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## ABSTRACT

The current financial crisis has brought Europe to a critical juncture. In this paper, we map the fiscally United States of Europe. We simulate an optimal EU-wide income tax and calculate the implied cross-country transfers. The comparison of the implied transfers with the real transfers shows how insufficient the actual transfers are to reduce income disparities across the EU. Moreover, to evaluate the chances for a stronger European fiscal integration within different (core-) groups of member states, we illustrate the winners and losers from an optimal EU-wide income redistribution across the Union. While the need for centralized redistribution grows with the number of heterogeneous member states, the implementation of a European income tax becomes at the same time ever more unlikely.


Keywords: European Union, Inequality, Redistribution, Solidarity, Fiscal Policy, Optimal Taxation

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## 1 INTRODUCTION

Europe is at the crossroads. Before the current crisis, the only way for the European Union to go seemed to be ever closer integration. Since 2008 many things have changed. Some minor parties (such as the AfD in Germany), but also some major government parties (such as the Tories in the UK) call for less fiscal and monetary integration and a move back towards just a single market. Yet, the leaders of the two European core countries - France and Germany - "both want to deepen economic, monetary - and in the future - political union, to arrive at integration and solidarity" (Francois Hollande, 27th June 2012). A look back in time illustrates how the European Union without a common currency would look like, and given the relatively small transfers within the EU, a world without any EU-wide fiscal redistribution is easy to imagine. What is less likely to imagine is the other side of the spectrum and thus what we depict in this article - a fully integrated European tax and welfare state.

The aim of this paper is not to argue for or against European fiscal centralization or illustrate its exact design, but to highlight how an *ideal* EU-wide redistribution would look like. Thus, we illustrate the optimal redistribution among European citizens without considering possible inefficiencies in tax collection or spending[1]. We adopt a method by Kopczuk, Slemrod, and Yitzhaki (2005) to simulate the United States of Europe from a welfare perspective. Income redistribution takes the form of a fiat-rate tax and a lump-sum transfer. Based on the income distribution in the member states we calculate an optimal European income tax (EIT) and compare it with the simulated optimal decentralized solution (DEC) as well as with the current international transfers. From this analysis we draw several conclusions.

First, only a centralized European income tax is able to reduce the large income inequalities among European citizens. This implies a significant redistribution from rich to poor countries. According to our simulation, even the residents at the 95th percentile of the income distribution in Bulgaria would receive transfers from the residents at the 5th percentile in Luxembourg.

Second, the current transfers via member payments are much too low compared to the optimal transfers. A Romanian citizen should receive 280 times more than what he or she receives now in net EU funds per capita. Not only are the current net transfers

[1] If these inefficiencies were taken into account, the citizens' willingness to redistribution would be further reduced.

insufficient to reduce income disparities across the EU, they are also biased against the new member states and in favour of the small donor nations. This supports the findings of authors on the EU budget allocation who argue that the actual transfers are at least partly politically determined rather than needs-based (de la Fuente and Domenech, 2001; Rodden, 2002; Kauppi and Widgren, 2004; Casella, 2005; Aksoy and Rodden, 2009; Schneider, 2010).

Third, our calculations show that an EIT could not be passed if citizens were only concerned about their income, no matter if we apply the unanimity or double majority voting rules. This finding is robust to different levels of redistributive preferences. Inspired by the internal differentiation among member states, we simulate the EIT for a variety of plausible core scenarios. We still find that the implementation of an EIT would not be feasible under monetary considerations only – albeit less costly. Here, our simulation illustrates the paradox behind a common European fiscal policy: The more unequal member states the Union has, the more a centralized fiscal policy becomes necessary. Yet at the same time, the increasing number of heterogeneous member states makes an implementation of such an EU-wide policy ever more unrealistic.

The reminder of the paper is structured as follows: The next section gives a short discussion on the relation of our paper to the existing literature. The third part introduces our model. We then describe our results. The last section concludes.

