels.

[37] For example, the STR in Italy is one of the highest in developed countries since the beginning of the Nineties and still is, even after various reforms. Looking at the marginal tax rates, however, the Italian situation is one of the most appealing in Europe. A recent contribution by the European Commission (2001) indicates Italy as one of the countries where the cost of capital for a foreign subsidiary would be lower (about 5 per cent instead of an average of 6 per cent).

[38] See, on this choice, Gastaldi-Pazienza (2002).

[39] See on the topic Nicodeme (2002) and Collins & Shackelford (1995) .

[40] A greater firms dimension usually leaves room for a greater tax elusion.

Table 14 - EPITRs for different scenarios: dimensional breakdown

Classes of employees	Scenarios			Differences			
	Baseline 1998	2001	Full Reform 2003	2001-1998	2001-1998	2003-2001	2003-2001
				Overall	Corporation tax	Overall	Corporation tax
100-199	4,44	4,18	3,85	-0,27	-0,27	-0,33	0,03
200-249	4,60	4,31	3,93	-0,29	-0,29	-0,37	-0,03
250-499	4,92	4,60	4,20	-0,32	-0,32	-0,40	-0,03
500-1000	4,35	4,08	3,74	-0,27	-0,27	-0,34	0,03
Above 1000	3,95	3,69	3,34	-0,26	-0,26	-0,35	0,02
Total	4,52	4,24	3,89	-0,28	-0,28	-0,35	0,01

Source: Authors' estimations

The tax changes implemented in 2001 by the previous Government result in a reduction of almost 0,3 percentage points in the implicit tax rate: the overall effect of the 2001 legislation is widespread and approximately homogeneous across firms, but large firms gain slightly more than the other ones considering that the incidence of the absolute variations over the base-line rate is a little higher for these firms. Simulation results prove that for all dimensional classes, overall reductions of the tax burden are due only to reforms of the corporation tax, while the IRAP changes brought in this period seem to benefit only smaller firms, as already said in paragraph 5.1. Estimations give also new evidence to a result already discussed in this paper. The changes to the DIT system introduced in 2001 (allowable profits are increased by 40% and benefit fully from the reduced rate as the constraint on the average rate is removed) while reducing the implicit rates almost in the same way for all companies, slightly benefit larger firms, compared to smaller ones, considering that larger companies show descending rates in the base-line year.

The full reform proposed by the current Government adds 0,35 percentage points to the reduction in tax rates. In this case, however, reduction of the tax burden is mostly due to the 20% labour cost deduction provided by the IRAP revision, rather than by the corporation tax reform which increases tax revenue. We also find that benefits of the IRAP changes are greater for larger firms, considering that labour cost generally increases with the firm size.

Regarding the modelled corporate tax reform, results show basically an unchanged mean implicit rate between 2001 and the full reform scenario. This aspect is discussed in more details below. Here we observe that increase of implicit rates occur in all classes except for companies of the second and third class.

Table 15 shows that the sectoral rates are not homogenous in all scenarios. Highly taxed firms are those of the sector "Hotels and restaurants", "Transport and communication", "Real estate and business activities", "Heath", "Other service activities", which all exhibit greater rates than the average one. Again, the simulations confirm that reduction of the overall rate in all sector in 2001 is due to changes to the DIT system and the reduction of the statutory corporate tax rate by 1 point. Greater falls of the implicit rates regard the "Electricity, gas, water supply" sector and the "Transport, communication" sector.

As regards the effects of the full reform, the estimations show some interesting findings. First, the implicit rate drops in all sector because of the full reform, except "Electricity, gas, water supply" which records an increase of the implicit rate of 0,07 percentage points mainly due to the reform of the corporation tax. This is somewhat an expected finding as, according to our simulations, this is the sector where (large) firms seem to have been most favoured by the DIT system[41]. We also recall that the same result applies to companies of the sector "Transport and communication", although for such sector changes to IRAP provide for a reduction of the overall implicit rate. On the whole, falls of the implicit rates are grater for companies of the commerce and of the services sector; the highest reduction is recorded for the sector "Education" (-1,65).

