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SHIFTING TAXES FROM LABOUR TO CONSUMPTION: THE EFFICIENCY-EQUITY TRADE-OFF

by Nicola Curci* and Marco Savegnago*

Abstract

We assess how a tax shift from labour to consumption affects the Italian tax-benefit system in terms of the efficiency-equity trade-off. We designed three budget-neutral scenarios, where the revenues generated by increasing VAT rates are used to finance some alternative cuts in direct taxes. In all the scenarios, the trade-off is confirmed: efficiency increases but equity decreases. However, the scenario best positioned in the trade-off is the one providing an increase in labour income tax credits: in this case, the increase in efficiency is the highest and the decrease in equity is the lowest. We also account for the distribution of winners and losers following this reform. We show that, even if the losers are mostly concentrated in the lowest part of the equivalent income distribution, the recently introduced minimum income schemes provide these households with a benefit that is much higher than the loss generated by the tax shift.

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1 Introducion[1]

Opinion makers often cite a high level of taxation with respect to GDP as the primary source of inefficiencies and distortions induced by the tax system, while they normally devote less attention to tax structure issues such as, for example, the share of direct vs indirect taxes in total revenues.[2] In fact, a decrease of direct taxes (compensated by an increase of indirect taxes, if needed) is often considered a growth-friendly fiscal policy as it reduces the fiscal burden on factors of production. In this spirit, international organizations have often recommended to the Italian government to reduce labour taxation trough an increase in property and consumption taxes (see for example Andrle et al. 2018 for IMF proposals and Commission 2019 for the European Commission).

Apart from structural characteristics, a tax shift from labour to consumption is a specific policy option to be used in peculiar economic junctures. For example, a change in the tax mix has often been advocated in recent years to restore competitiveness in currency unions where nominal devaluations are by definition excluded: mimicking classical currency devaluations, such policy has been denominated *fiscal devaluation* (de Mooij and Keen 2012, Koske 2013, Fahri et al. 2014).

The main contribution of this paper is to evaluate the day-after effects of a fiscal devaluation on the efficiency and on the equity of the Italian tax and benefit system. We simulate the increase in the VAT rate foreseen by 2019 legislation for 2020 (the so-called *clausole di salvaguardia*, i.e. safeguard clauses) and we allocate the additional revenues to financing three alternative possible cuts of labour taxation: a cut in some statutory tax rates of the Personal Income Tax (*Irpef*); an increase in tax credits for labour incomes; a reduction in social security contributions. The empirical analysis is performed through BIMic, the Banca d'Italia Microsimulation (BIMic) model for the tax and benefit

[1] We thank for their helpful comments: an anonymous referee, Fabrizio Balassone, Andrea Brandolini, Pasquale Recchia, Paolo Sestito, Martino Tasso, Stefania Zotteri and the participants to the Workshop on Fiscal Policy and Microsimulation (Valencia, January 25, 2018) and to the Workshop on Microsimulation and Fiscal Policy (Banca d'Italia, Rome, February 23, 2018), where some preliminary results of the paper were presented. Any views expressed in this paper are those of the Authors and do not reflect the opinion of Banca d'Italia.

[2] Tax structure, measured by tax categories as a share of total tax revenue, varies significantly across OECD countries, even if differences have recently become less pronounced. OECD (2018b) shows that the (partial) convergence of tax structures for developed countries between 1995 and 2016 has been achieved through a shift away from personal income taxes and non-VAT consumption taxes toward higher social security contributions (SSC) and VAT. The more prominent role of VAT in total revenues is a structural aspect of modern tax systems and can be rationalized by considering that, in the context of the need for fiscal consolidation, consumption is an attractive and reliable source for government revenues as stable tax base.

system (Curci et al. 2017). Microsimulation models are particularly suited for this kind of analysis, as they allow to understand the impact of any element of the tax system on the degree of progressivity and efficiency. The high level of details in reproducing the actual fiscal system, as well as the possibility of considering the effective distribution of the underlying population, represents a valuable advantage of microsimulation over more stylized models, even though this requires cumbersome programming efforts.

In order to study the taxation on income and on consumption jointly, we integrate the BIMic database with household expenditure data by means of statistical matching techniques. A more complete picture of households' financial well-being is then available. As an application of this integrated dataset, we characterize the distributive impact of VAT (a tax levied on consumption) on disposable income. We find that VAT is regressive with respect to income, due to the fact that poorer household have, on average, higher propensity to consumption (therefore, the share of consumption subject to VAT is higher than that of richer household); the multiple rates structure of VAT only slightly counteracts this effect.

The paper is organized as follows. Section 2 discusses how the paper fits in the literature review; Section 3 briefly describes BIMic, how it has been integrated with expenditures data and our measures of efficiency and equity; Section 4 illustrates the simulated policy scenarios and Section 5 reports our results. Section 6 concludes.

2 Literature review

A fiscal devaluation consists in a tax shift from labour to consumption. Lower taxes on labour imply lower output prices and make domestic products more competitive than foreign products. This reduces imports and expands exports, thus improving the trade balance, a classical substitution effect. In principle, higher exports and output would cause imports to raise and this would worsen the trade balance (income effect): the total effect on imports is unpredictable a priori but the substitution effect normally dominates on the income effect (as it is normally assumed even in an external devaluation).[3]

Apart from the macroeconomics behind fiscal devaluation, which is beyond the scope of this paper, many works studied the distributional consequences of such a policy. These

[3] It is important to say at this point that, even if economic models predict real effects, their magnitude are empirically estimated to be small. For a comprehensive discussion on the main empirical studies about fiscal devaluation and their effect on economic activity, with a special focus on EU countries, see EC-TAXUD (2013).

have been assessed mainly by means of microsimulation models. Thomas and Picos-Sànchez (2012) calculate average and marginal 'combined' tax wedges for family types in 13 OECD European countries, augmenting information usually contained in the 'OECD Taxing Wages' models with a microsimulation model of consumption taxes, based on expenditure microdata from the Household Budget Surveys (HBS). Exploiting this newly created database, they can consider together the counteracting effects of a fiscal devaluation for low-income workers. Indeed, low-income workers on one side may take advantage from the cut in SSC (either immediately by lifting take-home pay if the cut regards contributions paid by employees or in the long run after wage adjustments if employer contributions are cut). On the other side, the increase in consumption taxes needed to finance the cut in SSC affects low-income workers lowering the consumption value of their net-take home pay. To weigh these counteracting effects, the authors propose a 'combined' measure of average and marginal tax wedges, which accounts for both labour and consumption taxation. They show that, all in all, such reforms will increase work incentives for low-income workers at both participation and hours-worked margins.

Family-type analyses, like the one just mentioned, may lack of some realism as they do not account for the representativeness of family types in the population. An approach that relies completely on microsimulation models in studying the redistributive effects of fiscal devaluation has been followed by Decoster et al. (2010). Integrating Euromod microsimulation model with household expenditure data from HBS, the authors simulate a budget-neutral tax shift in five European countries (Belgium, Greece, Hungary, Ireland, UK) consisting in a cut in SSC financed by an increase in standard VAT rate. The simulation shows that the weaker groups in society are adversely affected while the richer ones benefit from the shift. This is true even assuming that the extra money accrued to taxpayers for the cut in direct taxes is entirely spent on additional consumption. Indeed, non-working population, which does not benefit from the cut in SSC while still consumes and pays taxes on consumption, is disproportionately represented in the lowest decile of the income distribution.

More recently, Pestel and Sommer (2017) highlighted the equity-efficiency trade-off that arises from such policy. The trade-off stems from the fact that on one side lower taxes on labour might have positive effects on employment, thus enhancing efficiency, while, on the other side, higher consumption taxes are often associated with lower tax progressivity and higher levels of inequality. However, employment increases may outweigh adverse distributional impacts. Therefore, assessing the final entity of this trade-off is an empirical question. The work employs a behavioural microsimulation model for Germany in evaluating several revenue-neutral policy scenarios in which the standard VAT rate of 19 percent is increased in steps of one percentage point each. The resulting additional VAT revenues are used to finance a reduction on income-related taxes, namely the personal income tax and SSC separately. The efficiency of this shift is measured through the behavioural response of individuals' labour supply (both at the intensive and the extensive margin): a rather moderate (below 1 percent) increase in total employment is estimated as a consequence of a 6 percentage points increase (to 25 percent) of the standard VAT rate. On the equity side, negative effects are expected for low-income workers, unemployed and pensioners: in these groups the budget loss amounts to up 4 percent of equivalized income, whereas the policy clearly favors high-income earners. Typically, most losers have very low burden of direct taxes and so they hardly benefit from a cut of the income taxation. Finally, in tackling the question of which between the personal income tax and SSC is the best candidate to the cut, SSC appear preferable because they affect household budgets even at a rather low income level, while low income earners are normally exempted from paying the personal income tax.