## 2 EUROPEAN TAXATION IN THE PUBLIC AND ACADEMIC DEBATE

How do politicians and scholars assess a European tax and welfare state? At the EU level a common economic and social policy to equalize living standards via a transfer union has been called for since decades. The goal to reduce income inequality is already stated in the Treaty establishing the European Community (Art. 156). This pledge is echoed in various reports and papers on the European Monetary Union (EMU), which became a common goal at the European summit in The Hague in 1969. One year later Europe’s leaders set up a High Level Group under the then Luxembourg Prime Minister Pierre Werner to report on how EMU could be achieved by 1980. Next to a common monetary policy, the group also called for closer fiscal coordination. The MacDougall report (1977) on closer financial integration in the EU even explicitly argued in favour of a European transfer union to stabilize the currency union and equalize living standards. Also the Lisbon Council in 2000 has stressed an integrated European social and economic policy (Atkinson, 2002), as have Merkel and Hollande during the recent financial crisis.

Yet the EU finances itself mostly via payments by member states, and as our analysis illustrates not always according to their respective ability to pay. Due to the EU budget’s small size (around one percent of the EU’s GDP) its redistributive capacity is very

limited. While policy experts advocated EU redistribution - albeit with low success - researchers have until recently not even explored the possibility of a European income tax.

The scholarly debate on EU tax policy is mostly concerned with the internalization of negative externalities stemming from closer market integration. Thus, researchers argue in favour of tax harmonization to avoid competition between member states (Sprensen, Bacchetta, and Jullien, 2000; Goodspeed, 2002; Ganghof and Genschel, 2008) as well as a coordinated fiscal policy to stabilize the Eurozone (Wildasin, 1991; Obstfeld and Peri, 1998; Farina and Tamborini, 2004; Breuss, 2009; Bordo and Jonung, 2011; Bargain et al., 2013). Yet any common fiscal policy is thought of as means to enable national redistribution within the member states rather than achieving a stronger income equality between the member states. European-wide redistributive taxation only seems to have entered the scholarly agenda with the beginning of the fiscal crisis (Lambert, 2011; Bargain et al, 2013). Researchers now start considering different income taxation schemes to arrive at some degree of additional European redistribution.

Lambert (2011) proposes a supra-national layer of income taxation in addition to the national income tax. This EU income tax is designed to be fair in the sense that individuals at the same percentile points in their within-country net income distributions face the same tax progression. As a result, individuals from different countries with the same income pay different EU-taxes as long as the income distribution in these countries differs. In his simulation for six European countries, the European average tax rate for the median income is set at one percent. Thus, the main redistribution still takes place within rather than across member states. Yet once the EU has become "fully a community of redistribution" (Lambert, 2011, 257), the fairness criterion will shift and redistribution will occur on the European level.

Bargain et al. (2013) simulated an *average* taxation of eleven Eurozone countries, which generates the same revenue and progressivity at the EU level as the existing national systems. They assume that EU-tax revenue is assigned in such a way that each country receives the same initial net revenue as under the national system. This implies that redistribution across countries only happens by changing the net tax burden of the households. They also show the strong redistributive effects of such an EU-tax. Nevertheless, due to the constraints placed by the existing national systems, the level of redistribution is much lower than in our analysis.

Different to the existing literature, our paper simulates a welfare-maximizing taxation for all 27 EU countries in one European tax system. Our model analyzes the optimal level of redistribution across all European residents, no matter what their nationalities are. Therefore, the EIT in our paper treats all Europeans as if they live in one country, while in Lambert (2011) and Bargain et al. (2013) the nationality plays an important

role in determining the EU-tax payment. We could thus consider our analysis as implementing the perfect European integration, where there is only one state of Europe, and consider Lambert (2011) and Bargain et al. (2013) as implementing an intermediate level of European integration.

## 3 A MODEL OF CENTRALIZED INCOME TAXATION

In this section we briefly describe the simulation method developed by Kopczuk, Slemrod, and Yitzhaki (2005)[2]. The model utilizes the standard optimal income taxation theory which shows the trade-off between equity and efficiency. The government being benevolent and concerned about income inequality implements a redistributive tax policy. In order to focus on the redistributive aspect, the model is simplified in such a way that individuals have only labor income and there is only one period and one consumption good. Consequently, labor income taxation is the sufficient means of redistribution.