The effects of the corporation tax reform for each sector, in short, depend both on changes of the tax base and on the (uniform) statutory rate of taxation as compared to the "effective" one prevailing in the 2001 scenario where a dual rate system is present. As a total result, firms of the sectors "Real estate and business

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[41] Indeed, this sector experiences the lowest "effective" statutory rate in 2001 (see par. 5.2).

activities", "Hotels and restaurant", Education, "Other service activities" would gain from the reform, while companies of all other sectors would record a rise in the implicit tax rate.

Table 15 - EPITRs for different scenarios: sectoral breakdown

	Scenarios			Differences			
Sector of Activity	Baseline 1998	2001	Full Reform 2003	2001-1998	2001-1998	2003-2001	2003-2001
				Overall	Corporation tax	Overall	Corporation tax
Manufacturing, mining	4,13	3,84	3,62	-0,30	-0,30	-0,21	0,00
Electrical energy, gas, steam, water	2,79	2,36	2,43	-0,43	-0,43	0,07	0,31
Construction	3,39	3,19	3,00	-0,20	-0,20	-0,18	0,11
Wholesale and retail trade services	2,37	2,22	2,13	-0,15	-0,15	-0,09	0,03
Hotel and restaurant services	4,77	4,60	4,07	-0,17	-0,17	-0,53	-0,08
Transport, storage, communication services	6,79	6,24	5,76	-0,54	-0,56	-0,49	0,29
Real estate, renting and business services	6,00	5,88	4,89	-0,13	-0,13	-0,99	-0,21
Education services	4,50	4,47	2,82	-0,04	-0,05	-1,65	-0,13
Health and social services	6,32	6,09	5,35	-0,24	-0,24	-0,74	0,08
Other community, social and personal services	6,05	5,71	5,26	-0,34	-0,35	-0,44	-0,05
Total	4,52	4,24	3,89	-0,28	-0,28	-0,35	0,01

Source: authors' estimations

Finally, Table 16 presents results for groups formed by investing and non investing firms and by exporting and non exporting firms. In the baseline scenario, more dynamic firms exhibit smaller implicit tax rate; in the 2001 scenario, benefits are approximately homogeneous with the same reduction in absolute values. In the full reform scenario, less dynamic firms (non exporting and non investing in the reference year) seem to gain more in terms of reduced tax burden.

Table 16 - EPITRs for different scenarios: results for exporting and investing firms

	Scenarios			Differences	
EXPORTING	Baseline 1998	2001	Full Reform 2003	2001-1998	2003-2001
No	5,15	4,89	4,36	-0,26	-0,54
Yes	4,07	3,78	3,57	-0,29	-0,21
Total	4,52	4,24	3,89	-0,28	-0,35
INVESTING					
No	4,87	4,61	3,97	-0,26	-0,63
Yes	4,50	4,22	3,89	-0,28	-0,33
Total	4,52	4,24	3,89	-0,28	-0,35

Source: Authors' estimations

6. Concluding remarks

In this paper we present a microsimulation model for Italian enterprises to perform tax policy analysis for the business sector. Although in the past decades microsimulation models for the household sector have become a widely used tool for analysis of the redistributive impact of public policy, empirical research on enterprises microsimulation models is still very limited.

The model discussed here reproduces the main indirect taxes (IRAP, social insurance contributions) on firms and the corporation tax (IRPEG). As regards data, for tax modelling purposes it is necessary to move from single survey data, or single accounts data, to a comprehensive system of "integrated and systematised" datasets on enterprises. To this purposes the model uses a specific integrated data-set which combines survey data on enterprises and company accounts for the year 1998, built at ISTAT (Italian National Statistics Office) within the DIECOFIS project. This integrated dataset allows for a complete representation of the tax rules on Italian corporations and validation results show that performance of the integrated model in reproducing the tax system on corporations is good.

