Family taxation and labour market participation incentives in Italy

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ABSTRACT

The potential implications of using the family as opposed to the individual as the unit of taxation are not clear. This applies both to work incentives and distributional outcomes. In this paper we evaluate the effects of a hypothetical reform of Italian income taxation both on labour supply incentives and on redistribution of income between families with different composition and income levels. In particular, we analyze the potential effects of a shift from the current system of individual taxation to a system of family taxation similar to the French family-splitting approach by implementing a tax-benefit model. Based on data from the Bank of Italy Survey of Household Income and Wealth, our simulations show a reduction in the degree of progressivity and a disincentive for the labour supply of additional earners within the family.

JEL: H24, H31, J08, J16

Introduction

Low female labour force participation across the European Union has been an issue of continued concern since the Eighties, and emerged as a specific policy-issue in the Lisbon Strategy[1]. There are indeed huge differences across Member States in the share of employed women, currently standing at around 40 percent in southern European countries (i.e. Spain, Italy and Greece) and above 65 percent in the Nordic countries (Table 1). The problem is even more astonishing in Italy, where the participation and employment rates are the lowest of the EU15 members (only Malta has a lower indicator within EU25). Growth in female employment rates in Italy is clearly inadequate, as it was only 10 percent between 1995 and 2005. This leaves Italy 15 percentage points below the Lisbon target, and compared to Spain and Ireland, where the growth figures were 20 and 16 percent respectively, progress has been poor.

While there is agreement on the need to increase female employment rates in Europe, it is not clear how this can be best achieved. Part-time jobs, tax wedges, and childcare facilities are some of the policy instruments that are widely discussed[2]. Substantial differences in the share of part-time jobs can be found among Member States (ranging from 5% in Greece to 45% in Netherlands) and a similar variation can be found in fertility rates. It is argued that the female labour supply and labour force participation rate is linked to fertility. In particular, there seems to be a correlation between high labour force par-

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[1] In 2000, with the Lisbon Strategy, the European Union introduced a very ambitious goal of raising the employment rate of both men and women by almost 10 percentage points in ten years. Moreover, a specific target for women was defined: the employment rate should rise to 60 per cent by 2010 (it was below 50% in 1995).

[2] On the positive relation between the employment rate, part-time job diffusion, fertility and childcare facilities see, among many others, Boeri et al. (2005).

ticipation (thanks to specific labour market policies) on the one hand, and high fertility on the other. The Scandinavian countries provide good examples of this pattern (Koegel 2006).

Interestingly, however, within the European Union there is much stronger uniformity in terms of the tax wedge than there is for employment or fertility rates[3]. In the light of this, an interesting comparison can be made between the three largest continental European countries: France, Germany and Italy. All three countries have similar average tax rates for labour income (they are considered high tax countries) but France and Germany have a family taxation system whereas Italy applies individual taxation. Moreover, Italy and Germany are both characterised by low fertility; Germany has high female employment rate, while France is the only country characterized by relatively high levels of both indicators. These differences explain why tax reforms focusing on the treatment of marriage and children are often proposed as a policy that could be used to influence both fertility and work incentives for mothers. In this debate, increasing attention has been devoted to the French Family Splitting system[4].

The Italian income tax introduced in 1974 (Irpef) was based on family income, but in 1976 the Constitutional Court delivered a judgement against combined income taxation. From this point onwards the tax unit became the individual, and household dependents (the spouse and/or the children) are taken into account by means of tax allowances and tax credits[5]. However, a move back to the family system has been proposed several times[6] and it is still highly topical in Italy, mainly with regard to the possible effects on income distribution for households of different size and income level[7]. In contrast, the debate in France and Germany seems to focus on tax reform effects on the female labour participation rate. As an example, Bargain and Moreau (2003) simulate the effect on labour supply of a change in the French tax unit – from family to individual – using a collective framework model. In a similar way, Beninger,

[3] The explicative role of taxes in the employment differential between the US and Europe has been widely debated. For recent contributions see Prescott (2004) and Rogerson (2007)

[4] Most OECD countries employ an individual base of personal income taxation as Italy, Sweden, Finland, Netherlands, Austria and Great Britain. In Belgium, Ireland and Germany options for a splitting system are in force, whereas in France, Portugal and Luxembourg compulsory splitting systems are in force. In the US, the federal income tax base is the household combined income and two different tax rates and brackets are in force for single taxpayer and couples. From the third tax rates, brackets in force for couples are less than the double of those for singles and the system implies a disadvantage for the former, said marriage tax. See Longobardi (2005) and Di Nicola (2006) for further details.

[5] The disadvantage of single earners in comparison with the treatment of dual earner families was underlined by the Constitutional Court in two later sentences.

[6] Visco (1991) , Marenzi (1995), Oneta (2004), Campiglio and Tartamella (2004), ISAE (2004), Tutino (2005), Di Nicola (2003 e 2006) and Larcinese (2005).

[7] In Larcinese (2005), where the labour supply is specifically modelled, the main interest concerns the Lorenz dominance of net incomes.

Table 1 – Employment rates by gender

	1995	2000 Male	2005	1995	2000 Female	2005	1995	2000 Total	2005
EU15	**70,5**	**72,8**	**72,9**	**49,7**	**54,1**	**57,4**	**60,1**	**63,4**	**65,2**
BE	*66,9*	*69,5*	*68,3*	*45,0*	*51,5*	*53,8*	*56,1*	*60,5*	*61,1*
DK	*79,9*	*80,8*	*79,8*	*66,7*	*71,6*	*71,9*	*73,4*	*76,3*	*75,9*
DE	*73,7*	*72,9*	*71,2*	*55,3*	*58,1*	*59,6*	*64,6*	*65,6*	*65,4*
GR	*72,5*	*71,5*	*74,2*	*38,1*	*41,7*	*46,1*	*54,7*	*56,5*	*60,1*
ES	*62,5*	*71,2*	*75,2*	*31,7*	*41,3*	*51,2*	*46,9*	*56,3*	*63,3*
FR	*67,2*	*69,2*	*68,8*	*52,1*	*55,2*	*57,6*	*59,5*	*62,1*	*63,1*
IE	*67,1*	*76,3*	*76,9*	*41,6*	*53,9*	*58,3*	*54,4*	*65,2*	*67,6*
IT	***66,9***	***68,0***	***69,9***	***35,4***	***39,6***	***45,3***	***51,0***	***53,7***	***57,6***
NL	*75,3*	*82,1*	*79,9*	*53,8*	*63,5*	*66,4*	*64,7*	*72,9*	*73,2*
AT	*78,5*	*77,3*	*75,4*	*59,0*	*59,6*	*62,0*	*68,8*	*68,5*	*68,6*
PT	*73,5*	*76,5*	*73,4*	*54,4*	*60,5*	*61,7*	*63,7*	*68,4*	*67,5*
FI	*64,2*	*70,1*	*70,3*	*59,0*	*64,2*	*66,5*	*61,6*	*67,2*	*68,4*
SE	*73,1*	*75,1*	*74,4*	*68,8*	*70,9*	*70,4*	*70,9*	*73,0*	*72,5*
UK	*75,1*	*77,8*	*77,6*	*61,7*	*64,7*	*65,9*	*68,5*	*71,2*	*71,7*
US	**79,5**	**80,6**	**77,6**	**65,8**	**67,8**	**65,6**	**72,5**	**74,1**	**71,5**
JP	**81,9**	**80,9**	**80,4**	**56,4**	**56,7**	**58,1**	**69,2**	**68,9**	**69,3**

Source: Eurostat.