The government implements its redistributive policy through a flat-rate income tax and a non-individualized lump-sum transfer to the individuals (demogrant). Such a taxation is an indirect progressive taxation[3]. Saez and Piketty (2012) conclude that a proportional tax with a lump-sum transfer is a reasonable first approximation of actual tax system. The lump-sum transfer can take different forms such as basic income, food stamps or income tax credit. The optimal taxation is defined by the tax policy that maximizes a social welfare function, which is an aggregate of individual utilities in consumption and leisure. The concavity of the social welfare function expresses the extent of the government's redistributive preference. The stronger the redistributive preference, the higher the optimal tax rate. However, a higher tax rate lowers the residents' incentives to work and thus the total income, because it reduces the after-tax wage income. The extent of this disincentive effect is determined by the individuals' preference for leisure. The optimal income taxation thus balances the gains from redistribution, which is measured by the increase of welfare due to a more equal income distribution, against the efficiency costs arising from a lower incentive to work.

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[2] Please see the appendix for more details.

[3] Different to a direct progressive income tax which can, for example, be found in Germany, in an indirect progressive tax system the average rather than the marginal tax rate increases with income. Since Estonia started the fiat tax revolution more and more countries, especially in Eastern Europe have introduced a fiat tax. Also Western European countries such as Germany have been discussing its introduction. Although the majority of member states still has a directly progressive system, we use a fiat tax in our simulation for reasons of simplicity. However, a more flexibly direct progressive taxation would imply an even stronger redistribution. Thus, our results would only be strengthened.

There is a continuum of workers who only differ in their abilities. The distribution of abilities is assumed to be log-normal. The economy consists of two sectors, which respectively produce tradable *T* and non-tradable goods *N*. The price of tradable goods is assumed to be 1, whereas the price of nontradable goods $p_i$ in country *i* is country-specific. Both sectors are competitive, such that the wage rate in each sector is equal to the marginal productivity. Workers choose in which sector to work and how much labor to supply in order to maximize their utility. By assuming that the marginal productivity in the non-tradable sector depends less on the ability $a$ of the worker, there is a cut-off level of ability such that workers with a higher ability work in the tradable sector with a wage rate of $w(a) = a$ and the ones with a lower ability work in the other sector with a wage rate of $w(a) = p_i a^d$. The parameter $0 < d < 1$ measures the productivity in the non-tradable sector. The individual utility function is assumed to be CES (constant elasticity of substitution) between consumption and labor:

$$u(T,N,L) = \left[(1-\alpha)\left(T^{\delta}N^{1-\delta}\right)^{-\gamma} + \alpha L^{-\gamma}\right]^{-1/\gamma}$$

The sub-utility function in consumption is Cobb-Douglas with the parameter $\delta$ denoting the share of tradable goods in total consumption. The relative importance of consumption to leisure *L* is given by the parameter $\alpha$ and the elasticity of substitution between consumption and leisure is determined by $\gamma$. The equilibrium of the economy is characterized in such a way that the demand of non-tradables meets the supply and that the demand of tradables is equal to the supply plus the net transfer that the country receives. This determines the price of non-tradables as well as income and consumption of each resident in the country.

By assuming the utility function to be Cobb-Douglas ($\gamma = 0$), there are three global parameters, α, δ mid $d$, and two country-specific parameters, i.e., mean and standard deviation of the ability distribution, which need to be determined. These parameters are calibrated to match actual data regarding country-specific mean income, Gini-coefficients, PPP indicators and an average labor supply in EU-countries of 0.20[4]. For the calibration the tax rate is assumed to be $t = 0.34$ in all countries, which is the average implicit tax rate on labor in 2007 in EU-countries. Moreover, the government budget constraint is assumed to be fulfilled in all countries so that the country-specific lump-sum transfer can be pinned down.

The calibration is done in two steps. For given α, δ and $d$, the ability distribution parameters in each country are adjusted to match its mean income and Gini coefficient of disposable income. This yields the price of non-tradables and the respective PPP indi-

[4] The labor supply of 0.2 is based on the estimate of EU-average annual working hours by Eurostat of 1, 686 in 2006, which corresponds to about 20% of total hours in one year.

ces. For the next step, the parameters α, δ and *d* are adjusted to generate the average lab or supply of 0.20 and to minimize the standard deviation of the simulated PPPs from the actual PPPs. The calibration leads to parameter values of δ = 0.79, *d* = 0.12 and α = 0.66.

After having the ability distribution and the model parameters, optimal income tax rates and lump-sum transfers for each country and for all EU countries as a whole can be calculated by assuming a social welfare function as used in Atkinson (1970): $W = \Sigma (1 - v)^{-1} u^{1-v}$. Here, *u* is the individual utility and the parameter *v* determines the extent of the redistributive concern. The smaller *v*, the less important redistribution is for the government.[5] For the baseline simulation we use *v* = 2. For robustness checks we set *v* also at other values, as tables 6 and 7 in the appendix illustrate.