In this paper we run the model to analyse the impact on firms of the fiscal reforms introduced in recent years by the previous Government, as well as the effects of the full reform approved by the current Government with the Enabling Law no. 80 (April 7, 2003).

The base-line year of the model is 1998. In the empirical analysis we consider two scenarios. The first, 2001, considers the structure of the tax system existing just before the new Government came into effect including the reduction of the statutory rate from 37% to 36% and the changes to the DIT system introduced in the same year; for the latter, profits eligible to the preferential rate (19%) are increased by a multiplier (1,4) and the constraints that the average corporate tax rate could not fall below 27% is removed. In this scenario also changes of the social insurance contribution rates and of IRAP are modelled. The first changed as a consequence of nominal adjustments and as a double dividend effect of the Carbon Tax introduced in 1999. As regards IRAP, while tax rates can be varied by the Regions, the 2001 Budget introduced specific deductions from the tax base basically addressed to small enterprises. As a result of these reforms, firms which are not chargeable to this tax rise by about 10 percentage points, while the DIT changes lowers the "effective" statutory corporate tax rate from 36% to 33,1% because of the dual rate system.

The second scenario, 2003, considers the full reform approved by the new Government. As regards IRAP, it is worthwhile to note that the 2003 Budget introduced some further changes (varying the existing deductions or introducing new ones) to IRAP, addressed, again, to small firms. The effects of these changes are also specifically analysed in this paper; simulation results show an increase of the incidence of firms that are not chargeable to IRAP from 16% to 23% because of these allowances, and that such benefits are mainly concentrated in the South.

The full reform introduces a deduction of 20% of the labour cost from the IRAP tax base as a first step towards the (future) abolition of this tax. The new corporation tax system moves back to a uniform tax rate (33%), as the DIT system is abolished, brings in some changes to the definition of the tax base by exempting corporate dividends and symmetrically removing the dividend tax relief, capital gains from long term assets owned for at least one year, and by limiting deductibility of interest costs provided under thin capitalisation rules. The reform also introduces an optional consolidated tax statement for groups that can be extended to foreign subsidiaries.

Finally, to go deeper into the analysis of the effects of the full reform, we estimate ex-post implicit tax rates. Simulations (which exclude the effects of the group tax regime that cannot be modelled on the basis of available data) show that the full reform reduces the overall (IRAP and IRPEG) implicit tax rate from 4,24% (2001) to 3,89% (2003), therefore by 0,35. One important conclusion we can draw from the analysis is that the reduction of rates which we observe in the full reform scenario is mainly due to the large cut of the IRAP tax base with the abatement of 20% of the labour cost, while the corporation tax changes should produce an increase of the tax revenue. Firms operating in sectors which benefited most from the DIT allowance, so far will bear most of the reform cost in terms of higher implicit rate (i.e. "Electricity, gas and water supply"). On the whole, modelled tax revenue would fall by 2,7%, while corporate tax revenue would slightly increase by 2,1%.

APPENDIX

A.1 The 1998 Fiscal Reform: a general overview

The 1998 reform represented the first time since 1973 that the regime underwent a wide restructuring. The production of norms and regulations as of 1996 turned to different areas, albeit with the similar main objective of achieving *neutrality* and *efficiency*. New norms modified personal income, corporate income, income on capital, VAT and minor indirect taxes, local taxation, tax assessments, sanctioning penalties and litigation procedures. The tax reform affected all entities carrying out economic activity and established a substantial restructuring of revenue which regarded both the type of economic entities concerned as well as the level of government involved.

Focusing on matters which most affect levies on corporate income, we out that the reform that came into effect in 1998, aimed at reaching the following objectives:

◊   simplifying the system for taxpayers having productive activities;
◊   moving towards decentralization and tax competition between regions;
◊   reaching neutrality of the system in regard to choices of sources of financing and company input;
◊   decreasing the labour cost as an impetus for increased employment;
◊   increasing the tax base for companies that are structurally at a loss for income tax purposes.