Laisney and Beblo (2003) compare unitary and collective models of labour supply to test the labour supply effect of changing the tax unit in Germany – again from family to the individual. In a more general perspective, Waghenals (2000) studies the incentive effects of the 2000 German tax reform on female and male labour force participation. A contribution by Baclet, Dell and Wrohlinh (2005), simulates the adoption of French family splitting in Germany: in this case the main issue is the fertility target, given that in terms of female work incentives and participation levels the French and German splitting systems are similar.

The aim of this paper is not to discuss whetter a female labour participation increase may improve the social welfare or whetter household production should be recorded in the national product, neither whetter a taxation system may influence fertility decisions. Our purpose is to evaluate the impact of a hypothetical shift from individual income taxation to family taxation in Italy by using microsimulation analysis. Redistributive effects will be taken into account by considering average tax rates and family characteristics; work-related effects will be discussed starting from an estimation of the labour supply. The

paper will be organised as follows: Section 2 presents the pros and cons of family and individual taxation from a theoretical point of view. Section 3 describes the tax benefit microsimulation model and the dataset employed. Section 4 discusses the results of a simulation of a hypothetical change from an individual to a family taxation system. In Section 5 some gender-differentiated labour supply estimations are presented in order to gain some elements for the discussion of a tax reform. Section 6 concludes.

1. Progressive income tax: individual or family tax unit?

It is worthwhile to start by reviewing the tax implications of individual versus family (or joint) taxation. In the former case, income tax is applied separately to each family member and tax concessions are employed for dependent children and spouses, if any. Formally, in a household with two wage earners the tax schedule is applied to each personal income and the household average rate is the ratio between the sum of the two individual taxes and the overall income of the couple, as follows:

$$ t_{af}^I = \frac{T_1 + T_2}{y_1 + y_2}, \qquad T_{1,2} = f(y_{1,2}, \varepsilon) $$

where:

t_{af}^I is the family average tax rate, under individual taxation;
$y_{1,2}$ are individual incomes;
$T_{1,2} = f(y_{1,2}, \varepsilon)$ are the tax due by each spouse following the individual tax schedule;
ε is indivual tax allowances and/or tax credits

Under individual taxation, marginal tax rates are different for each spouse, depending on their individual incomes (y_1 and y_2).

Family taxation is generally applied as a splitting system[8], where the tax rates are applied to a tax base built by summing all the incomes and dividing the result by a specific divisor (p), as follows:

$$ t_{af}^F = \frac{T^F}{y_1 + y_2}, $$

where:

t_{af}^F is the average household rate, adopting family taxation

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[8] However, in Italy until 1976 family taxation was applied as pure joint taxation, i.e. the tax schedule was applied to the overall income and the average rate was simply a function of the sum of the incomes of the couple.

T^F is the tax due by the family and is equal to $T^F = p* f\left(\dfrac{\sum_{1,2} y}{p}\right)^{\cdot}$

In this case the two spouses' marginal rates are equal.

There are two main splitting schemes in use in European countries: the German splitting system and the French family splitting system. In the former, the income tax of a married couple is calculated by applying the tax function to half of the total incomes $(p = 2)$[9], and the tax due by the family is calculated by doubling this amount.

In France the total family income is divided by a number that differs according to household size. In other words, the divisor p is a sum of different coefficients, one for each member of the household:

$$p = \sum_{i=1}^{n} c_i$$

where c_i is the coefficient representing member i of the household.

This «family quotient» is computed on the basis of an equivalence scale, with a value of 2 for a couple ($c_i = 1$ for each adult), 0.5 for the first two children and a weight of one applied to each additional child: for a family with two spouses and two children the family quotient would be three, as shown in the Table below (drawn from the French *Code des Impots*). This means that under the French system the taxable income for a single (without spouse and dependent children) is three times the tax base of a couple with two children and an identical income level.

Table 2 – The splitting divisors in use in France in 2003

Civil status	Without dependent people	Number of dependent people				
		1	2	3	4	5
Married	2	2.5	3	4	5	6
Widower	1	1.5	2	3	4	5
Single/divorced	1	1.5	2	3	4	5

Source: Code General des Impots, 2003.

The French splitting divisor is of interest for at least two reasons. First, the number of wage earners in a couple is not relevant to the overall tax burden,

[9] In this case the household size, including the number of dependent children, is taken into account by tax concessions, as in all the other individual taxation systems.

since the divisor is a function of the components of the family and is not linked to the number of earners. Secondly, a significant tax favour for dependent children is provided after the second child: starting from the third child a unitary increase of the divisor is envisaged for each new member being cared for, producing a higher reduction of the fiscal burden than that caused by the first two children. This implies that after the third child the economy of scale is ignored and children are considered as adults.

Clearly the tax unit is important and can affect several economic and social dimensions of behaviour. It might for instance have an impact on tax compliance, and in general it is acknowledged that the individual tax system gives more room for avoidance, mainly due to fictitious income shares among family members.

The systems will also have different impacts on incentives to legalize unions through marriage. If the individual tax system can be considered neutral, a family taxation system can exhibit either a deterrent or an incentive – depending on the exact details of the systems in place.

There is also a difference for families with children. Family taxation offers a more beneficial treatment of large families, due to the lower average tax rate; however, a system of tax credits with a high incentive for children can also be modelled in the individual taxation system.

Under the two taxation systems, incentives for work effort to the additional earner are different. Essentially, family taxation deters the labour supply of additional family members[10]. The influence on the work effort or, more specifically, on the decision to enter the work force, stems from the different marginal effective tax rates that the secondary earner faces in the two tax regimes. More precisely, the two spouses' marginal rates in family taxation are exactly the same and they are equivalent to the household marginal rate; on the contrary, under an individual system, marginal rates are related to individual incomes.

Table 3 shows examples of average and marginal tax rates under different hypotheses of income levels (20.000, 40.000 and 125.000 euros) and income concentration among spouses (1:1, 2:1 and 1:0, or single earner family). The

[10] From an efficiency point of view, optimal income taxation theory would favour individuals rather than households as the unit tax. In fact, the traditional Ramsey optimal taxation principle suggests taxing secondary workers at lower rates with respect to primary workers, because the labour supply elasticity of secondary workers is higher (for a survey see Blundell and McCurdy, 1999). Under a progressive individual taxation system, primary earners have higher incomes and higher marginal tax rates, while secondary earners face lower marginal tax rates. On the contrary, in a joint-income tax system, tax rates are identical across members of the same family (see Mirrlees (1971) for a seminal contribution at the individual level, and Boskin and Sheshinski (1983) for the extension at the family level. The optimal taxation approach does not offer clear-cut prescriptions if differences across families are taken into account or the household production function is considered. Moreover, under specific hypotheses on household decisions and welfare, joint taxation becomes optimal (see among others Kleven et al. (2006) and Cremer et al. (2007)).