Our work fits in this strand of literature. In particular, as Thomas and Picos-Sànchez (2012) and Pestel and Sommer (2017), we are interested in both the equity and the efficiency dimension of the effects of the tax shift from labour to consumption. Differently from Thomas and Picos-Sànchez (2012), we use a proper microsimulation model and not family-type figures to draw our conclusions. Differently from Pestel and Sommer (2017) that propose a behavioural analysis, we use a non-behavioural microsimulation model and calculate marginal effective tax rates as a measure of the incentives driven by the tax system on individual labour supply.

3 Data and methodology

3.1 The microsimulation model BIMic

The analyses presented in this paper are based on BIMic, the tax–benefit microsimulation model developed at Banca d'Italia (Curci et al. 2017). BIMic is a static and non–behavioral model able to replicate the most salient features of the Italian tax-benefit system, such as social security contributions, the personal income tax, taxes on real and financial assets and the most relevant means–tested benefits. The model is periodically updated to account for policy changes and new waves of the sample data. BIMic is based on the Survey of Household Income and Wealth (SHIW; Bank of Italy 2015), which is conducted by Banca d'Italia every two years on a sample of about 8,000 households representative of the Italian population. The survey contains a wide and detailed array of information on socio–demographic characteristics, labor market status, income and wealth. Incomes are reported at the individual level, net of taxes and social security contributions. Gross incomes (i.e. before taxes and transfers) are recovered from net incomes through an iterative procedure, which takes as inputs the fiscal rules in force in the base year and a set of individual-specific characteristics (e.g. type of incomes earned, family composition, etc.). Wealth information is collected at the household level and pertains to both real (real estate, business properties, valuables) and financial assets (saving instruments). In this work we use the SHIW 2014 wave and we apply the fiscal rules that will be in place in 2020. The values of the recovered gross incomes and of wealth referred to 2014 have been uprated to 2020 according to the nominal GDP growth rate (realized until 2018, forecast for 2019 and 2020). Even if the uprating to the year of simulation does not change the rank of 2014 gross incomes, re-ranking within the distribution of simulated 2020 net incomes is possible due to non-linearities of the fiscal rules and to non-adjustment to inflation of the parameters of the tax and benefit rules. Moreover, policy changes legislated between 2014 and 2020 are also carefully taken into account, resulting in another source of re-ranking for net incomes with the respect to the original 2014 rank.

3.2 The integration of consumption data in BIMic

Since Italian (and most other countries) VAT rates vary across categories of goods and services, any realistic simulation of this tax requires detailed information on household consumption. Such level of detail is absent in SHIW, which reports household's expenditure only for very broad sets of consumption items (such as, for example, food products) generally levied by different VAT rates. A data source with expenditure information on narrower sets of consumption items is the Italian Household Budget Survey (HBS), conducted yearly by the national institute of statistics (Istat). In this work, we use the HBS 2014 wave: expenditures data are therefore uprated by the household final consumption expenditure's growth rate (realized until 2018, forecast for 2019 and 2020) in order to recover the VAT tax base for 2020.

HBS reports the monthly expenditures for a basket of 482 goods and services consumed by more than 16,000 households (on annual basis) representative of the Italian population. For each of these 482 items we impute the corresponding VAT rate, based on a comparison between the item description in the survey and the VAT rules.[4] The

[4]Some mild inaccuracy may arise in this imputation as the sets of consumption items identified in the survey do not necessarily contain goods and services taxed at the same VAT rate. In any case, we believe that this limitation does not affect the validity of our exercise given the level of granularity of HBS

imputation process delivers 75 expenditure categories classified as exempted from VAT (to which we actually impose a zero VAT rate), 54 subject to the "super-reduced" rate (4%), 112 to the "reduced" rate (10%) and 241 to the "standard" rate (22%).[5]

In order to perform a distributive analysis involving *both* income and consumption, HBS data have been combined with SHIW data. The combination has been carried out through *statistical matching* techniques. Intuitively, *statistical matching* aims to pair each household in the SHIW (recipients) with one household in the HBS (donors), chosen to be the "most similar" in terms of a given set of variables (typically socio-demographic characteristics). The procedure exploits the fact that both samples derive from the same population of interest and that these surveys share some relevant variables having a distribution (as derived from the two samples) very similar.[6] In particular, we match the donor and the recipient dataset on the basis of a "total matching expenditure" variable (henceforth, TME).[7] We find that TME, computed in both samples, displays a similar distribution although more peaked and slightly underestimated on average in SHIW (Figure 1). Although SHIW under-reports TME with respect to HBS, we can assume it supplies a good piece of information on the rank of the households in the consumption cumulative distribution.

We divide both samples into strata, using macro-area of residence (North-West, North-East, Center, South, Islands) and family size (single, two members, three members, four or more members) as stratification variables and further splitting each of the 20 resulting groups into 20 quantiles according to the TME conditional distribution. We impose matching to be exact between the resulting 400 strata. Data combination within each stratum is performed by *nearest-neighbour matching*, based on Mahalanobis distance defined on several matching variables. We use the following socio-demographic characteristics as matching variables: number of components aged less than 3 years (and aged less than 18 and more than 65), age, sex and citizenship of the household head (identified as the one with the highest income), size and type of the municipality (metropolitan area, big or peripheral, small). Most importantly, in order to better capture the link between consumption and household well-being, we include the following variables: an indicator

database that limits the cases of conflict in attributing the VAT rates to consumption items.

[5]In our exercise we do not specifically account for the 5% VAT rate as it applies to a rather limited set of goods.

[6]All the common variables used for statistical matching have been harmonized between the two surveys in order to make the data comparable.

[7]Specifically we exclude from TME the amount paid for life insurance, loans repayments, extraordinary house maintenance expenditure, but we do include house rent and imputed rent for home-owners. Moreover we exclude expenditures for rent different from the main dwelling, travels, cars and holidays because information is either absent in SHIW or not coherent between the two surveys.

for whether the household is home-owner, the imputed rent for homeowner households, the dwelling width (either owned or rented) and the monthly expenditure for in-house food consumption. Despite the different way of recording (through a straight question in SHIW, by aggregation of detailed items in HBS), food consumption displays a similar distribution in both samples and its inclusion among the common variables helps to capture the multivariate relationship between income, food consumption and consumption of all other items.[8] Table 1 shows the balancing property for these variables in the two (unweighted) samples. In general, the common variables appear to be highly balanced among the two samples. Some differences only arise for household members' age, with SHIW having a lower incidence of "young" households. This could be due to the high non-responding rate in the working-age population, typical of not-compulsory surveys like SHIW. Figure 2 provides a graphical evidence about the goodness of the matching procedure. In the left panel, we plot the estimated marginal distributions of total expenditures in the original HBS survey and in the matched BIMic data: we observe that the sub-sample of HBS chosen to be paired to SHIW closely resembles the original sample. In the right panel, we provide suggestive evidence that the matching procedure is able to capture almost all of the consumption-to-income relation: indeed, the average amount of food expenditures by income decile is very similar using either the original food expenditures (one of the common variables in the matching procedure) or the food expenditures of the matched households.

A final issue may derive from the fact that households in HBS are interviewed in different periods of the year, therefore some expenditure items may exhibit some seasonality (like food or heating, for example). While the HBS weighting procedure takes this factor into account, obviously SHIW weights do not. In principle we cannot exclude that some households, for whom expenditures patterns can be highly seasonal, are matched with SHIW. However, seasonality patterns in HBS should compensate with each other when households are matched in SHIW (in fact, the distribution of the month of interview of the matched households closely resembles the one of the full HBS sample); moreover, the distribution of food expenditures for the full HBS sample (using the HBS weights, that account for seasonality) is similar to the one of the sub-sample of HBS household matched in SHIW (using SHIW weights), providing indirect evidence that the potential HBS seasonality does not qualitatively affect our results.

[8]For related discussions about the integration of income and consumption data in Italy, see also Pisano and Tedeschi (2014); Gastaldi et al. (2014); Baldini et al. (2015).

3.3 The validation of VAT revenues in BIMic

Thanks to the matching procedure, we can now include the VAT into the picture of the most relevant taxes paid by the households. According to BIMic, VAT revenues in 2014 amounted to 61 billion euros, around 40% less than the national accounts figure. The difference can be explained by many factors.

First, national accounts estimates of VAT revenues capture also the tax applied to inputs of exempt goods and services, while these VAT revenues are imputed to zero in BIMIc. Exemptions from VAT mean that the last stage of increase in value is not taxed, while the previous stages are normally taxed.[9] The rules for exemptions imply that producers (or traders) who sell an exempt product to final consumers do not collect VAT from them but, at the same time, they cannot claim a credit for the VAT they have paid for their inputs, thus in principle bearing the weight of the tax on those inputs. In practice, however, given that they normally have the power to set prices, they can choose a price such that final consumers effectively bear (part of)the burden of the VAT paid on inputs in a "hidden" (non-transparent) way. For this reason in the literature this is often referred to as "hidden VAT". In BIMic exemptions are treated as "zero-rate" outputs, so producing no VAT revenues for the public budget, which is not the case, and having no effects on household net income. In principle, it would be possible to estimate the hidden VAT paid by households on their expenditures on exemptions. For example, Siemers (2014) discusses in details the effects of hidden VAT on microsimulation model estimates of the distributional and budgetary effects of the EU VAT regime, with a special focus on Germany. He finds that hidden VAT in Germany accounted for 19 per cent of the total VAT revenues in 2008. While this extension can be a valid enrichment of our model that we leave for future researches, a priori we cannot assess how it would affect the distributive analysis of VAT, given that exemptions regard a set of goods and services that has no clear distributional pattern in the population. Notwithstanding this, given that VAT is regulated by European Union and countries have limited decision margins on the types of goods that can be exempted, a similar weight of hidden VAT can be expected even in Italy, thus explaining almost a half of the discrepancy between our estimates and national accounts figures of VAT revenues.