Concerning the objective of <u>simplification</u> we recall that IRAP substituted several other taxes and social contributions, that had been part of a system that was particularly confusing mostly due to the complex tax rate charts for health contributions.

Regarding the <u>decentralization issue</u>, the new financing system of local authorities is based on IRAP and the regional IRPEF surtax, taxes which are addressed to become the focus of regional tax autonomy. The fact is, however, that for both these taxes it is not exactly accurate to refer to autonomy, even without obligations of allocation of revenue. As a matter of fact, for both IRAP and the IRPEF surtax, the decentralized institutions have the possibility of maneuvering the tax rates, albeit within quite restrictive limits, without any power to affect the setting of the tax bases[42]. Indeed, for both taxes, local institutions are subject to effects of changes to tax bases established at central level. The new tax pursued also greater *neutrality and decreased the labour cost*. It is, however, important to recall that the objective of progressively reducing tax discrimination between different financing sources, was explicitly addressed to the *Dual Income Tax* (see A.1.2).

Among the objectives that are not actually explicitly stated, lowering the tax burden on companies must be considered too. The law provided for a revenue-neutral reform. However, the result of the enactment of the reform shown lower revenue than what was expected, lower by approximately 6,5 billion Euros. Moreover, this discrepancy is not deemed to have been entirely "unforeseen"[43].

A.1.1. IRAP

IRAP is a tax on the company value added net of amortizations and depreciations, with the exclusion therefore of deductibility of interest incurred and the cost of labour. Companies and individuals carrying out an independently organized activity, directly aimed at the production or the trading of goods or the rendering

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[42] In addition to the lack of autonomy in setting bases, it should also be noted that, as it regards IRAP, there has been much criticism over the fact that local authorities have been attributed a tax which has a highly disproportionate tax base on a national level and, moreover, which is characterised by substantial mobility. The choices of regional institutions, in setting different tax rates, might, on one hand, discord with regulations set by the central Government, and on the other hand, be overly conditioned by horizontal tax competition (an attempt by regions to attract business by granting tax advantages). Furthermore, the existence of a tax with a highly disproportionate base needed to be coupled with the institution of a complicated interregional system for equalisation.

[43] For an analysis of differences in tax burden between two fiscal regimes see Lusignoli and Pazienza (2001), and Gavana, Majocchi, Marenzi (2001).

of services are subject to IRAP, including both private and public institutions, as well as state administrative institutions and bodies[44].

Generally speaking, the IRAP tax base can be calculated, with a hypothetical calculation of production, by subtracting the sum of purchases for intermediary goods, service costs and amortization and depreciation from the total turnover. From a perspective of production distribution, IRAP affects items producing value added, such as salaries, earnings and earnings on capital (interest incurred)[45]. More specifically, determination of the tax base is rather complicated and is also differentiated by type of production.

The IRAP rate is set at 4,25% and as of January 1 2000 each Region can vary the rate (be it an increase or a decrease) within a 1 percent margin, also differentiating between different productive sectors and different categories of taxpayers. In spite of this, a provisional regime has been adopted which sets a concessional rate for the agricultural sector (from 1,9% in 1998 to eventually reach 4,25%) and a higher rate for the financial sector (from 5,4% for the three year period between 1998-2000 to the standard regime in 2003).

Special regimes regard, among other things, companies relating to their location[46], business size, existence of a new productive activity. Given the importance of the novelties deriving from the introduction of IRAP in the structure of tax levies on companies, several measures were introduced to eliminate inconsistencies found in initial determination of tax bases. Some of these measures were limited in scope and aimed, in particular, at the items making up the cost of labour[47] which are deductible from the tax base, and at avoiding the so-called "third track" (the requirement that companies keep special accounts exclusively for IRAP in addition to bookkeeping required by civil code and for IRPEG purposes). Finally, some Regions varied the tax rate [48].