*Table 3 – Average and marginal tax rates under individual and French family tax system (couple without children)**

Income levels and concentration			Tax liability				Average rates				Marginal rates			
			Individual taxation			Family taxation	Individual taxation			Family taxation	Individual taxation			Family taxation
Household Income	Spouse 1 Income	Spouse 2 Income	T_1	T_2	T_1+T_2	T_F	t^I_{a1}	t^I_{a2}	t^I_{af}	t^F_{af}	t^I_{m1}	t^I_{m2}	t^I_{mf*}	$t^F_{m1}=t^F_{m2}=t^F_{mf}$
Equal income levels (1:1)														
20.000	10.000	10.000	1.800	1.800	3.600	3.600	18,0%	18,0%	18,0%	18,0%	18,0%	18,0%	18,0%	18,0%
40.000	20.000	20.000	4.541	4.541	9.082	9.082	22,7%	22,7%	22,7%	22,7%	32,0%	32,0%	32,0%	32,0%
125.000	62.500	62.500	20.347	20.347	40.693	40.693	32,6%	32,6%	32,6%	32,6%	39,0%	39,0%	39,0%	39,0%
Main and secondary earners (2:1)														
20.000	13.333	6.667	2.580	1.200	3.780	3.600	19,4%	18,0%	18,9%	18,0%	24,0%	18,0%	21,0%	18,0%
40.000	26.667	13.333	6.674	2.580	9.254	9.082	25,0%	19,4%	23,1%	22,7%	32,0%	24,0%	28,0%	32,0%
125.000	83.333	41.667	29.288	12.222	41.510	40.693	35,1%	29,3%	33,2%	32,6%	45,0%	39,0%	42,0%	39,0%
Single earner														
20.000	20.000	-	4.541	-	4.541	3.600	22,7%	0,0%	22,7%	18,0%	32,0%	18,0%	25,0%	18,0%
40.000	40.000	-	11.572	-	11.572	9.082	28,9%	0,0%	28,9%	22,7%	39,0%	18,0%	28,5%	32,0%
125.000	125.000	-	48.038	-	48.038	40.693	38,4%	0,0%	38,4%	32,6%	45,0%	18,0%	31,5%	39,0%

* The table shows a very simplified tax framework with no tax credits related to work or dependent spouse. Marginal tax rates are computed as the ratio of tax increase to income increase under the *hypothesis* that both spouses earn few additional euros.
Source: Authors' calculations on the basis of Italian brackets and rates in use in 2002 (see Table 5).

Table shows that in the case of equal income levels between spouses (top three rows of Table 3) all the tax rates are identical under the two taxation systems. If the ratio of incomes is 2:1 and the household income is 40000 euros, under individual taxation the secondary earner faces a marginal rate equal to 24% – much lower than the marginal tax rate (32%) under the family system. In a single earner household (bottom three rows in the Table), at the same income level the effect is even more evident: if the non-working adult decided to enter the job market, his/her marginal rate would be 18% under the individual system and 32% under the family system.

Finally, the two systems have an impact on the degree of progressivity: when adopting the same marginal rates and brackets, progressivity becomes stronger in an individual framework. In contrast, the average tax rate becomes lower in the family taxation system due to the tax base abatement[11]. This is because the tax due in an individual and progressive taxation system is positively correlated with income concentration: the less egalitarian the income distribution between the two spouses, the larger the tax burden becomes. Therefore, for a given total family income under an individual taxation framework, the tax burden is greater for single-earner families than for two-earner households. Under a family taxation system, on the contrary, single earner and two-earner families pay exactly the same amount of tax: for a total household income of 125.000 euro the average tax rate is the same in the family taxation system whatever the income distribution between spouses (32,6%); on the contrary under an individual tax system the average tax rate increases with income concentration (from 32.6 % to 38.4%). Summing up, individual taxation is neutral with respect to the labour supply of the secondary earner, whereas the family taxation system implies a disincentive for the secondary earner. The *neutrality* of the individual tax system is straightforward in this simplified framework but may be reduced when benefits and allowances are a decreasing function of family income level, as are family allowances in the Italian system. This simple tax framework has been proposed also to illustrate the implicit reduction in tax progressivity implied by the French system and shown by the average tax rate differences. However in an hypothetical reform tax progressivity can be amended by choosing different level of tax rates and tax allowances.

2. A tax benefit microsimulation model

Our data come from the 2002 Bank of Italy Survey of Household Income and Wealth. Net incomes recorded in the survey are transformed into gross-of-tax amounts using a microsimulation model based on the Italian personal income tax legislation in force in 2002[12]. Though the share of self-employed in-

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[11] If family taxation is under a splitting system and not a pure joint taxation system.

[12] TAXPOL is a microsimulation model built at the Dipartimento di Studi sullo Stato (University of Firenze). For a different application see Gastaldi et al. (2008).

dividuals is substantial in Italy, the available data for their labour supply and earnings are not completely reliable: this explains why we consider a sub-sample of families in which individuals work as employees (if not unemployed).

As a result of the selection procedure, the dataset is composed of four categories of families:

1. couples of employees (with or without dependent children and other dependent relatives);
2. couples with one employed and one unemployed (with or without children and other dependent relatives);
3. single-parent families (employed or not employed and with children and possibly other dependent relatives);
4. singles (employees and unemployed).

The dataset, which after the aforementioned selection cannot be considered representative of the Italian population, has 9066 individuals and 2.919 families, as shown in Table 4.

Table 4 – Simulation dataset by household types

Two earners couples	991
Couples with a single earner	1011
Single parent, employed	288
Single parent and couples unemployed	227
Singles (employed or not)	402
Total	**2919**

Source: Authors' estimation.

Families with relatives recorded as working (young adults or grandparents) are included in the sub-sample because they may be important to explain labour supply decisions, although these kinds of additional earners in the family are not directly affected by the reform. Even when they live in a household, their income tax does not change as they are considered as singles. As for the splitting divisors, we chose those used in France in 2003, as previously illustrated in Table 2.

The *base scenario* is obtained by applying the Personal Income tax in force in Italy in 2002 (Table 5), including tax allowances related to family and work status. In the *family tax scenario*, the household income, equal to the sum of the spouses' incomes, is divided by the splitting divisors outlined above in order to obtain a new tax base. As a second step, the Italian personal income tax schedule for 2002 (Table 5) is applied to this new tax base and, as a last step, this provisional tax charge is multiplied by the divisor in order to obtain the total household tax.

Table 5 – Marginale rates, income brackets, tax credit of Irpef 2002

Income brackets	Marginal Rates (%)	Employees tax credit	First child tax credits
Up to 10329 euros	18	22 brackets. The higher	516.46 up to 36152 euros
From 10329 to 15494 euros	24	tax credit decreases	303.68 from 36152
From 15494 euros to 30987 euros	32	from 1146,53 for incomes	to 51646 euros
From 30987 euros to 69722 euros	39	under 6197 euros to 51,65	285.08 more than 51646
More than 69722 euros	45	for incomes more than	
		51646 euros	

Two children tax credit	Three children tax credit	Fourth and more children tax credit	Dependent spouse tax credit
516.46 up to 41317	1549.4 up to 46481 euros	516,46 euros for each child	546,2 euros up to 15494 euros
41317 to 51646	977 from 46481 to 51646 euros		496,6 from 15494 to 30987 euros
285 more than 51646	855 more than 51646 euros		459,4 from 30987 to 51646 euros
			422,2 more than 51646 euros

Source: Italian Ministry of Finance.