Second, in BIMic we capture neither the VAT paid by public administration neither the VAT paid by enterprises on investment goods. Moreover, given that national accounts VAT statistics are not disaggregated by taxpayer categories, we cannot assess the part

[9] VAT regimes in OECD countries make extensive use of exemptions. For a discussion on the rationale and details about exemptions, see OECD (2018a).

of VAT revenues paid by households in isolation from the other parts to validate BIMic estimates.

Third, even restricting the attention to the VAT paid transparently by households, our estimates would probably result in lower VAT revenues. Indeed, our source of information about household expenditures is HBS, which estimates aggregate household consumption at 750 billion euros (including the VAT), compared to final consumption expenditures resulting from national accounts amounting to 977 billion euros. This discrepancy can be due to many reasons: the population from which the HBS sample is drawn is different from the resident households, the reference for national accounts; final consumption in national accounts collects information from many administrative sources and includes also financial intermediation services indirectly measured; HBS as any survey may be affected by mis- and under-reporting issues.

All these factors explain the difference in the VAT revenues between our estimates and the national accounts statistics. Such a discrepancy is well documented in the literature (see for example Lamarche 2017) and, under the assumption that it is neutral from a distributional point of view, does not prevent a large use of microsimulation analysis of VAT. Neutrality assumption may be questionable. However, if not equally distributed across households, expenditures on exempted goods, which are the main source of discrepancies, may eventually be a higher share of total expenditures for lower income households (consider, for example, medicines and health services). This would reinforce the main conclusion of our redistributive analysis of VAT, namely that VAT is regressive with respect to income.

3.4 Income definitions and notation

Here we introduce the concepts of gross, disposable and net income that will be used in the following sections.

Let Y_{ih}^{G} be the gross (or before taxes and benefits) income for an individual i belonging to a household h. The gross income includes wages, incomes from real and financial assets and pension benefits (which we regard as deferred compensation).[10] The gross income Y_{ih}^{G} can be interpreted as the income level an individual would enjoy after a mechanical neutralization of the public tax-benefit system.

[10] An alternative definition could exclude pensions from the gross income (and include them in the disposable income along with other benefits; see below) but this would not affect qualitatively any of the results shown in this paper.

Let Y_{ih}^D be the disposable income, defined as

$$Y_{ih}^D = Y_{ih}^G - T_{ih} + B_{ih} \tag{1}$$

where T_{ih} represents all direct taxes (the most relevant of which are the personal income tax, Irpef, and the social security contributions) and B_{ih} represents all benefits received, such as (for example) family allowances. Note that both T_{ih} and B_{ih} depend (via the fiscal rules) on the gross tax income Y_{ih}^G and on individual and household characteristics, such as the source of income, the family size, the region of residence and so all.

Finally, let Y_h^N be the net (or after benefits and all taxes, including VAT) income enjoyed by the household h

$$Y_h^N = Y_h^D - V_h \tag{2}$$

obtained subtracting the VAT paid by the household over its consumption, $V_h = V(Y_h^D)$, from the household's disposable income (Y_h^D), which is the sum of the individual disposable incomes Y_{ih}^D.[11]

Three things should be noted in equation (2). First, we let VAT depend on disposable income. In fact, holding fixed the average propensity to consume, an increase in disposable income leads to a consumption expansion[12] that itself causes VAT to increase. We will take into account this dependence structure in the counterfactual scenarios, where the simulated tax shifts end up augmenting workers' disposable income. Second, the net income Y_h^N can be interpreted as the amount of money that would be left for consumption after paying VAT: this income concept is obviously virtual, since money are not disposable any longer for consumption when the purchase is made and VAT is paid.[13] Third, subtracting VAT from disposable income is equivalent to say that consumers bear all the economic cost of VAT. Analogously, in the counterfactual scenarios involving an increase of VAT rates, we will assume a full and instantaneous tax shift from firms to consumers, so abstracting from the fact that (at least in the short run) this shift might be partial and that firms might therefore bear part of the cost of the VAT increase.

[11] Consumption information are recorded at the household level in both SHIW and HBS and therefore we can estimate VAT only at the household level.

[12] Practically we compute the average propensity to consume for each 482 consumption items for each household. Following a change in household disposable income, a new vector of household consumption can thus be calculated using the propensity to consume. The underlying hypothesis is that consumption habits (captured by item-specific propensities) do not vary after a marginal change of disposable income, as customary for static microsimulation analysis.

[13] See also the discussion in Pestel and Sommer (2017).

3.5 Efficiency and equity: definition and measurement

In this paper the level of *efficiency* of a tax-benefit system is related to (the lack of) financial (dis)incentives to increase individual's gross income.[14] Since the decision to increase individual's gross income also affects other family members' disposable income through the effects over their tax liabilities and means-tested benefits, it is important to assess these financial incentives considering the effect of a change in individual gross income on the overall household disposable income.[15] Therefore our efficiency indicator is the expected share of before-tax income which is left for *household* consumption after the application of taxes and benefits, following a marginal increase of *individual* i before-tax income:

$$\begin{aligned}\text{efficiency} &= \mathbb{E}\frac{\Delta Y_h^N}{\Delta Y_{ih}^G} \\ &= \mathbb{E}\frac{\Delta(Y_h^G - T_h + B_h - V_h)}{\Delta Y_{ih}^G} \\ &= 1 - \mathbb{E}\frac{\Delta(T_h + V_h - B_h)}{\Delta Y_{ih}^G} \\ &= 1 - \mathbb{E}(\text{EMTR}_i)\end{aligned} \tag{3}$$

where EMTR_i is the effective marginal tax rate for the individual i.[16] Since this indicator of efficiency focuses on the intensive margin, its calculation is restricted to those individuals with positive employment income. Note that we include VAT in the definition of EMTR, since VAT limits the amount of actual consumption a household can enjoy by earning higher income (Kotlikoff and Rapson 2007). Moreover, not including VAT in our efficiency measure would have the undesirable consequence to allow for free-lunch efficiency gains by shifting taxes from income (which appear in equation (3)) to consumption

[14] Such increase may reflect an expansion of the labour supply as measured by the number of hours worked, as well as an increase of productivity (holding fixed the amount of work). This definition allows us to focus not only on payroll employees (for whom the number of hours worked represents the most relevant dimension of labour supply, at least in the short term) but also on self-employed workers (for whom productivity changes impact taxable income much quicker than for employees).

[15] As an example, consider the following stylized situation. A married woman is considering whether to increase her taxable income from 2,800 to 2,900 euros. If she stays at 2,800 euros, she qualifies as dependent married individual and therefore her husband is entitled to a tax credit up to 800 euros (in fact a married individual is defined as dependent if his/her yearly income is below 2,840.51 euros and lives with the taxpayer); if she moves to 2,900 euros, she does not qualify as dependent family member and therefore her husband is not entitled any more to the tax credit.Therefore, in this specific case, the disincentive to increase the taxable income by 100 euros is null from the point of view of the woman only (given that the income remains under the non-taxable threshold), but it overcomes 100% when the total household income is considered.

[16] In equation (3) $\Delta Y_h^G = \Delta Y_{ih}^G$ by definition.

(which would not).

We acknowledge that this indicator has a relevant limitation, as it does not take into account the heterogeneity of workers' reaction to a new environment (in fact, a more complete assessment of efficiency would consider how total hours of work or taxable income change after the introduction of a new policy).[17] The choice of measuring efficiency by $1 - \mathbb{E}(\text{EMTR}_i)$ reflects the non-behavioral nature of BIMic and the difficulty to model the heterogeneity of the labour supply elasticity across the entire income distribution. However, the average EMTR is still informative from the policy-maker's point of view as it reveals the financial incentives to increase taxable income given the existing tax code and income distribution, being agnostic on how (much) tax payers react to a tax code change.