A more substantial change was introduced with the 2001 Budget Law, which introduced a deduction from the tax base for companies whose taxable income is no greater than 181.000 Euros, to be applied prior to any eventual division of the tax base. Since 2001, extra-ordinary revenues and costs are in the tax base if these items are correlated to positive and negative elements of production revenues from other fiscal years, and, as already pointed out, expenditures undertaken by hiring disabled people are fully deductible.

A.1.2 Dual Income Tax

The Dual Income Tax (DIT) system was introduced in 1998 under the general purpose of reducing both the discrimination against equity finance and the effective tax rate[49]. In line with the Nordic DIT and the ACE

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[44] Among taxpayers subject to IRAP there are IRPEG taxpayers who include, in addition to public limited companies, organisations whose sole or main activity is commercial, non-commercial organisations and public administration (including state bodies and administrative institutions exempt from IRPEG), companies and organisations of any type that are not resident in Italy. Taxpayers subject to IRPEF include private and individual partnerships carrying out commercial activity, individuals, general partnerships and equivalent companies carrying out free-lance activity; agricultural producers save for those exempt from VAT.

[45] For a proposal which, among other things, provided for a value added tax in the place of social contributions see Di Majo (1986).

[46] As far as location is concerned, to a substantial degree, the regulations absorbed tax relief provisions which were already in force; a special deduction is provided for companies located in southern Italy (in compensation for the benefits of exemption from social contributions) and the existing ten year exemptions for local income tax was upheld.

[47] It was in fact clarified that income from continuative and coordinated collaboration may not be deducted in any event with regard to the determination of tax base, whereas contributions for work disability insurance, expenses for apprenticeship contracts and work training contracts may be deducted (up to 70%). The 2001 Budget Law also included the possibility of deducting expenses for disabled workers.

[48] In Emilia-Romagna, non-profit organisations and co-operatives are taxed at 3,5%. In Friuli-Venezia-Giulia, a tax credit was introduced for firms and professional activities. Small firms, some professionals and some co-operatives are taxed at 3,5%. In Lazio, the tax rate varies between 3,25% and 5,25%, depending on the sector of activity. In Lombardia, banks, insurance companies and other financial firms are taxed at 5,75%, whereas travel agencies are taxed at 3,25%. Non-profit organisations do not pay IRAP. Moreover, in Marche, IRAP will be increased to 5,15% (with the exception of social co-operatives which will be taxed at 3.25%). Banks, insurance companies and other financial activities will be temporarily taxed at 5,75%. In Toscana, commercial activities of particular interest for mountain communities will be exempted from IRAP.

[49] The Dual Income Tax systems introduced in some Northern European countries, as well as the Allowance for Corporate Equity (ACE) proposed by the Institute for Fiscal Studies at the beginning of the 90s, obviously were taken

systems, profits are divided in two components. The first component represents the ordinary income or normal profits, that is the opportunity cost of new financing with equity capital, both in the form of new capital subscriptions and retained earnings, compared to other forms of capital investments. According to the system in force in 1998, ordinary income is calculated by applying an imputed nominal rate of capital return to the annual capital increases evaluated with reference to the value of capital stock at the date 31/09/96 (when the reform was actually presented), net of increase (again evaluated with respect to 1996) of loans to subsidiaries undertakings, loans to parents undertaking, other investments held as fixed assets by the firm. The nominal rate is set yearly by the Government and since the introduction of DIT and until 2001, when the system was practically abolished, the nominal rate was 7%. Ordinary profits are taxed at the preferential rate of 19% while remaining profits, the second component of corporate income, are taxed at the ordinary rate. In order to limit revenue losses resulting from the introduction of the dual system the law fixed as 27% the average rate under which the effective corporate tax rate could not fall. This constraint was then removed in 2001. Furthermore, the law sets that allowance can be brought forward up to five years whenever allowable income does not benefit from the reduced rate[50].