Finally, to calculate the net tax amount we consider tax credits related to the work status of the taxpayer[13], while tax credits for dependent children and spouse are eliminated. In fact, we consider family splitting as an alternative to the family-related tax credits in force in the Italian system. Summing up, we keep the Italian tax schedule and work tax credits under the *family tax scenario* as our aim is to highlight the effect of the transition from an individual to a family income taxation system, without altering the legal brackets and rates in force in Italy. In that way the transition from the individual to a family taxation system automatically reduces the tax progression[14]. The aim of this work, however, is not to evaluate the progressivity of the French system if it were applied to the Italian income distribution, but to verify the effects of the «family quotient» on families that are different for incomes and composition and to underline the labour supply incentives of a family taxation system, considering that a transition from the individual system to the family system may involve both a loss of revenues and a progressivity reduction. In this paper the latter two effects are only measured considering the original tax schedule.

[13] More precisely, we allocate tax credits related to work status according to the gross income of each spouse before calculating family gross income and family gross tax. As final step, we reduce the family tax due by tax credits previously assigned.
[14] For a demonstration of the so-called «grin from splitting» see Richter and Hampe (1984) or Lambert (1993).

3. Microsimulation and fiscal analysis

A tax benefit model simply measures the change in the budget constraint that households face because of a fiscal reform without taking into account any behavioural change. Starting from survey data and the socio-demographic characteristics of households, these models arithmetically derive disposable incomes and net tax payments given the official rules for the computation of taxes and benefits in the policy being analysed. By using this kind of model the analysis can be at least threefold. First of all, it is possible to calculate the effect of the reform on revenues. Secondly, fiscal policies can be evaluated for several typologies of households, with the objective of discerning the winners and the losers after the reform. Finally, arithmetic models allow us to compare different taxation system or, generally speaking, the impact of reforms with regard to income distribution. This kind of evaluation is done by comparing different net equivalent income distributions by means of inequality indices, and taking the household equivalent gross income distribution as the starting point. In all these analyses, the behavioural responses are ignored and the results can be considered as *ex-ante* evaluations, in the sense that the reaction of economic agents to each policy is not taken into account. Behavioural models overcome this limitation, as they include a detailed representation of the behavioural response of individuals and households to changes in their budget constraint. The type of behaviour taken into account differs across models, although consumption, labour supply and portfolio choices are the most frequent focuses of interest. However, behavioural models are usually structural models, but their computational burden is beyond the scope of this paper[15]. For this reason we present the microsimulation results, and then we add some qualitative considerations based on non-structural labour supply estimations.

3.1. Results of the arithmetical microsimulation of the reform

The simulation of the fiscal reform shows a loss in total income tax revenue (-5.1 percent)[16] confirming other empirical evidence from Italy[17]. However this result is not homogeneously spread across the population as winners and losers among Italian households can be identified.

Generally speaking, the simulated reform shows a reduction in the tax liability of male taxpayers and an increase for female taxpayers, as women are

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[15] See Colombino et al. (1999a, 1999b e 2000)

[16] This result refers to individuals affected directly by the simulated tax reform. The revenue loss decreases to 3,6 per cent if all income tax is considered, including individuals, as singles, for which nothing changes with the simulated tax regime.

[17] See Marenzi (1991), Ministero delle Finanze (1992), Declich and Polin (2004), Rapallini (2005), Tutino (2005).

usually the secondary earners[18]. Defining splitting gain[19] as the difference be-
tween income tax due in a family system and that due in an individual system
and considering the average tax change for households, Figure 1 shows that there
is a splitting gain for a couple with two earners (the first category) and for one-
wage earner households (second category); contrary to the expected result, the
gain is higher for the first category. In contrast, single parent households (third
category) exhibit a splitting loss, in the sense that their tax liabilities are greater
under the simulated reform than the present Italian income tax system. A similar
splitting loss emerges also for households in which parents (single parents or
couples) are unemployed: this effect is driven by their very low income level[20]. In
fact, on the one hand their incomes are still in the first bracket both if income is
individually considered and if combined and the divisor effect is null; on the oth-
er hand, family-related tax credits in the base scenario are not in force in the fam-
ily tax scenario. As expected, Figure 1 shows a zero splitting gain for singles
(fifth category), employed or unemployed, because they are unaffected by the
simulated reform as their tax base is divided by one ($p = 1$).

Figure 1 – Splitting gain by household type
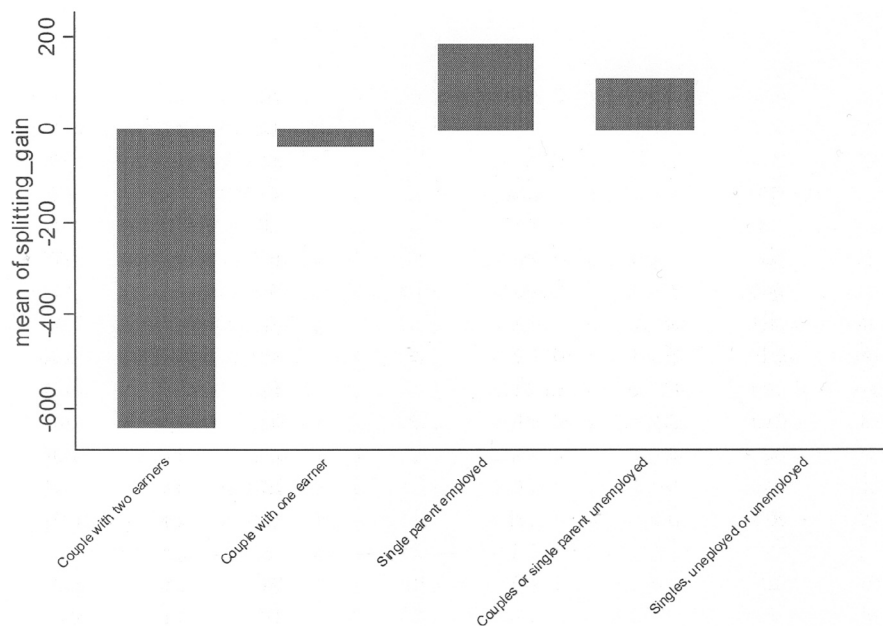
Source: Authors' estimation.

[18] In our sample in 86,4 % of the households there is a female secondary earner.
[19] A splitting gain simplified analytical version is in the appendix.
[20] In the sample, people who declare themselves unemployed at the time of the inter-
view usually worked only for a few months of the year.

The high splitting gain for two wage-earner couples can be explained by the income level, considering that the model shows a higher gross average income for the two wage-earner households than for the one wage-earner category.

As shown in Figure 2, the splitting gain in the simulation increases with gross income; the effect of a higher gross income for the two-earner families completely offsets the advantage of the concentration income effect of the single earner households.