We define *equity* as the ability of the tax-benefit system to reduce inequality. A widely adopted measure in the literature is the Reynolds-Smolensky index (RS index), computed as the difference in before- and after-tax income concentration (Reynolds and Smolensky 1977). In order to compare the financial well-being of individuals belonging to households of different sizes (and so properly take into account the economies of scale in consumption), the redistributive analysis is carried on equivalised incomes. Those are obtained dividing the household income by the "OECD-modified equivalence" scale[18] and attributing such equivalised income to each household member. Therefore our equity indicator takes the form

$$\text{equity} = \text{Gini}\Big(\frac{Y_h^G}{equiv.scale}\Big) - \text{Gini}\Big(\frac{Y_h^N}{equiv.scale}\Big) \tag{4}$$

4 Scenarios description

Our results are based on a comparison between the baseline and three counterfactual scenario. The baseline scenario describes the tax and benefit system that will be in place in 2020, according to 2019 legislation, apart from VAT rates that are those in place in 2019 (i.e. 4, 10 and 22%). The three counterfactual scenarios involve a budget-neutral tax shift from direct taxation (PIT or SSC) to indirect taxation (VAT). Whether the VAT increase is common in each scenario (Section 4.1), the fiscal recomposition (Section 4.2) can be achieved by lowering the Irpef tax rates (Scenario 1), by increasing tax credits

[17] For example, when comparing two policies that both reduce the average EMTR, it could be even possible that the increase in taxable income is larger when the reduction in EMTR is smaller, because such reduction is concentrated among individuals with the highest elasticity of labour supply.

[18] This scale assigns weight 1 to the first adult, 0.5 to any remaining individual aged at least 14 years old, and 0.3 to others.

for labour income (both employees and self-employed; Scenario 2) or by decreasing SSC paid by both employees and self-employed (Scenario 3). Note that in all scenario, budget-neutrality takes account of the indirect effects of the policy changes (for example, reducing SSC rates leads to an increase of Irpef tax base). In the Appendix we provide a detailed background description of SSC, Irpef and VAT for the Italian case; more information on the other characteristics of the Italian tax-benefit system that are not directly affected by this fiscal recomposition can be found in Curci et al. (2017).

4.1 VAT increase

In principle there are infinite ways to simulate a VAT increase, depending on which rate(s) are increased and to what extent. Moreover, since we also simulate a budget-equivalent decrease in direct taxation, the choice of how to model the VAT increase has obvious effects on the equity-efficiency trade-off results. In order to design a "realistic" experiment, we simulate the VAT increase envisaged for 2020 according to 2019 legislation (i.e. the safeguard clauses). Therefore, in all counterfactual scenarios we assume that the reduced VAT rate increases from 10 to 13% and the standard rate from 22 to 25.2%, while the super-reduced rate of 4% is left unchanged.

Following VAT rates increases, we assume that price levels adjust immediately whereas quantities are left unchanged. The expenditure for a specific item therefore increases accordingly to the change in price.[19] The (new) VAT revenues are thus obtained from the post-reform vector of household expenditures. This assumption implies a full and instantaneous pass-through of the VAT increase from firms to consumers and rules out the possibility that (at least in the short term) the higher tax rate could be partially absorbed by a mark-up change.

4.2 Direct taxes reduction

In Scenario 1 the extra revenues generated by the VAT increase (policy A, from now on) are used to reduce the lowest tax rate of *Irpef* from 23 to 20% (policy B; see Section A2 in the Appendix for more detail on the Italian Personal Income Tax). Such tax relief benefits all Irpef taxpayers, irrespective of their income source. In principle any taxpayer can save up to 450 euros (that is 3% of 15,000 euros). In practice for many taxpayers the actual saving is zero, since their tax liability after tax credits was already zero before the simulated reform (those type of taxpayers are generally refereed as *incapienti*). However,

[19] We cannot distinguish between price and quantity as we only observe their product (household expenditures).

for other taxpayers the actual savings can exceed 450 euros. This happens because the local surcharges are due only if the tax liability before local surcharges is greater than zero, and for some taxpayers the tax cut causes the tax liability to become null: in this way they pocket both the national-wide tax relief and the local surcharches that are no longer due.

In Scenario 2 the fiscal recomposition is achieved increasing the tax credits for labour income by 40% (policy C), for both payroll employees and self-employed. Differently from Scenario 1, this reform only benefits individuals with labour income, leaving pensioners and rentiers unaffected. Figure 3 shows how this tax refom could be simulated. For payroll employees the maximum tax credit amount increases from 1,880 to 2,632 euros (from 1,104 to 1,546 for self-employed); moreover, the level of gross income above which the credit turns null is also increased, from 55,000 to 77,000 euros. Analogously to Scenario 1, even in this scenario the actual benefit a taxpayer can enjoy is larger than the statutory change in the tax credit, due to the interaction between tax credit themeselves and other features of the tax-benefit system (such as local surcharges).

Finally, in Scenario 3 we simulate a reduction of SSC by 11% for both employment and self-employment incomes. We assume that the whole relief for employment income benefits employees, leaving unchanged the SSC paid by employers (policy D). This assumption implies a 40% reduction in SSC rates faced by payroll employees. Following the SSC rates reduction, for any given level of pre-tax income we now have a higher taxable income than in the baseline scenario.

All the counterfactual scenarios are designed to capture the day-after effect of a policy change: therefore, the pre-tax income is the same in both the baseline and counterfactual scenarios, ruling out any behavioural reaction (for example the bargaining process between the firm and the worker may lead to a level of gross-income lower than the baseline, allowing the former to pocket some of the latter's benefits). This assumption, typical in static microsimulation analysis, mirrors the one adopted for VAT. Therefore, the households bear all the cost of VAT increase and enjoy all the benefit of direct taxes reduction.

Table 2 summarizes the counterfactual scenarios just described characterized by the fact that the Government budget remains balanced. In the lowest panel of the table the single components of the three policy scenarios are reported with an indication of their effect over the Government budget.

5 Results

5.1 The distributive impact of VAT

According to our simulation, in the baseline scenario each household is expected to pay 2,773 euros as VAT in 2020. Almost 70% of this amount is related to goods and services taxed at the standard 22% rate, while almost 27% of the amount is related to those taxed at the reduced 10% rate; the super reduced rate plays a minor role in terms of revenues.

The distributional profile of VAT is driven by two factors.

The first one is the average propensity to consume by income level that determines the total amount of consumption subject to VAT. Tables 3 shows that the average consumption-to-income ratio is above 130% for low income households and then declines substantially as income increases. Holding fixed the expenditure composition, this factor makes the VAT regressive with respect to income. It should be noted that the definitions of both income and consumption include imputed rents, which are relatively more concentrated among poorer households: excluding imputed rents from the calculation, as shown in Table 4, leads to an increase of such a ratio for low-income households and to a decrease for high-income households. The inclusion or exclusion of imputed rents does not qualitatively affect our conclusion about the distributional profile of VAT.

The second factor is that the different composition of consumption by tax rates might result in a different tax liability even for households with the same total consumption. Figure 4 shows the shares of goods and services subject to different VAT rates by deciles of total expenditures. As total expenditures increases, the share of goods exempted and the one of those subject to the 4% rate substantially decrease, the share of those taxed at the 10% rate stays roughly constant, while the share of good and services subject to the 22% clearly increases. Holding fixed the propensity to consume, this factors makes the VAT progressive.

As Tables 3 shows, the first factor is overwhelming. On average, VAT absorbs 7.8% of household disposable income, but such incidence shows a decreasing pattern with respect to income: it is much higher for lower-income households, as it reaches 11.1% for families in the first decile of equivalized disposable income, then it declines steadily up to 5.9% for higher-income households.[20]

[20] A similar and stronger picture is obtained exluding imputed rents from income and consumption, as shown in Table 4. In this case, the VAT incidence ranges from 14.3% for the first decile of equivalent income to 6.9% for the tenth decile. All the subsequent analysis will be based on the income definition

The regressivity of VAT with respect to income is confirmed using inequality indices. The Gini index on equivalised gross income[21] is 41.24%, the one on disposable income is 33.02%, while the one on net income is 33.92%. Therefore, the application of the VAT has a regressive effect of about 0.90 percentage points as measured by the Gini index.

5.2 The effects of a tax shift

A Pareto improvement for policymakers would be to have a tax shift scenario with no change in the Government net borrowing and an increase in both efficiency and equity with respect to the baseline. Unfortunately, such a result is not easy to achieve. We present the outcomes of our simulations looking separately at the effects in term of redistributive power of the system and in term of efficiency. We focus on the three policy scenarios described in Section 4 which are obtained by combining the policies A–D so as to be budget neutral (see Table 2). Results are reported in two different tables where the first line presents indicators related to the baseline scenario valid for 2020 and the other lines refer to tax shift scenarios (and their components) as a deviation from the baseline. Table 5 shows the distributive analysis, indicating both the Gini indexes referred to different definitions of income and the RS index, our preferred measure of the redistributive power of the tax-benefit system (see Section 3.5). Table 6 describes the effects of the simulations in terms of efficiency, reporting the average EMTR together with the contributions of its four main components, i.e. personal income tax, SSC, benefits and VAT. To have an idea of the contribution of these components, in the baseline scenario, out of a total average EMTR of 43.6% for 2020, 27.2% are imputable to *Irpef*, 8.5% to the SSC, almost 5% to the benefits and 3% to the VAT.

The redistributive effects of the VAT in the baseline scenario for 2020 presented in Section 5.1 suggest that the VAT increase envisaged for 2020 by 2019 legislation raises the Gini index reducing the redistributive power of the system. The sole effect of the safeguard clauses for 2020 (policy A) is estimated to be equal to 0.2 percentage points in terms of Gini index with respect to the baseline scenario. The redistributive power of the tax and benefit system, as measured by RS index, with this policy declines to 7.12 from 7.32 in the baseline (last column of Table 5). The higher VAT rates affect also our measure of efficiency (see Table 6): the average effective marginal tax rate increases to 44.18%, about half a percentage point more than the baseline. All in all, the mere VAT increse would reduce both the efficiency and the equity of the tax-benefit system in

that includes imputed rents.