In the first years of application, presumably, the dual system benefited mainly new and less capitalised enterprises rather than highly capitalised companies (Bordignon, M., Giannini, S., Panteghini, P., 2001). Therefore, in order to increase the short-term impact of the reform and at the same time to speed up the transition to a regime where ordinary income is calculated on the entire capital stock rather than just capital increases (incremental regime), in 2000 some corrections to the original reform were introduced. Specifically, ordinary corporate income that can benefit from the preferential rate is increased (up to the enterprise net wealth threshold) by a conventional parameter set first to 20% (2000) and then to 40% (2001), while for unincorporated companies ordinary income is computed on the entire capital stock.

Formally, the total corporate tax amount (T_C) under the regime in force before July 2001 can be expressed as follows:

$$T_C = t\ (\Pi - 1{,}4\ r\Delta K_{96}) + t'\ 1{,}4\ r\Delta K_{96} \qquad\qquad (1.A)$$

Where Π represents total taxable profits, r is the imputed nominal rate and equals 7%, t the ordinary corporate tax rate (36% in 2001) and t' the preferential tax rate (19%), ΔK_{96} net capital increases evaluated with reference to 1996, as explained above. Therefore, under the DIT system the "effective" statutory ranges between t and t', depending on the amount of profits eligible to the benefit (ΔK_{96}), increased by 40% in the regime existing in 2001.

A.1.3 Social Security contributions in Italy

The social contributions (SC) borne by Italian employees and employers differ for their functions and scope. Full time workers pay social contributions to be distinguished from those paid by workers with different contracts such as apprenticeship and work training contracts. Our aim is to model the effects of all contributions distinguished by type, rate, type of contract, firm size, activity sector and so on. Therefore, a preliminary detailed collection of all social contributions provisions was carried out.

Regarding employees, we can observe that the total contribution for nearly all employees working in small companies amounts to 8.89% of taxable income and it increases to 9.19% for employees in larger firms[51]. The total contribution rate in Manufacturing is generally 44.09% most of which is charged to the employer[52]. It is important to stress that rates depend on the sector of economic activity, the firm size and the worker

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[50] into consideration when designing the 1998 tax reform, although the "Italian" DIT differs from the other systems. On these aspects see Bordignon, Giannini, Panteghini (2001). It is important to note that as for the ACE system, the "Italian" DIT applies both to the corporate and non corporate sector.

[50] In the following cases: before 2001 when average corporate tax rate falls below 27%, when ordinary profits exceed total taxable income, when enterprises incur in losses.

[51] The rates for pension funds change as income changes for each category: they range from 8.89% to 9.89%. For CIGS the rate depends on the size of the firm. All workers of firms with up to 15 employees (50 for commerce) do not have to pay any contribution, while workers in firms with 16 or more employees (51 or more for commerce) have to pay the 0.3% of the taxable income. As total contribution for CIGS is 0.9%, the difference of 0.6% has to be paid by the employer. Executives do not have to pay any rate.

[52] The social contribution rates used in the model are detailed for a larger number of sectors.

category employees (manual workers, white collar workers and executives). A particular scheme in terms of social contributions is applied to dependent workers as apprentices and trainees. Adding to other measures already in force, these provisions were adopted to promote employment especially for young people as the rates are generally lower and therefore the non-wage costs are reduced.

A peculiar provision of the Italian system is the Severance Pay (Trattamento di Fine Rapporto, **TFR**), regulated by article 2120 of Civil Code. In all cases of termination of employment, the employee has the right to a severance pay[53]. The recent legislation on pension funds sees the takeoff of supplementary pensions which has depended on the use of the resources which were until now intended for severance pay. The intention, in fact, is for the bulk of the contributions to pension funds to come from the severance pay system.

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[53] This payment is calculated by setting aside, at the end of each financial year, an amount equal to the salary due for that year, divided by 13.5 (7.41% of salary). The amounts set aside are revaluated at 31 December of each year by a fixed 1.5% plus 75% of the increase in the consumer price index calculated by ISTAT.
The revaluation formula is thus:

r = 0.015 + 0.75 p

where p is the inflation rate of the previous year. In practice, severance pay represents a form of forced saving towards retirement for workers and a form of self-financing for firms.

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