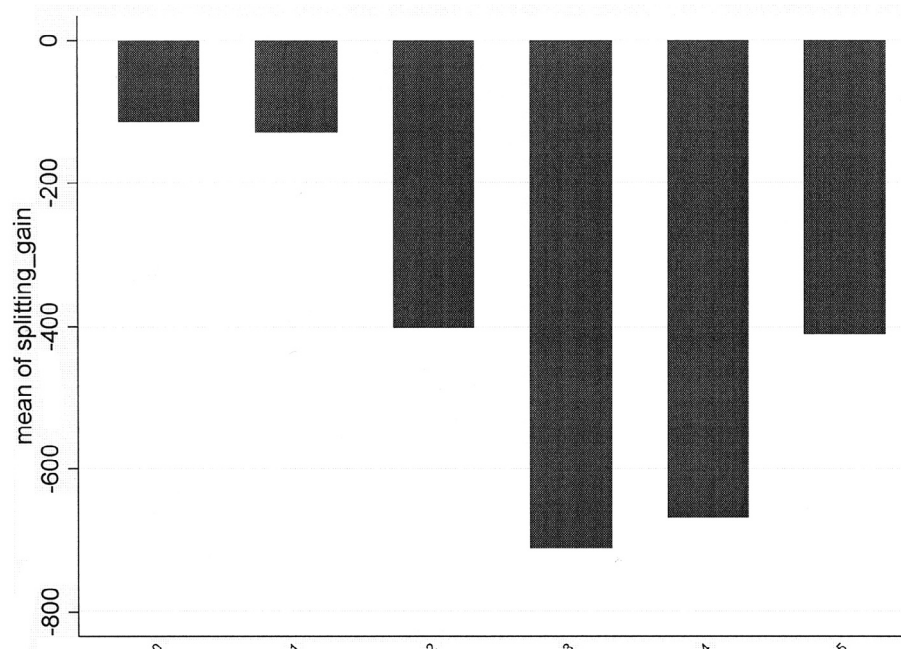*Figure 2 – Splitting gain by deciles of household income*
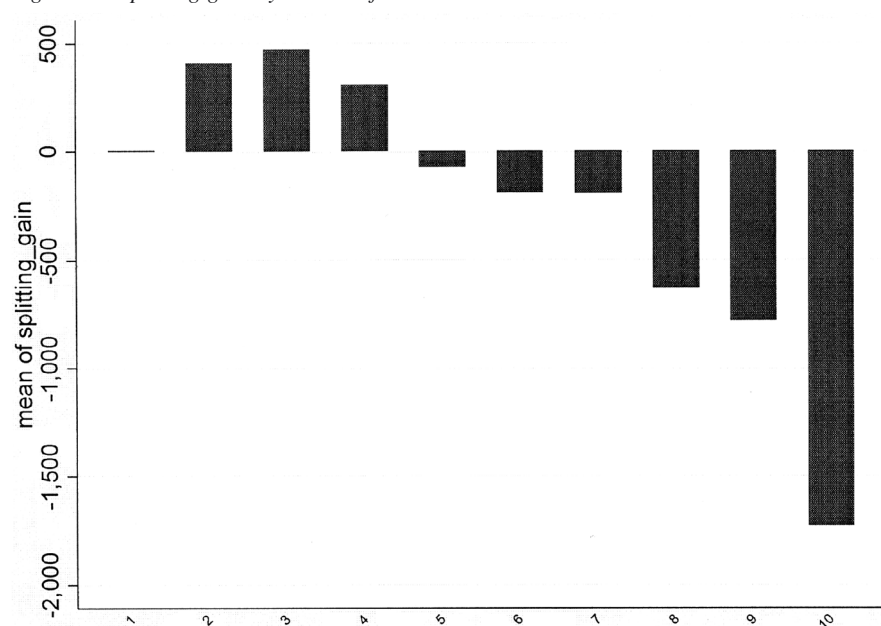
Source: Authors' estimation.

As for income distribution, the empirical result is consistent with the analysis carried out in the first section: the splitting gain is positive for those households positioned after the fifth decile, while there is an increase in the tax due for households located in the first four deciles[21].

[21] This effect on income distribution is confirmed by the Gini index trend. Starting from a gross equivalent income index of 0.6750, the net equivalent income index in the *individual scenario* is 0.6538 whereas the index of the *family scenario* is 0.6591, showing the expected increase. Net and gross incomes for the two scenarios are defined «equivalent» because, before calculating the Gini index, they are divided by the OECD equivalence scale. This scale assigns the value 1 to the first member of the household, 0.7 to all other adults, and 0.5 to children.

Figure 3 – Splitting gain by households with different numbers of dependent children

As regards the link between splitting gain and family size, the simulation shows that the reform is more advantageous for households with three and four dependent children, while those with more than four dependent children seem to gain less from this hypothetical reform. This apparently illogical result is, again, strictly related to income level distribution. Considering that in Italy households with more than four dependent children are mainly located in the first deciles of income distribution, the gain from French family splitting due to a large number of children is offset by a low income level[22].

[22] The arithmetical microsimulation and the analysis by household type can also be performed in a «neutral revenue scenario». In this case the introduction of French family splitting and a change in tax rates are simulated jointly so that total income tax revenue does not decrease. However, infinite changes in tax rates can lead to a revenue-neutral reform from an individual to a family taxation system. To check our results, we simulate a neutral-liability progression tax change, following the methodology suggested in Lambert (1993). In other words, in order to compensate for the revenue loss implied by the reform, all tax liabilities are increased by a percentage which ensures the same pre-reform income tax revenue. As for household type effects, the outcomes of the neutral revenue simulation are very close to the simulation reported.

In addition, marginal tax rates can give some information on the labour incentives of the two tax systems considering the sample in use. By definition, a *marginal tax rate* is the tax rate applied to the last unit of income, corresponding to the change in tax due that results from a small change in income. Table 6 shows average marginal tax rates due to an income rise of 100 euros for each adult, considering either the couple (i.e. the family) or the individual tax payer (male or female). As expected, under a family taxation system each family member faces the same marginal tax rates (equal to the family average marginal tax rate: 28.4 for the two-earner couples, 17.6 for couples with a single earner, etc.), whereas under individual taxation marginal tax rates are different. In more depth, in two-earner couples, female marginal tax rate under individual taxation is lower than those in the simulated scenario (26.9 vs. 28.4), while in couple with a single earner marginal both female and male tax rates are higher under individual taxation. In the single-parent case, if employed, individual taxation involves marginal tax rates higher than those in the family regime, because the effect of the increasing divisor related to dependent children is stronger than the family tax credits enjoyed. As far as singles are concerned, the two scenarios are – as foreseen – equivalent.