[21] We refer to Section 3.4 for a description of the income definitions.

2020.

However, as described in Section 3.5, the additional revenues deriving from the VAT increase can be used to finance direct taxation cuts that are expected to be efficiency-improving with respect to the baseline scenario. Table 6 confirms this view: all the three policies B–D, which are alternative options to reduce direct taxes, lower the average effective marginal tax rate. Among these options, the increase in tax credits (policy C) realizes the strongest improvement in efficiency with respect to the baseline scenario, a reduction of 2.4 pp in average EMTR (to 41.2%). As regards the distributive aspects, the impact on equity is more mixed: the reduction of SSC rates has no statistically discernible effect on the RS index, while the reduction of the first PIT rate has a sligtly positive effect (statistically significant at the 10% level). Instead, policy C has a significant positive effect on the RS index of 0.08 pp.

We can now consider the combined effects of the raise in the indirect taxation and the cut in direct taxation envisaged by the tax shift scenarios. It emerges that scenario 2, which combines a cut in VAT (policy A) with an increase in tax credits (policy C), is the most preferable using our metric. Indeed, in this scenario the increase in efficiency is the highest and the reduction in equity is the lowest among the proposed scenarios. This finding confirms, on one side, that in the *Irpef* system tax credits for labour incomes play a relevant role in determining redistribution; moreover, on the other side, it adds evidence about the fact that a revision of tax credits can also be efficiency-improving.

The result can be represented also in graphical form. Figure 5 reports on the axes our two measures of equity and efficiency, presented in Section 3.5 and used to compare the proposed policy scenarios. The points in the graph indicated by numbers 1–3 refer to our three options of tax shift described in Section 4. The points denoted by capital letters A–D are the single components (either on direct or on indirect taxation) of the tax shift options. For the sake of comparison the baseline scenario is used as reference point to divide the space in four parts. Points at the NE of the baseline represent scenarios that improve in terms of both efficiency and equity with respect to the baseline: as expected, none of our three tax shift proposals is in that quadrant. Of course, single components may well be collocated there: for example, policy B and C are both efficiency- and equity-improving with respect to the baseline. However this occurs because, taken as alone, these policies imply a higher net borrowing for the Government and are not budget neutral, differently from scenarios 1–3 that do not imply additional resources transferred to households. On the opposite side, scenarios at the SW of the baseline are less efficient and less equal: this is the case of policy A, the mere activation of the safeguard clauses, which drains resources from households in a regressive way and deteriorates the efficiency of the system. Tax shift scenarios 1–3 are collocated all in the NW quadrant, being more efficient but less equal than the baseline. In the proposed tax shifts indeed the direct taxation cuts more than compensate the negative effect of the VAT increase on our efficiency indicator but are not able to counteract the negative effect on our equity indicator. However, within the three options, a clear hierarchy appears: Scenario 2, which combines the VAT raise with the direct taxation cuts via increase in tax credits, ensures both higher efficiency and higher equity than the other two. We can conclude that, if desirable for its macroeconomic effects (a consideration that is out of the scope of our analysis) and neutral for its budgetary effects, a tax shift through an increase in tax credits is a better policy option in the Italian tax benefit system than a tax shift through a cut in the first Irpef tax rate or in SSC.

5.3 Winners and losers

Since our simulated scenarios are budget-neutral, they necessarily imply a transfer of resources across households. Consequently, some of them will be better-off with respect to the baseline scenario, and some worse-off. The characterization of "winners" and "losers" is an important step in assessing the redistributive content of any policy change, also taking into account some political economy aspects (for example, the identification of compensative policies targeted to the losers in order to make the reform more likely to be approved). We limit our analysis to Scenario 2, the one minimizing the loss of redistributive power of the tax-benefit system. Conclusions about scenarios 1 and 3 are qualitatively similar, as they involve the same tax categories.

We define winners the households with a percentage change in net equivalent income with respect to the baseline scenario larger than 1%, losers those with a change lower than -1%, and neutral the remaining households. In Scenario 2, 42% of the households are losers, with an average loss amounting to around 480 euros (2.2% of the baseline net income), and 29% are winners, with an average gain amounting to around 810 euros (2.7% of the baseline net income). As shown in Figure 6, those who lose from the tax shift are mostly concentrated at the bottom of the net equivalent income distribution. This is not surprising as these households bear the cost of the VAT increase but benefit only partially from the direct tax reduction, because their tax liability is already small (if not zero) in the baseline scenario: of course this can be due to low gross incomes or, in case of moderate gross incomes, to the presence of substantial tax credits.

Even if poorer households are very likely to be worse-off in all simulated scenarios, it should be noted that a specific minimum income scheme (*Reddito di cittadinanza*), introduced in 2019, will be fully operational in 2020. According to BIMic estimates, almost half the losers from Scenario 2 belonging to the first decile of net equivalent income is eligible to claim this benefit. For this group the yearly amount of the benefit is estimated to be around 5,600 euros, which compares with an average loss due to the tax shift of around 315 euros.[22]

6 Conclusion

The objective of this paper is twofold.

In the first part of the paper we describe how the microsimulation model BIMic, originally presented in Curci et al. (2017), has been integrated with expenditures data. Such integration consists in a statistical matching procedure, where each household in the SHIW dataset has been paired with one from the Household Budget Survey, which includes detailed information on consumption. A more complete picture of households' financial well-being is now available. As an application of this integrated dataset,[23] we characterize the distributive impact of VAT (a taxes levied on consumption) on disposable income. We find that VAT is regressive with respect to income, due to the fact that poorer household have, on average, higher propensity to consumption (therefore, the share of consumption subject to VAT is higher than that of richer household); the multiple rates structure of VAT only slightly counteracts this effect.

In the second part of the paper we contribute to the policy debate involving the design of a growth-friendly tax system. When fiscal space is limited, and then any tax cut needs to be compensated by other revenue increase or spending reduction, a viable option for fiscal policy is to shift the burden of taxation from labour to consumption. This policy has been often named fiscal devaluation, as it would mimic the effects of a classical currency devaluation. We assess where the Italian tax-benefit system is placed along the equity-efficiency trade off after fiscal devaluation scenarios by means of BIMic, integrated with consumption data as described above. For the sake of the empirical analysis, this policy has been made operational assuming that VAT rates increase by the same amount envisaged by 2019 legislation for 2020 and three possible direct taxes decreases: by lowering the lowest *Irpef* tax rate, by increasing tax credits for labour income

[22] For a more comprehensive distributive analysis of anti-poverty measures recently introduced in Italy, see Curci et al. (2019).

[23] A second application consists in assessing the impact of the recently introduced minimum income schemes (*Reddito di inclusione* and *Reddito di cittadinanza*) on absolute poverty (which is typically computed from consumption data); see Curci et al. (2019).

or by decreasing SSC for both payroll employees and self-employed. In all these three scenarios we document an increase in efficiency (as measured by one minus the average effective marginal tax rate) and a decrease in equity (as measured by the Gini index of net incomes); moreover, the scenario involving the increase in tax credits for labour income shows the highest gain in efficiency and the lowest reduction in equity.

Obviously the way these policies are designed and simulated plays a crucial role in determining the results of the simulation. Notwithstanding this, our results show that labour-income tax credits are a key element of the Italian Personal Income Tax, although they are often overlooked in the public debate. Finally, even if the highest share of losers from our preferred scenario is in the lowest income decile, minimum income schemes (like the ones recently introduced in Italy) provide these poor households with a benefit that is much higher than the loss provoked by the tax shift.

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Appendix: background information on the Italian tax and benefit system

Here we describe the most relevant features of the Italian tax and benefit system for our analysis. This section heavily draws on our previous work (Curci et al. (2017)).

A1. Social security contribution (SSC)

SSC account for more than 30% of total fiscal revenues in Italy, including SSC paid by employers. The amount of SSC paid by the households greatly differs according to different dimensions, the most important of which is the type of work (dependent workers vs self-employed).

For dependent workers SSC rates change according to sector of activity (agriculture, manufacturing, construction, trade, logistic, banking and insurance, services, public administration), number of employees in the firm, occupational status of the employee (blue collars, white collars, executives) and type of contract (open ended versus fixed term). SSC are almost always proportional to labour income (approximately 30% paid by employers and 9-10% paid by employees). We also model deviations from the general rule of flat rates contribution. In particular, we consider the so-called *minimale contributivo*, a threshold income below which a fix amount of SSC is due, and the so-called *massimale di reddito*, a threshold income above which SSC are no more due.