## 4 INCOME DATA FOR THE EUROPEAN UNION

Our data are from 2007 and stem from Eurostat (see table 4 in the appendix). We use the year before the financial crisis as base year, because we want to depict the state of the union under stable economic conditions. Additionally, 2007 was the first year of the new financial perspective, giving also the new member states a say in the budget allocation and as such reducing the new member states penalty (Aksoy and Rodden, 2009, 627). We view the crisis as an exogenous event (at least exogenous to the expectations of most citizens, policy makers and also investors) which could lead to either much greater or much less fiscal integration across the EU. Thus, we depict the differences in income and inequality across the member states before the crisis and simulate how a centralized European income tax redistributes wealth across the borders (and within the member states).

Table 4 in appendix gives an overview of the European Union member states' mean income and their respective Gini-coefficients. The data on GDP is PPP- adjusted to account for the differences in actual living costs in each country. We find the lowest average income in the new East-European member states, especially in Bulgaria, whereas Luxembourgers are the richest by far. The most unequal country is Romania with an after-tax Gini coefficient of 0.38. Slovenia and Sweden, on the other hand, are the most equal member states. The remaining columns illustrate the net transfers between the member states. They are based on the operation budgetary balance, i.e. the difference between a country's payments to the EU (excluding EU administrative costs) and the EU's expenditure to citizens, regions, and companies within that particular country. These include agricultural subsidies to farmers and fishermen, money from the Eu-

[5] For *v* = 0, we have a utilitarian welfare function, where the utility of each individual has the same welfare weight. For *v* = ∞ we have a Rawlsian welfare function, which is equal to the utility of the worst-off individual. If *v* = 1, the welfare function becomes $W = \Sigma \ln U$.

ropean Regional Development Fund (ERDF) to foster underdeveloped regions or funds to support local citizens' projects to name but a few. Assuming that money is fungible, these are transfers to a particular member state which then has no longer to provide the funds itself. We thus follow the literature and argue that "one of the explicitly stated goals of the EU is to narrow the wealth gap between poorer and richer EU member states. The main instruments for this task are fiscal transfers made through the EU budget. [...Thus, the] analysis of the actual redistributive effects of all EU programmes is justified, regardless of what the declared goals of the programme are" (Mattila, 2006, 34ff). The operating budgetary balance is taken from the 'EU budget 2009 Financial Report'. As table 4 shows, Germany as the most populous member state also contributes the most to the EU. Though if we look at transfers per capita, it falls to the fifth place. With almost 300 Euro per citizen Luxembourg gives the most by far, followed by the Netherlands, Denmark and Sweden. The Netherlands even overtake Luxembourg when it comes to transfers as percentage of GDP. With half a percentage point the Dutch contribution to their fellow Europeans is on the same level as their foreign aid. This again highlights the relatively small size of the EU budget. Although they are neither big nor relatively poor, Greeks receive the most transfers in total, per capita and in GDP terms, already in 2007. Yet how do these transfers compare to the level and direction of transfers needed for an optimal EU-wide income distribution?

# 5 AN OPTIMAL EUROPEAN INCOME TAX

In the following we discuss the results of our simulation. The first part compares the optimal income tax for each of the 27 individual member states with the optimal EU-wide income tax (EIT). We then discuss the implied transfers between member states via EIT in light of the actual transfers. In addition, we compare the EIT with the simulated optimal centralized income taxation for the 17 Euro-countries in 2007. In the second part we evaluate the implementability of an EIT by two different voting rules and across distinct EU core groups. In the end we discuss the implied welfare weights on foreigners from the point of view of a donor country.

## 5.1 Implications of an Optimal European Income Taxation

In general, the distributive effect of taxation can be measured by how much the Gini-coefficient of disposable income is reduced compared to the Gini of labor income (before-tax). The efficiency loss of taxation is depicted by the reduction of labor supply and hence the reduction of average labor income.