Table 6 – Effective marginal tax rates, on average for family, women and men

| | Marginal rates | | | | | |
| | Family average | | Women | | Men | |
	Family taxation	Individual taxation	Family taxation	Individual taxation	Family taxation	Individual taxation
Two earners couple	28.4	30.0	28.4	26.9	28.4	33.1
Couple with a single earner	17.6	26.9	17.6	20.1	17.6	27.0
Single parent employed	12.5	29.8	12.3	29.1	15.0	36.8
Single employed	30.4	30.4	31.3	31.3	29.5	29.5

Source: Authors' calculations

Focusing on job entry incentives, marginal tax rates for a wage entry level of 10.000 euro have been computed for couples, single parent households and singles if unemployed[23]. As singles are treated in the same way in the two regimes, entry marginal tax rates are identical as expected. For couples, the family tax system shows a marginal tax rate higher in all cases: this effect is due to the fact that for a 10.000 euro income level family-related tax credits under an individual system are more powerful with respect to the splitting effect. As regards single parent households, the difference between the family average and the gender differentiated value is explained by the fact that in our

[23] The simulation considers that if one dependent spouse enter the labor market, the dependent spouse tax credit and family allowances may be lost or reduced.

dataset the number of dependent children is higher when the unemployed single parent is a man[24]: as a consequence both the family system and the individual system signal lower marginal tax rates for men.

Table 7 – Job entry marginal tax rates, entry wage=10.000 euros

| | Marginal rates | | | | | |
| | Family average | | Women | | Men | |
	Family taxation	Individual taxation	Family taxation	Individual taxation	Family taxation	Individual taxation
Couple unemployed	13.0	10.94	13.0	10.94	13.0	10.94
Single parent unemployed	5.37	10.11	5.44	10.12	3.58	9.99
Single unemployed	12.58	12.58	12.58	12.58	12.58	12.58

Source: Authors' calculations.

4. A qualitative appraisal: wage and labour supply estimation by gender

In this section we estimate labour supply functions for men and women in order to gain some additional elements for a qualitative evaluation of the microsimulation analysis previously illustrated.

As discussed in the introductory section of the paper, a sizeable proportion of Italian women are out of the labour market and this raises concerns about potential labour supply disincentives. As regards Italian regional heterogeneity, Table 8 shows the employment rates[25] for different regions of Italy by gender.

Table 8 – Employment rates in the age group 15-64 years, simulation sample and official statistics, 2002

		Non working	Working	
Men	North	7,9	92,1	100,0
	Centre	11,4	88,6	100,0
	South	24,9	75,1	100,0
	Total	15,4	84,6	100,0
	Total (official figure)	*30,6*	*69,4*	*100,0*
Women	North	28,9	71,1	100,0
	Centre	39,1	60,9	100,0
	South	69,4	30,6	100,0
	Total	47,2	52,8	100,0
	Total (official figure)	*55,3*	*44,7*	*100,0*

Source: Authors' estimation and Istat for official figures.

[24] Even though the sample of male single parent unemployed is very small.

[25] The employment rate represents employed persons aged 15-64 as a percentage of the same age population.

There is of course a large difference in employment rates among men and women. Parts of these differences are explained by women staying at home to care for children. However, it has also been argued that employment rates among women are particularly low in Italy due to the lack of part-time jobs. Interestingly, there are considerable differences between regions, both for men and women. Parts of these differences are explained by the informal economy in the south, which is considerably larger than in the North.

Those not working are naturally coded as having zero wages in the survey. In the labour supply function we are nevertheless interested in their predicted wage, which can be thought of as the reservation wage. Thus, by estimating the wage equation we are able to construct the predicted wages, which can also be assigned for those not working. Women not participating in the labour market may also be due to self-selection. Consequently, we tried several versions of the Heckman selection model. However, selection does not appear significant in our sample, probably because of the selection procedure (excluding all families with self-employed workers). We settle therefore on a simpler wage equation without controlling for selection effects. This is given by:

$$\ln(W_i) = X_i \beta + \varepsilon_i,$$

where $\ln(W_i)$ is the logarithmic wage and vector X_i contains the set of individual characteristics. Estimations are performed separately for men and women. The results are presented in Table 9. The estimates conform well with what was expected. Age is positively associated with wages, but in a non-linear way. Regions are important – the Centre and the South having significantly lower wages than the North. Work status is also important for wages. Interestingly, once we control for these background characteristics, the number of children does not have a significant effect on women's wage levels.

Table 9 – Wage regressions by gender

	Women		Men	
	Coefficients	t stat	Coefficients	t stat
Age	0.0580	5.65	0.0491	6.91
Age squared	-0.0005	-4.07	-0.0004	-4.88
Region 2	-0.0616	-1.84	-0.1234	-4.85
Region 3	-0.1684	-5.11	-0.2717	-12.6
Work Status				
- level 2	0.2157	6.02		
- level 3	0.4137	7.58		
- level 4	0.3651	4.2		
- level 5	0.5947	4.75		
Educ. Years	0.0390	7.52	0.0552	21.6
Child	0.0880	3.72		
Constant	-0.1605	-0.79	0.1011	0.72

Notes: OLS estimates. Observations include total population between 18 and 66 for men (2582cases)and between 18 and 63 for women (1594). Region 2 is the centre of Italy and Region 3 is the south.
Source: Authors' estimation.

The labour supply model is estimated by multinomial logistic regression. This means that labour supply is divided into groups, each reflecting a certain level of hours worked per week. The labour supply categories are different for women and men, reflecting the actual labour supply distribution of the samples (see Table 10). Four classes were chosen for men: 1) not working; 2) working at least one hour per week but less than 40; 3) working 40 hours (i.e. full-time); 4) working more than 40 hours. For women we use the following four groups: 1) Not working, 2) Working at least one hour per week but less than 24, 3) working more than 23 hours but less than 40 hours, 4) working 40 hours (i.e. full-time) or more.

Table 10 – Hours worked frequency distribution (18-64 years)

	Men			Women	
	Freq.	Perc.		Freq.	Perc.
0	413	13.60	0	1385	46.79
< 40 hours	742	24.41	< 24 hours	298	10.07
40 hours	1175	38.68	24 <hours< 40	609	20.57
> 40 hours	708	23.31	40 hours and more	668	22.57
Total	3038	100.00	Total	2960	100.00

Source: Authors' estimation.

The parameter estimates for women are presented in Table 11. Most of the estimates are as expected. We find that wages are positively associated with labour supply, but in a highly non-linear way. For instance, the marginal effect of the predicted wage for not working (i.e. the first labour supply group) is -1.65, which indicates that women are less likely to stay out of the labour market as wages increase. Moving on to the groups with positive labour supply, we see a positive effect of predicted wages. The strongest effect is for the third group, where the marginal effect is 0.79. The positive effect of wages declines to 0.50 for the last group (i.e. at least 40 hours per week).

There is also a control for the presence of children. This is done by controlling for the presence of children younger than three years of age in the household, and it confirms that labour supply is generally lower for women with young children. The regions are also important. As reflected in Table 8, the labour supply is clearly lower in the South, and for some groups also lower in the centre. Finally we see that non-labour income and other earners in the household matter. This is especially the case for women not working. Here the marginal effect of non-labour income and other earners is clearly positive and significant; it is negative for all the other groups with positive labour supply.