For self-employed and similar workers (members of a profession and individual entrepreneurs) SSC rates are much more heterogenous. We identify 25 categories of self-employed workers, ranging from regimes whose contributions are collected by the National Social Security Institute (henceforth, INPS), such as those valid for shopkeepers, craftsmen, farmers, to regimes for workers in professional services, whose contributions accrue to the so-called *Casse professionali* (e.g. lawyers, physicians, accountants, etc.). As a rule, also for self-employed workers, SSCs are proportional to labour income and —for members of professions— to business volume (i.e. VAT base). As *Casse professionali* are largely autonomous in defining SSC rules, many exceptions or special regimes apply (for example, SSC contributions for some professions are smaller for younger workers). We are generally able to model these exceptions given the rich structure of our database. Finally, the SSC base for farmers is determined on cadastral values of the land they farm, analogously as their taxable income.

A2. Personal income tax

The *Imposta sul reddito delle persone fisiche* (Irpef, henceforth) is a personal and progressive tax on total income. It is personal because individual tax burden depends on individual characteristics, the most important of which is total income; among other personal characteristics, family dimension and composition (relevant for tax credits) may be cited as an example. It is the primary instrument through which progressivity is achieved within the tax-benefit system (Bosi and Guerra, 2019). Accounting for 25% of total tax and SSC revenues, Irpef is the main tax in Italy. From a logical point of view, the simulation of Irpef requires the following steps: *i)* identification of the tax base, i.e. the sum of different income sources subject to the personal income tax; *ii)* simulation of tax deductions, which returns taxable income, and *iii)* calculation of tax liability before tax credits, namely the amount of tax resulting from the mere application of tax rates to taxable income; *iv)* simulation of tax credits and local surcharges to Irpef, which return final tax liability.

Given their relevance for the Irpef design, we conduct our experiment altering either the tax rates or the tax credits. Therefore we limit this section to those two elements only.

After the identification of the tax base and the computation of deductions it is possible to compute Irpef liability (before tax credits), that is the amount of tax an individual would virtually pay in absence of tax credits (see below). It is obtained applying the tax schedule shown in the next table to taxable income: progressively higher marginal tax rates are applied to higher income brackets (expressed in euros per year).

Income brackets and tax rates for the personal income tax

Income brackets	**Tax rates**
$\leq$ 15,000	23%
15,000 – 28,000	27%
28,000 – 55,000	38%
55,000 – 75,000	41%
$\geq$ 75,000	43%

The change of tax rates is simulated in Scenario 1.

At this stage, regional (*addizionale regionale*) and municipal (*addizionale comunale*)

Irpef surcharges are also determined, although they are due only by those taxpayers whose Irpef liability net of tax credits is strictly positive. For regional surcharge BIMic applies the actual tax schedules designed by the regional authorities.[24]

In order to determine the final tax liability due on personal incomes, it is necessary to determine all tax credits (*detrazioni*) the taxpayer is entitled to. Tax credits serve several aims in the context of the Italian personal income tax (Bosi and Guerra, 2019): *i)* along with the tax schedule, they contribute to tax progressivity, as they generally decrease along with total income and become zero beyond a given income threshold; *ii)* they allow a qualitative discrimination among income sources, as the amount of tax credit differ among them; *iii)* they enhance horizontal equity, as tax credits allow to differentiate tax burden of individuals with the same taxable income but belonging to households of different sizes; *iv)* they provide incentives to some kinds of expenditures, like those related to children education.

As such, tax credits can be divided in: tax credits for income sources, tax credits for dependent family members, tax credits for incentive purposes and tax credits for personal expenses. As a general rule, in Italy tax credits are not refundable. Here we recall how tax credits for income sources work.

Tax credits for income sources. These tax credits apply differently according to whether the taxpayer is an employee, a self-employed worker or a pensioner. The decreasing schedule of tax credits implicitly defines a no-tax area for the four classes of income sources. For example, tax credit for payroll employees is 1,880 euros for incomes up to 8,000 euros[25], it decreases almost linearly up to 55,000 euros, and it is zero beyond 55,000 (see Figure below). BIMic fully features these tax credits, accounting also for the option left to taxpayers in choosing the most convenient of them if they are entitled to more than one.

The change of this kind of tax credit is simulated in Scenario 2.

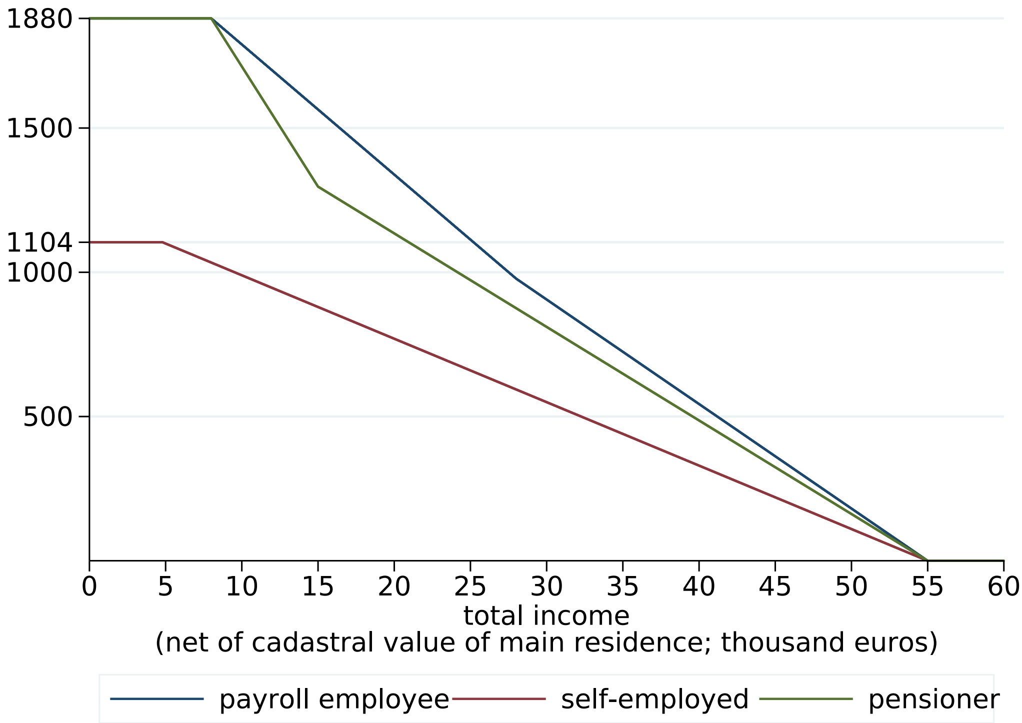
A3. Value added tax (VAT)

VAT is one of the main taxes in Italy, representing more than 40% of the revenues from indirect taxation and around 15% of the all tax and SSC revenues (as a term of reference,

[24] Starting from 2014, Regions can introduce some form of progressivity in their tax rates (in place of the pre-existing flat tax), provided that they use the same income brackets set at the national level.

[25] The no-tax area is implicitly defined at 8,000 euros. In fact the gross tax for this level of taxable income would be $23\% \times 8,000 = 1,880$, which is exactly the level of the tax credits.

Tax credit for income sources (euros)



the corresponding value for the personal income tax accounts is about 25%). Each consumption item is subject to one of three tax rates: 4% (e.g. bread, milk, nonprocessed food etc.), 10% (e.g. meat, fish, sugar etc.) and 22% (e.g. expenditures for utilities, clothing etc.). Other items like expenditures for insurances and financial services or health related expenses are exempted.

The current design of the VAT is the outcome of different legislative changes that have taken place over time. The two most recent changes took place in September 2011 and October 2013, when the standard rate was increased by one percentage point each time. The reduced (10%) and super-reduced (4%) rates have not been modified. Finally the Budget Law for 2016 introduced a further rate (5%) for very specific services that are not simulated in BIMic.

7 Tables and Figures

Table 1: Balancing property for the common variables in the matching procedure

Variable	SHIW		HBS	
	mean	sd	mean	sd
Male	0.65	0.48	0.69	0.46
Area: North - West	0.25	0.43	0.23	0.42
Area: North - East	0.20	0.40	0.21	0.41
Area: South	0.21	0.40	0.18	0.39
Area: Center	0.22	0.42	0.30	0.46
Area: Islands	0.12	0.32	0.08	0.27
Municipality size: Metropolitan Area	0.13	0.34	0.12	0.32
Municipality size: big or peripheral	0.45	0.50	0.27	0.44
Municipality size: small	0.42	0.49	0.61	0.49
Family size	2.37	1.25	2.38	1.25
Nr. of members age less than 3	0.03	0.17	0.05	0.21
Nr. of members age less than 18	0.20	0.40	0.24	0.43
Nr. of members age more than 65	0.47	0.50	0.38	0.49
HH's age	60.68	16.13	57.86	16.23
Foreigner	0.04	0.20	0.04	0.20
Home ownership	0.72	0.45	0.74	0.44
House width (squared meters)	102.35	48.05	98.10	39.81
Imputed rent for home-owners (€/month)	450.79	364.89	457.92	314.71
Food expenditures (€/month)	444.50	222.36	449.77	298.93
Total Matching Expenditure	2076.64	1227.69	2157.24	1278.18

Table 2: Summary of counterfactual scenarios and policies (*changed compared with the baseline scenario*)

	VAT	PIT: lowest rate	PIT: tax credits on labour income	SSC rates	General govt. budgetary balance
Scenario 1: (A + B)	⇑[1]	⇓[2]	=	=	=
Scenario 2: (A + C)	⇑[1]	=	⇑[3]	=	=
Scenario 3: (A + D)	⇑[1]	=	=	⇓[4]	=
Policy A	⇑[1]	=	=	=	⇑
Policy B	=	⇓[2]	=	=	⇓
Policy C	=	=	⇑[3]	=	⇓
Policy D	=	=	=	⇓[4]	⇓

[1] Reduced VAT rate from 10 to 13%; standard rate from 22 to 25.2%.
[2] Lowest PIT rate from 23 to 20%.
[3] Tax credits increased by 40%.
[4] SSC rates reduced by 40% for payroll employess and by 11.1% for self-employeed.