The simulation results for the optimal taxation for each of the 27 member states and the optimal EU taxation are summarized in table 1. Obviously, for the decentralized

system the optimal tax rates differ, depending on the different ability distributions calibrated from the respective country data. A higher Gini-coefficient as given in table 4 implies a higher inequality in ability and in potential income, which then requires a higher tax rate to achieve stronger redistribution. Romania, which has the highest Gini-coefficient of 0.38, also features the highest optimal tax rate of 0.47. The average tax rate for all countries is 0.37[6]. If we redistribute income across all EU residents, no matter where they live, the optimal income tax rate is 0.42. The rate is higher than the optimal decentralized tax rates in most of the individual member states. This implies that the within country income inequality is lower for the majority of countries than the income inequality in the EU as a whole.

Looking at the lump-sum transfer, we see that the demogrant in an optimal EIT amounts to 9701, which is almost six times more than the demogrant of the decentralized taxation in the poorest EU country Bulgaria. It is lower than that of the decentralized system in eleven relatively rich countries. All residents in these eleven countries would lose from a reform from an optimal decentralized taxation to an optimal EIT, because they pay more taxes while receiving a lower lump-sum transfer. This again shows that an optimal EIT calls for significant redistribution from rich countries to poorer ones.

The consumption Gini-coefficient for the EU is 0.36 in an optimal decentralized system, while an EU-wide taxation reduces it to 0.30. Interestingly, although almost all poor countries have a higher income tax rate under national taxation than under the EIT, the former cannot reduce their inequality much, only an EIT can do so. In Bulgaria, the Gini-coefficient of disposable income is reduced from 0.32 under a decentralized taxation to 0.07 under an EIT. This implies that the income discrepancy between rich and poor European countries is so large that the lump-sum transfer under an EIT would constitute a dominant part of the residents' income in poor countries. On the other hand, the richest countries would face a slightly increased inequality in consumption among their residents because of the strong reduction in the demogrant under an EIT.

The optimal EIT however increases the Gini-coefficient of labor income for the EU from 0.52 under the decentralized taxation to 0.54. Again, due to the strong redistribution from rich countries to poor ones, the average labor supply- in the poor countries decreases because of the dominating income effect, and the average labor supply in three rich countries actually increases (Denmark, Ireland and Luxembourg).

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[6] The average tax rate is calculated as the tax rate that generates the same total tax revenue as the decentralized tax system, while keeping the before-tax labor income in each country constant.

*Table 1: Simulated decentralized and centralized optimal tax policies across the 27 European Union member states with $\upsilon = 2$*