Table 11 – Marginal effects on labour supply for women

	Not working		Working Part Time (a)		Working Part Time (b)		Working full time or more	
	Marginal Effect	Z stat	Marginal Effect	Z stat	Marginal Effect	Z stat	Marginal Effect	Z stat
Wage	-1.654	-25.39	0.3518	13.63	0.7938	20.48	0.5088	12.15
Age	0.0805	8.48	-0.0102	-1.84	-0.0287	-3.75	-0.0417	-5.61
Age square	-0.0007	-6.09	6.54E-05	0.97	0.0003	2.92	0.0004	4.04
Region 2	0.0135	0.42	0.0185	1.09	0.0213	0.9	-0.0533	-2.54
Region 3	0.1796	6.42	-0.0042	-0.28	0.0285	1.33	-0.2038	-10.3
Non-labour income	0.00002	3.15	-2.48E-06	-0.59	-0.00001	-1.85	-1.22E-05	-1.75
Children under 3	0.1505	4.41	0.0036	0.22	-0.0412	-1.56	-0.1129	-3.98
Other earners	6.02E-06	8.48	-5.92E-07	-1.76	-2.60E-07	-5.05	-2.83E-06	-4.96
Predicted outcomes	0.4150	0.1062	0.2177	0.2589				

Notes: Part Time (a): less than 24hrs per week; Part Time (b): between 24 and 36hrs per week. Observations include total non-student population between 18 and 63 (2960). Region 2 is the centre of Italy and Region 3 is the south.
Source: Authors' estimation.

Table 12 – Marginal effects for labour supply for men

	Not working		Working Part Time		Working full time		Working more than 40	
	Marginal Effect	Z stat	Marginal Effect	Z stat	Marginal Effect	Z stat	Marginal Effect	Z stat
Wage	-0.0966	-3.75	0.3326	8.21	-0.2639	-5.47	0.0280	0.66
Age	-0.0170	-4.88	0.011	1.43	0.0038	0.48	0.0026	0.37
Age square	0.0003	5.13	-0.0001	-1.4	-0.00003	-0.35	-0.0001	-0.7
Region 2	0.0223	1.25	0.1225	4.38	-0.1189	-4.97	-0.0259	-1.17
Region 3	0.1120	6.46	0.2387	9.78	-0.2843	-12.39	-0.0663	-3.11
Non-labour income	0.00001	6.61	0.00001	2.92	-0.00003	-4.69	0.00001	3.81
Children dummy	-0.1436	-8.97	0.0020	0.1	0.06405	2.76	0.0776	3.84
Other earners	0.000001	3.02	0.00000	1.52	-0.000001	-0.84	-0.0000001	-1.79
Predict outcomes	0,0902	0,2561	0,4057	0,2479				

Notes: Observations include total non-student population between 18 and 66 (3038). Region 2 is the centre of Italy and Region 3 is the south.
Source: Authors' estimation.

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We now move on to the labour supply estimation for men. Also here the results are largely in line with our expectations. Before commenting on the results, it is worthwhile reminding ourselves that compared to women, very few men are out of the labour force. The predicted wage is negatively associated with not working. As for women, the higher the wage, the lower the likelihood of belonging to the first labour supply group. The effect is strong and positive for the next group, which includes all men working less than 40 hours. As we can see, this consist of 25 percent of the sample (predicted). In contrast, wage has a negative impact on working fulltime (i.e. exactly 40 hours), which implies that for this group, a higher wage does not increase the labour supply. These effects reflect the classic relationship between wages and labour supply for men: wages have a positive effect on hours worked, but reach a turning point and become negative for a very high number of hours of work. In other words, the substitution effect is stronger than the income effect. For those working more than 40 hours, the effect of wages is insignificant.

The effect of non-labour income is somewhat mixed. It is clear that it lowers supply, since the marginal effect in the first group is positive: higher non-labour income increases the likelihood of not working. It is also positive in the second group (i.e. part-time work), and then has a negative effect on working full-time. In other words, those with lower non-labour income are more likely to work full time. Somewhat surprisingly, the effect runs positive again for labour supply that is more than 40 hours per week.

The presence of children has the expected effect. Basically men work more when children are present. The effect is negative for the first group, then becomes positive, and significantly so for the last two groups with the highest labour supply. The regional patterns are similar to those for women. Men in the North work considerably more than men in the Centre and the South, the latter having the lowest labour supply.

Table 13 gives a general idea on model fitting: a comparison between working hours recorded in the survey and working hours predicted by the model highlights that, on average, the model seems to overestimate real data, in particular when dealing with the unemployed. The overestimation for women is particularly evident in households with one single earner and with unemployed parents. As for unemployed parents, male and female predictions are similar: in both cases there is a consistent overestimation.

Multinomial logit estimations essentially confirm the importance of net wage in setting labour supply, but marginal effects are highly differentiated by gender as regards magnitude. This evidence reinforces the concerns about labour supply disincentives for the additional earner implicit in the family tax system, especially in the case of women in families with dependent children.

Table 13 – Working hours by type of families: actual and predicted by the model

	Women		Men	
	Real	Predicted	Real	Predicted
Two-earner couples	30.3	24.7	35.6	37.0
Couples with a single earner	2.7	12.4	34.6	34.5
Single parents (employed)	29.5	23.4	26.6	31.0
Unemployed parents	3.6	10.6	12.3	29.0
Singles	33.5	26.9	38.4	35.1
	17.3	18.7	33.1	34.8

Source: Authors' estimation.

Conclusion

The main objective of this paper has been to verify both the distributional and the labour supply effects of a transition from the current individual tax system to a family tax system in Italy. In recent years, a move away from the individual system has been proposed several times and it is still highly topical in the Italian debate. This debate has mainly focused on the consequences on income distribution for different households (by size and income level), even though the reform involves a disincentive on female work effort. If the female work effort is still of key importance considering that Italian female work participation is the lowest in EU15, this paper demonstrates also that foreseeable distributional effects should be carefully verified with the real income distribution and with the main characteristics of households along this distribution.

In order to consider the latter implication of the hypothetical reform, we have implemented a microsimulation, analysing implications for revenue and identifying the possible winners and losers of the reform. The paper has demonstrated the somewhat unexpected effects of the reform when we consider household type. The simulation provides evidence of a positive splitting gain for couples, with a higher gain for couples with two earners. Single parent households and households in which the parents (single parent or couple) are unemployed, in contrast, appear as clear losers from the reform. Generally speaking, these results are mainly influenced by the distribution of gross incomes prevailing in Italy. Even though we would expect a higher splitting gain for higher income concentration (as in the case of one-earner couples), we verify that the higher gain is for two-earner couples. This result can be explained by the fact that the average income for two wage-earner households is significantly higher than that of the one wage-earner type. In other words, the splitting gain in the simulation strictly increases with gross income, and this income level effect completely offsets the income concentration effect of the single earner households.

As regards the relation between splitting gain and family size, the arithmetic simulations show that the reform is more advantageous for households

with three and four dependent children, while households with more than four children seem to be penalized by this policy. This apparently illogical result is again strictly related to the actual income distribution of our sample. In Italy, households with more than four dependent children are mainly located in the first deciles of income distribution. As a consequence, the gain from French family splitting due to the large number of children is offset by the fact that their total family income is in the first bracket.

The labour supply estimations raise concerns about incentives for labour supply and support the expectation of a reduction in female and an increase in male labour supply, which is linked to a gender differentiated effect of the tax simulation on net incomes. Besides, the male labour supply increase can be expected almost equally spread across all household types, while the female labour supply disincentive would be presumably stronger for one-earner or single parent households.