Table 3: VAT incidence, including imputed rents in both income and consumption definitions. Averages by income decile.

Disposable equivalent income[1] *(decile)*	**Disposable income** *(thousand euros)*	**Consumption** *(thousand euros)*	**VAT, by rate** *(euros)*				**Consumption to income ratio** *(%)*	**VAT to income ratio** *(%)*	**Effective VAT rate**[2] *(%)*
			Total	4%	10%	22%			
1	13.6	19.1	1,572	75	423	1,074	136.1	11.1	8.8
2	17.6	20.5	1,670	83	476	1,111	118.7	9.6	8.8
3	21.1	23.6	1,896	95	533	1,267	111.8	9.0	8.8
4	24.5	25.9	2,046	103	577	1,366	106.7	8.4	8.6
5	28.7	30.2	2,423	115	667	1,640	104.7	8.4	8.7
6	34.5	35.0	2,949	122	803	2,025	100.1	8.2	8.9
7	38.1	35.7	2,914	120	771	2,023	95.3	7.7	8.8
8	43.7	39.9	3,336	125	845	2,366	93.4	7.7	9.0
9	54.8	48.5	4,006	149	1,065	2,793	90.0	7.5	9.1
10	84.8	63.5	4,921	162	1,325	3,435	74.3	5.9	8.7
Total	36.1	34.2	2,773	115	748	1,910	95.9	7.8	8.8

[1] The equivalence of household disposable incomes is obtained applying the "OECD-modified equivalence" scale, which assigns weight 1 to the first adult, 0.5 to any remaining individual aged at least 14 years old, and 0.3 to others.

[2] The effective VAT rate is obtained as a ratio between the total VAT and the net-to-VAT consumption.

Table 4: VAT incidence, excluding imputed rents in both income and consumption definitions. Averages by income decile.

Disposable equivalent income[1] *(decile)*	**Disposable income** *(thousand euros)*	**Consumption** *(thousand euros)*	**VAT, by rate** *(euros)*				**Consumption to income ratio** *(%)*	**VAT to income ratio** *(%)*	**Effective VAT rate**[1] *(%)*
			Total	4%	10%	22%			
1	10.7	15.9	1,547	76	442	1,029	145.5	14.3	10.9
2	14.6	17.9	1,831	90	492	1,249	118.5	11.8	11.1
3	16.7	17.8	1,780	87	509	1,184	110.8	11.0	11.0
4	20.2	21.2	2,129	104	622	1,402	106.0	10.7	11.2
5	23.2	23.6	2,429	115	673	1,641	104.0	10.7	11.4
6	27.7	25.9	2,681	116	703	1,862	95.1	9.9	11.6
7	31.7	29.4	3,091	124	841	2,127	91.0	9.5	11.6
8	36.2	32.0	3,432	130	863	2,439	89.5	9.6	12.0
9	44.7	38.0	4,030	146	1,094	2,790	83.0	8.8	11.8
10	73.3	45.4	4,783	161	1,245	3,378	64.5	6.9	12.0
Total	29.9	26.7	2,773	115	748	1,910	91.2	9.5	11.6

[1] The equivalence of household disposable incomes is obtained applying the "OECD-modified equivalence" scale, which assigns weight 1 to the first adult, 0.5 to any remaining individual aged at least 14 years old, and 0.3 to others.

[2] The effective VAT rate is obtained as a ratio between the total VAT and the net-to-VAT consumption.

Table 5: Distributive analysis of the simulated scenarios. Percentage points.

Scenario/Policy	Gini index, by income definition			RS index[1]
	Gross[2]	Disp.[2]	Net[2]	
Baseline	41.24	33.02	33.92	7.32
Deviation from baseline scenario:				
Scenario				
1: VAT up, tax rate down	0	-0.01	0.17***	-0.17***
2: VAT up, tax credit up	0	-0.06***	0.12***	-0.12***
3: VAT up, SSC down	0	0.03*	0.21***	-0.21***
Policy				
A: VAT up	0	0[3]	0.20***	-0.20***
B: tax rate down	0	-0.01	-0.02*	0.02*
C: tax credit up	0	-0.06***	-0.08***	0.08***
D: SSC down	0	0.03*	0.02	-0.02

Note: * p<0.10, ** p<0.05, *** p<0.01.

[1] The Reynolds-Smolensky index is defined as the difference between the Gini index computed on gross income and the Gini index computed on net income; see Section 3.5.

[2] Gross income includes wages, incomes from real and financial assets and pension benefits; disposable income is obtained from gross income subtracting all taxes except VAT and adding all benefits; net income is obtained subtracting VAT from disposable income; see Section 3.4.

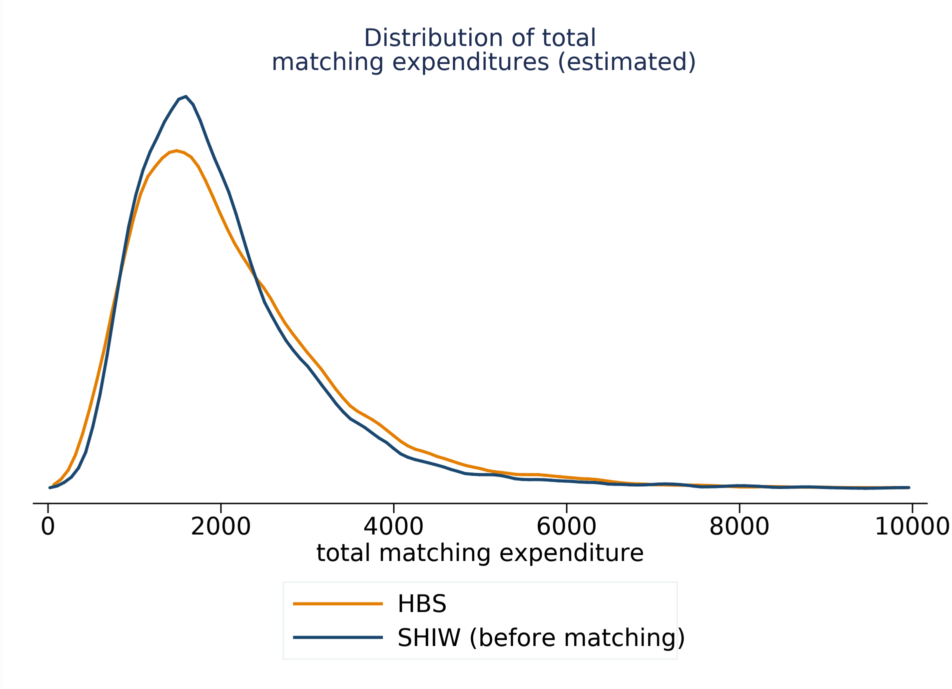
[3] By definition, the disposable income is not affected in this scenario.

Table 6: Average effective marginal tax rates for the simulated scenarios. Percentage points.

Scenario/Policy	Components				Total
	PIT	SSC	Benefits	VAT	
Baseline	27.25	8.52	4.90	2.97	43.64
Deviation from baseline scenario:					
Scenario					
1: VAT up, tax rate down	-0.75***	0.00**	-0.65***	0.60***	-0.79***
2: VAT up, tax credit up	-1.62***	0.00**	-0.85***	0.62***	-1.85***
3: VAT up, SSC down	2.21***	-2.94***	-0.14	0.52***	-0.36
Policy					
A: VAT up	0.00	0.00**	0.00	0.54***	0.54***
B: tax rate down	-0.75***	0.00**	-0.65***	0.05***	-1.34***
C: tax credit up	-1.62***	0.00**	-0.85***	0.07***	-2.40***
D: SSC down	2.21***	-2.94***	-0.14	-0.02	-0.90**