| Country | Tax Rate | | Demogrant | | Labour Gini | | Consumption Gini | | Mean Labour Supply | | Mean Labour Income | | Mean Consumption | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT |
| Austria | 0.33 | 0.42 | 10585 | 9701 | 0.40 | 0.42 | 0.27 | 0.27 | 0.24 | 0.23 | 32478 | 31449 | 32478 | 27933 |
| Belgium | 0.31 | 0.42 | 9915 | 9701 | 0.39 | 0.42 | 0.27 | 0.27 | 0.24 | 0.22 | 31658 | 29993 | 31658 | 27089 |
| Bulgaria | 0.45 | 0.42 | 1589 | 9701 | 0.57 | 0.45 | 0.32 | 0.07 | 0.17 | 0.07 | 3561 | 3122 | 3561 | 11511 |
| Cyprus | 0.37 | 0.42 | 7119 | 9701 | 0.46 | 0.48 | 0.29 | 0.24 | 0.21 | 0.17 | 19234 | 16995 | 19234 | 19554 |
| Czech Republic | 0.32 | 0.42 | 3923 | 9701 | 0.38 | 0.43 | 0.26 | 0.14 | 0.24 | 0.12 | 12312 | 8164 | 12312 | 14434 |
| Denmark | 0.32 | 0.42 | 13273 | 9701 | 0.38 | 0.39 | 0.26 | 0.28 | 0.24 | 0.25 | 41650 | 42325 | 41650 | 34239 |
| Estonia | 0.42 | 0.42 | 4501 | 9701 | 0.54 | 0.54 | 0.31 | 0.18 | 0.19 | 0.12 | 10684 | 8709 | 10684 | 14750 |
| Finland | 0.33 | 0.42 | 10983 | 9701 | 0.40 | 0.41 | 0.27 | 0.27 | 0.24 | 0.23 | 33699 | 32921 | 33699 | 28787 |
| France | 0.33 | 0.42 | 9657 | 9701 | 0.40 | 0.42 | 0.27 | 0.26 | 0.23 | 0.22 | 29163 | 27627 | 29163 | 25718 |
| Germany | 0.38 | 0.42 | 10554 | 9701 | 0.47 | 0.48 | 0.29 | 0.30 | 0.21 | 0.21 | 27747 | 27605 | 27747 | 25705 |
| Greece | 0.43 | 0.42 | 7832 | 9701 | 0.55 | 0.55 | 0.31 | 0.28 | 0.18 | 0.16 | 18241 | 17434 | 18241 | 19808 |
| Hungary | 0.32 | 0.42 | 3187 | 9701 | 0.38 | 0.42 | 0.26 | 0.11 | 0.24 | 0.10 | 10001 | 6046 | 10001 | 13206 |
| Ireland | 0.39 | 0.42 | 15841 | 9701 | 0.49 | 0.48 | 0.30 | 0.35 | 0.20 | 0.24 | 40592 | 44112 | 40592 | 35275 |
| Italy | 0.41 | 0.42 | 9711 | 9701 | 0.51 | 0.51 | 0.30 | 0.30 | 0.19 | 0.19 | 23805 | 22977 | 23805 | 23611 |
| Latvia | 0.45 | 0.42 | 3680 | 9701 | 0.57 | 0.55 | 0.32 | 0.16 | 0.17 | 0.10 | 8192 | 6476 | 8192 | 6723 |
| Lithuania | 0.42 | 0.42 | 3229 | 9701 | 0.54 | 0.51 | 0.31 | 0.13 | 0.19 | 0.09 | 7665 | 5627 | 7665 | 5836 |
| Luxembourg | 0.34 | 0.42 | 25929 | 9701 | 0.42 | 0.40 | 0.28 | 0.34 | 0.23 | 0.29 | 76428 | 86451 | 76428 | 59821 |
| Malta | 0.31 | 0.42 | 4209 | 9701 | 0.38 | 0.44 | 0.26 | 0.15 | 0.24 | 0.13 | 13430 | 9019 | 13430 | 9216 |
| Netherlands | 0.34 | 0.42 | 11584 | 9701 | 0.42 | 0.43 | 0.28 | 0.29 | 0.23 | 0.23 | 34145 | 32831 | 34145 | 33970 |
| Poland | 0.41 | 0.42 | 3046 | 9701 | 0.51 | 0.49 | 0.30 | 0.12 | 0.19 | 0.09 | 7467 | 5218 | 7467 | 5397 |
| Portugal | 0.47 | 0.42 | 6495 | 9701 | 0.60 | 0.59 | 0.32 | 0.26 | 0.16 | 0.14 | 13893 | 12769 | 13893 | 13186 |
| Romania | 0.47 | 0.42 | 2378 | 9701 | 0.62 | 0.53 | 0.33 | 0.11 | 0.16 | 0.08 | 5030 | 4177 | 5030 | 4366 |
| Slovakia | 0.31 | 0.42 | 3524 | 9701 | 0.36 | 0.41 | 0.25 | 0.12 | 0.25 | 0.12 | 11535 | 6972 | 11535 | 7141 |
| Slovenia | 0.28 | 0.42 | 4922 | 9701 | 0.33 | 0.40 | 0.24 | 0.17 | 0.26 | 0.16 | 17837 | 12609 | 17837 | 12934 |
| Spain | 0.40 | 0.42 | 8620 | 9701 | 0.49 | 0.50 | 0.30 | 0.28 | 0.20 | 0.18 | 21719 | 20095 | 21719 | 20710 |
| Sweden | 0.28 | 0.42 | 10670 | 9701 | 0.34 | 0.36 | 0.24 | 0.25 | 0.26 | 0.24 | 38369 | 35259 | 38369 | 36591 |
| United Kingdom | 0.41 | 0.42 | 13050 | 9701 | 0.52 | 0.51 | 0.30 | 0.34 | 0.19 | 0.22 | 31708 | 32601 | 31708 | 33662 |
| EU | 0.37 | 0.42 | 8872 | 9701 | 0.52 | 0.54 | 0.36 | 0.30 | 0.18 | 0.18 | 23724 | 22355 | 23724 | 23083 |

Consequently, the inequality in labor income for the EU as a whole increases. The largest reduction in labor supply is found in Hungary, from 0.24 to 0.10. In contrast, Luxembourg's mean labor supply increases by 0.06. On average, the labor supply remains almost the same under the EIT as under the decentralized taxation.