Summing up, the French family splitting effect on the labour supply of women in households with a single earner confirms a disincentive on the work effort of secondary earners, regarded as the main drawback of this tax system. In our opinion, the effect on female single parents is particularly striking. In fact, this type of household is becoming more widespread in western countries and low income problems, if not poverty, are frequently linked with this household composition[26].

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Appendix: a simplified analytical version of the splitting gain

Define splitting gain *SG* as the difference between income tax due in a family system and that due in an individual system: if $SG > 0$ there is a tax increase in a hypothetical change from the individual to the family system, while if $SG < 0$ the same reform implies a tax cut.

Losses and gains result both from the household composition, i.e. the number of children and if it is a single earner family or a household in which both partners are working, and from the income tax system characteristics, i.e. number of brackets and rates, level of tax allowances and/or tax credits accorded (ε).

To simplify, consider a household without children in which $p = 2$ and a tax code without tax allowances and tax credit. In this example, if the two partners earn the same income, $SG = 0$, while it becomes negative if one partner earns a large proportion of the household income; the greatest *SG* is accorded to single earner households. In other words, in switching from an individual to a family tax system other things being equal, single earner households are expected to gain more than others.

Formally, if the partners' incomes are equal ($y_1 = y_2$),

$$if \begin{cases} p = 2 \\ y_1 = \dfrac{1}{2} y \rightarrow y_1 = y_2 \\ \varepsilon = 0 \end{cases}$$

$$SG = 2\, f\left(\frac{2 y_1}{2} \right) - \left[f(y_1) + f(y_2) \right]$$

$$SG = 2f(y_1) - 2f(y_1)$$
$$SG = 0 \text{ for any tax function } T = f(y)$$

If the partners' incomes are different, the income tax function must be known to calculate *SG*. In such a way, it is possible to evaluate whether the application of the tax function to the household income shares (household income divided by 2 in our example) implies moving into lower brackets with respect to those applied to each partner under an individual system.

Generally speaking, in a tax system with *n* brackets, *SG* is the following:

$$SG = 2 * \sum_{j=1}^{l-1} t_j (s_j - s_{j-1}) + t_l((y_1 + y_2)/2 - s_{l-1}) - \sum_{j=1}^{k-1} t_j(s_j - s_{j-1}) + t_k(y_1 - s_{k-1}) - \sum_{j=1}^{m-1} t_j(s_j - s_{j-1}) + t_m(y_2 - s_{m-1})$$

where the first term indicates the tax due under the family system (whose tax base is in the *l*-th bracket) and the other two represent the tax due by the spouses under the individual system (with incomes in the *k* and *m* brackets respectively).

In this example, splitting gain exists only if $l \neq m \neq k$. On the contrary, if incomes are very low they may be taxed in the first bracket, both if individual income is considered and if household income is shared; in this case *SG* would be zero. The same effect there would occur if both individual incomes and the shared household income are so high that all fall in the top tax bracket.

To further simplify, consider a tax system with only two brackets (identified by income level s_1) and two tax rates (t_1 and t_2), and a household in which only one partner has an income that would be taxed in the second bracket while the other partner has an income taxed in the first bracket. Under a splitting system the household income would be in the first bracket. In this case *SG* can be computed as follow:

$$SG = 2 * t_1 \left[\frac{(y_1 + y_2)}{2} \right] - t_1(s_1 - 0) - t_2(y_1 - s_1) - t_1 y_2$$
$$SG = t_1 y_1 + t_1 y_2 - t_1 y_2 - s_1(t_1 - t_2) - t_2 y_1$$
$$SG = (t_1 - t_2)(y_1 - s_1)$$

Given that t_2 and t_1, *SG* would be negative and increasing according to the difference between the bracket (s_1) and the higher income level (y_1). SG becomes constant when $\left(\dfrac{y_1 + y_2}{2} \right) = s_1$.

Figure A.1 shows the gain from splitting when Italian tax rates and brackets for 2002 are taken into account. If income is fully concentrated (as for a single-earner family) the splitting gain is large and increasing with income level, whereas it is zero for households in which income is perfectly shared between the spouses[27]. Figure A.1 also shows that the gain is increasing with in-

[27] Similarly to table 3, figure A.1 and A.2 are built on the Italian tax rates and brackets in force in 2002, without considering any personal or work-related allowances. This hypo-

come for single earner households but stabilizes at 8.100 euros for incomes over 140.000 euros[28]. For other income concentration among spouses, SG is smaller and depends on the different position of family income and individuals incomes of spouses among tax brackets.

Figure A.1 – French family-splitting gain with different income distribution between the two spouses (without children)
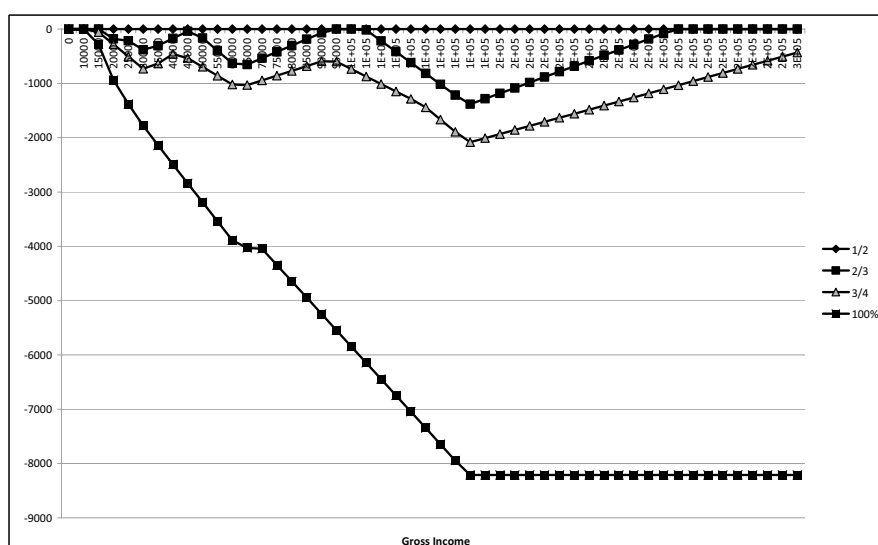
The splitting gain for a couple with two children[29] is shown by Figure A2. Switching from an individual to a family system produces a tax increase for low-income households, while a tax cut is gained by higher incomes. Given the level of tax credits for dependent children in force in 2002, the individual tax system favours couples with two children and less than 45,000 euros, and implies a tax increase for higher levels of income. As in the previous case, the gain from splitting is a positive function of the income concentration within the family and of the level of income. However, in the case of dependent children, the strong reduction in progressivity embedded in the family taxation system gives a tax reduction also to families where the income is perfectly shared between spouses.

thetical splitting gain is the difference between the tax due in a family-splitting system (by applying the French coefficients and the Italian tax rates) and in the individual tax system. Therefore a negative splitting gain shows that tax due under the family system is lower than tax due under the individual system.

[28] In 2002 the last bracket starts at nearly 70.000 euros. As a consequence, in this simplified framework, SG stabilizes at 140.000 euros.

[29] In Figure A.2 the individual tax system employs the child tax credit in force in 2002, whereas the French system uses a coefficients of 3.

Figure A2 – French family splitting gain with different income distribution between the two spouses (with two children and children related credits in the individual taxation system)