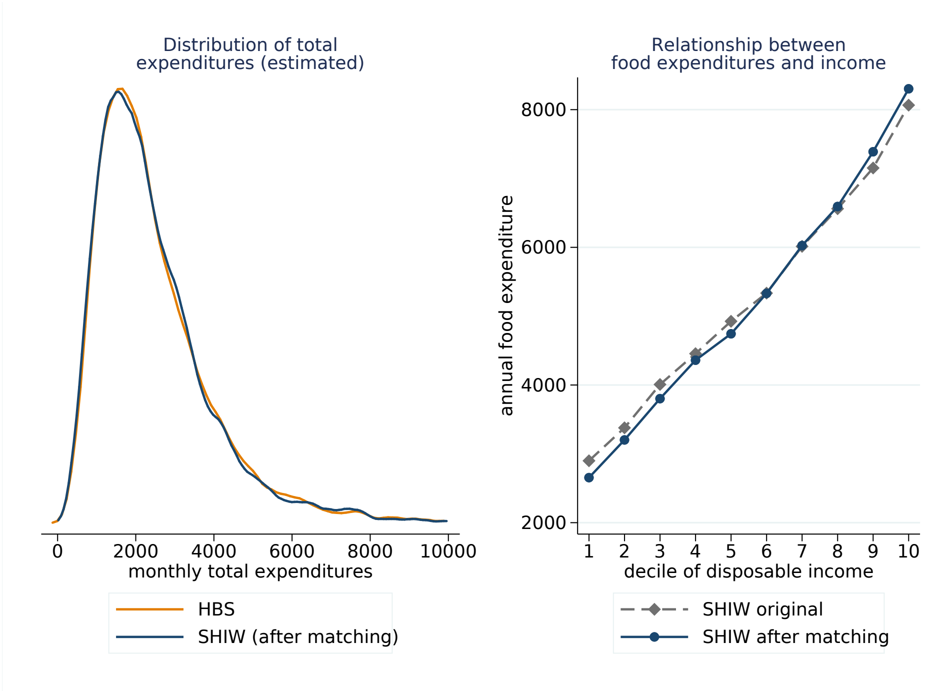
Note: * p<0.10, ** p<0.05, *** p<0.01.

Figure 1: Distribution of total expenditure in the two samples before the statistical matching



Note: total matching expenditure refers to an expenditure definition that we harmonized between the two surveys. More information can be found in Section 3.2.

Figure 2: Outcome of the matching procedure



Note: total expenditure refers to an expenditure definition that we harmonized between the two surveys. The information on food expenditures is present both in SHIW and HBS. More information can be found in Section 3.2.

Figure 3: Scenario 2: labour income tax credits

Note: the graph shows the amount of labour-income tax credit (euros per year) in the baseline and in Scenario 2. For more information about tax credits in the Italian personal income tax, see the Appendix.

Figure 4: Composition of household expenditures among VAT rates, by deciles of total expenditures. Percentage points.

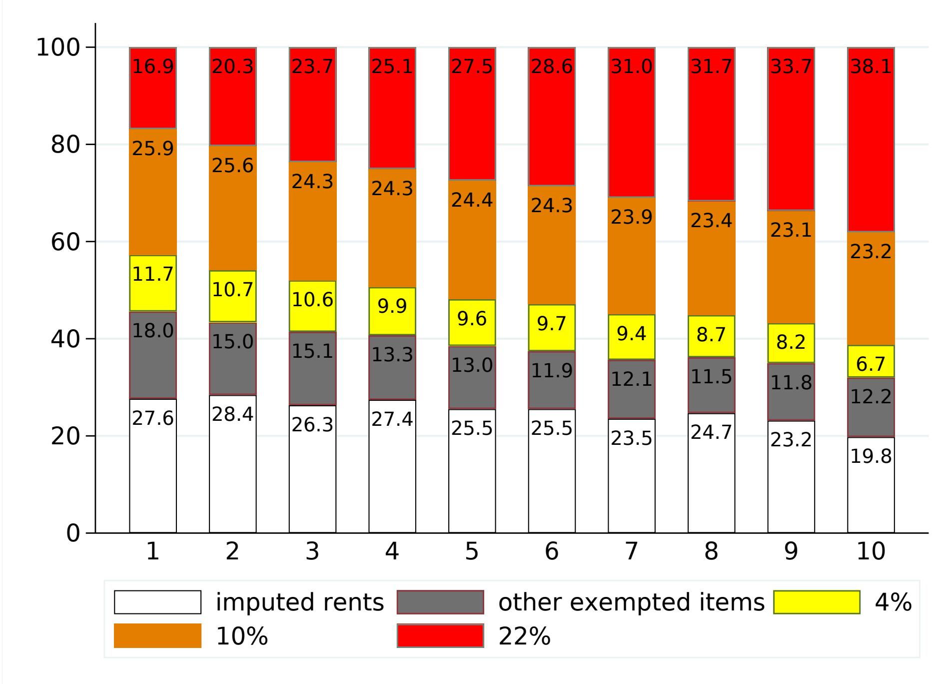
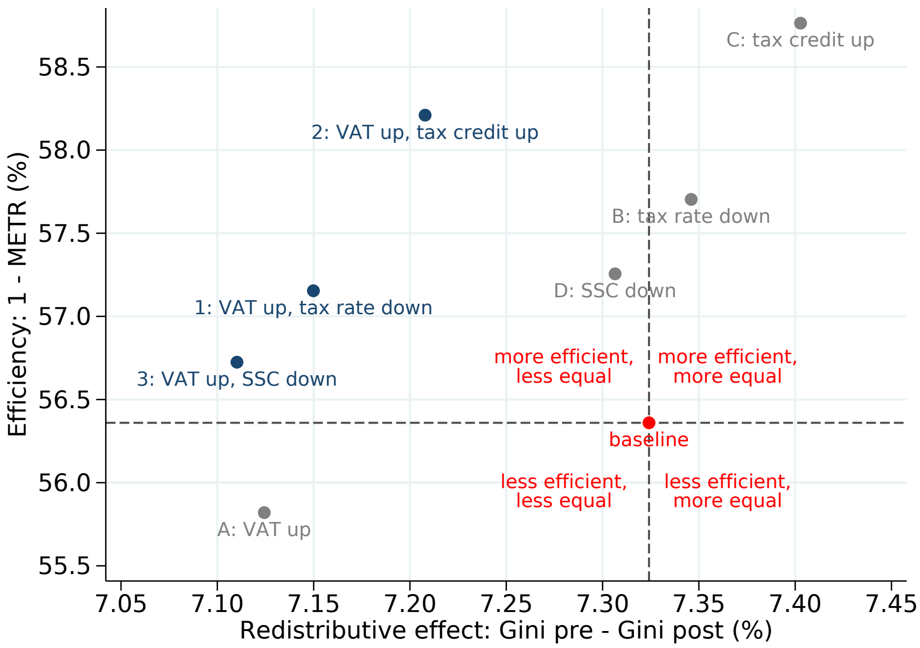
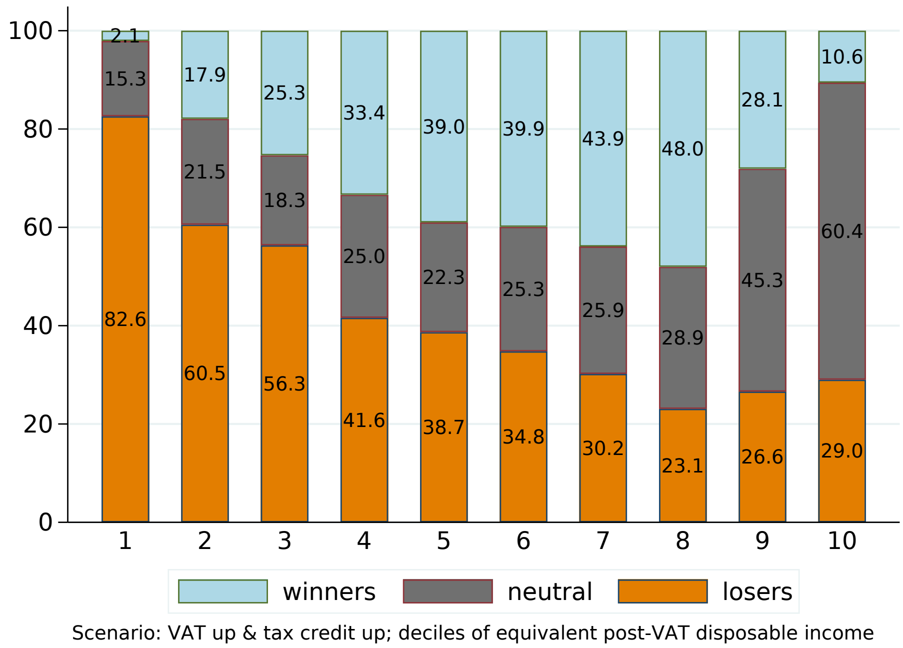


Figure 5: The equity-efficiency trade-off of a tax shift



Note: the graph shows synthetically the equity-efficiency combinations of the baseline scenario (red dot), the simulated scenarios from 1 to 3 (blue dots), and the single policies from A to D (gray dots). Starting from the baseline scenario, a movement upwards of the equity-efficiency combination signals an increase in efficiency (that is, a decrease of the marginal effective tax rates), while a movement towards the right signals an increase in the redistributive power (that is, a decrease of the Gini index of net incomes).

Figure 6: Winners and losers in Scenario 2



Note: we define winners the households with a percentage change in net equivalent income with respect to the baseline scenario larger than 1%, losers those with a change lower than -1% and neutral the remaining households.

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