What does the optimal EIT imply for the transfers between EU countries? The implied transfers per capita are shown in table 2 ordered from the highest payment to the lowest. Luxembourgers would pay the highest transfers and Bulgarians would receive the highest transfers according to our simulation. Moreover, 12 countries would pay and the other 15 countries would be recipients.

The second column of table 2 lists the actual net transfer of each country and the third column gives the ratio of the simulated transfers to the actual ones. The ratio ranges from 5 to 281, which implies that the actual transfers are too low compared to the case of an EIT. The biggest discrepancy is found in Romania, which should receive 281 times more per capita than it actually does. Greece shows the smallest discrepancy, receiving almost one fifth of the transfer implied by an EU-wide taxation. This mirrors the new member penalty[7], albeit it should no longer be so strong as the new financial perspective started in 2007 (Aksoy and Rodden, 2009, 627). Also the fact that Germany has a higher rank on the actual payments than on the simulated ones (see table 2) shows that larger core countries contribute relatively more to the EU budget than the EIT would suggest (Rodden, 2002; Aksoy and Rodden, 2009). Interesting are also Ireland and Cyprus, which switch donor and recipient positions. Ireland should pay 58 times more than it actually receives and Cyprus should receive 197 times more than it actually pays. This again illustrates the path-dependency of the Union and the importance of the multi-year bargaining procedure.

If an EU-wide income taxation was to be introduced, it is more likely to happen first for the Eurozone, because they already share a common currency. Economists also advocate a closer fiscal policy to stabilize the monetary union (Obstfeld and Peri, 1998; Farina and Tamborini, 2004; Bordo and Jonung, 2011). Therefore, we additionally discuss the optimal centralized income taxation for the Eurozone only. In 2007, the year we take our data from, 15 countries had the Euro.[8] We also include Estonia and Slovakia which have introduced the Euro since then.

The results are summarized in table 5 in the appendix. The optimal tax rate for the Eurozone is 0.38, considerably lower than that for the whole union. This implies – un-

[7] The EU applies a multi-year budgeting which penalizes countries which joined the Union after the bargaining took place.

[8] These are Austria, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Spain, Portugal, and Slovakia.

*Table 2: Simulated and Real Transfers per capita in the European Union. Sorted by Simulated Transfers.*

| | Transfer p.c. | | Simulated / actual |
|---|---|---|---|
| | Simulated | actual | |
| Donor Countries | | | |
| Luxembourg | -26630 | -291 | 92 |
| *Ireland* | *-8837* | *152* | *-58* |
| Denmark | -8086 | -111 | 73 |
| Sweden | -5676 | -109 | 52 |
| Netherlands | -4575 | -175 | 26 |
| United Kingdom | -4445 | -68 | 65 |
| Finland | -4134 | -32 | 129 |
| Austria | -3516 | -68 | 52 |
| Belgium | -2904 | -82 | 35 |
| Germany | -1900 | -90 | 21 |
| France | -1910 | -47 | 41 |
| Italy | -222 | -34 | 7 |
| Recipient Countries | | | |
| Spain | 997 | 81 | 12 |
| Greece | 2374 | 486 | 5 |
| *Cyprus* | *2559* | *-13* | *-197* |
| Portugal | 4159 | 233 | 18 |
| Slovenia | 4265 | 44 | 97 |
| Malta | 5828 | 69 | 84 |
| Estonia | 6041 | 169 | 36 |
| Czech Republic | 6270 | 64 | 98 |
| Slovakia | 6700 | 114 | 59 |
| Latvia | 6875 | 215 | 32 |
| Hungary | 7160 | 160 | 45 |
| Lithuania | 7248 | 235 | 31 |
| Poland | 7433 | 135 | 55 |
| Romania | 7866 | 28 | 281 |
| Bulgaria | 8388 | 44 | 191 |

surprisingly – that the inequality for the Euro-countries is lower than for all EU member states. The demogrant for a centralized taxation is 9919. The residents in five countries (Estonia, Greece, Italy, Portugal and Spain) would all gain from the introduction of a centralized taxation, because they pay less taxes and receive a higher demogrant. The Gini-coefficient of disposable income for the Eurozone decreases from 0.31 under a decentralized taxation to 0.30 under a centralized one. Although the centralized taxation does not reduce the inequality for the whole Eurozone significantly, it does so for four relatively poor countries (Estonia, Malta, Slovakia and Slovenia). Slovakia shows the biggest reduction in consumption inequality, and its Gini-coefficient reduces from 0.25 to 0.13.

The implied transfers between the Euro member states by a centralized taxation are shown in the last column in table 5. The comparison of these transfers with the actual transfers does not make sense, because the actual transfers take place in the context of

the whole EU. The comparison with transfers implied by an EU-wide EIT, however, shows a much lower extent of transfers between countries. So are Luxembourgers estimated to pay about 3000 Euro less per capita. This is due to the fact that the inequality across the Eurozone is much lower than that across all EU countries. The poorest countries in the EU, such as Bulgaria and Romania, are not allowed to take part in the Eurozone yet and some rich countries like United Kingdom and Sweden chose not to have the Euro.

In sum, for both the EU27 and the EUR017 only a common European income tax is able to effectively reduce income inequality. Because of the higher income inequality between than within member states, a decentralized solution cannot do so. The question remains, however, whether this general EU-welfare maximizing solution is actually implementable.

## 5.2 Implementability of an Optimal European Income Tax

In this subsection, we discuss the possibility of implementing an optimal centralized income taxation under two different voting rules: unanimity and double majority rule. We apply the median-voter theory and deduce the position of an individual country by looking at whether the median voter would win or lose from a centralized taxation. We also check the implementability of a centralized taxation for different EU country groups and for various extents of redistributional concern.

We calculate the after-tax income for the residents in each country at the 5th, 50th and 95th percentile of the income distribution under a decentralized taxation and compare this with the centralized solution. Not surprisingly, the residents in Luxembourg lose the most and the residents in Bulgaria win the most from a change towards EIT, no matter if at the 5th, 50th or 95th percentile. The residents at the 5th percentile in Luxembourg would loose 18625 EUR and the ones at the 95th percentile even 33953 EUR if an EIT is introduced. By comparison, the residents at the 5th percentile in Bulgaria would win 8133 EUR and the ones at the 95th percentile would win 8453 EUR from an EIT[9]. This gives the impression that the poorest citizens in Luxembourg are still richer than the richest ones in Bulgaria. The actual income data from Eurostat support this. In 2007 the PPP adjusted income of the residents at the 10th percentile in Luxembourg was 2.2 times higher than the income of the residents at the 90th percentile in Bulgaria. This fact illustrates once more that a decentralized redistribution cannot contribute significantly to the reduction of inequality in the EU, because a large part of inequality exists not within countries, but between the member states.

[9] That the richest Bulgarians win more than the poorest Bulgarians happens because the richest Bulgarians turn from net payers to net receivers by a switch to centralized taxation.

*Figure 1: Winners and Losers from a Centralized European Income Tax for the 27 EU Member States*


Figure 1 highlights the winners and losers from an EIT. The countries in light grey are those in which the resident at the 50th percentile looses from an EIT compared to the decentralized solution. Since the resident at the 50th percentile is the median voter, we argue that the countries whose median voter looses from an EIT are against an EIT and the countries whose median voter wins are in favor of an EIT. The countries in dark grey are in favor of the EIT. According to our simulation, 15 countries would vote for an EIT, including Portugal, Romanian and Slovakia, while 12 countries would vote against an EIT, including Denmark, France and Germany. Therefore, by the current rules for the reform in fiscal matters, an EIT cannot be passed as it requires unanimity. This result is not really surprising: since a large part of inequality in the EU exists between countries, there are certainly countries which would loose from an EU-wide redistribution and would thus be against it.

How would it look like if fiscal policy was decided by the double majority rule as it was established in the Lisbon Treaty[10]? The double majority rule says that in order to pass a reform, not only 55 percent of the countries have to be in favor, but they also have to represent at least 65 percent of all EU residents. The first condition is fulfilled

[10] This rule will come into power for most policies (yet not fiscal policy) from 2014 onwards.

for the case of an EU-wide income taxation, since 15 countries represent 55 percent of all 27 member states, but the population of the 15 countries only consists of 34 percent of all EU residents. Therefore, an EIT could not be passed, even if we had the double majority rule. The reason for this is that the poor countries which profit from an EIT are relatively small.

Given recent calls for a Core-Europe or a multi-speed Europe, we also simulate the centralized optimal income taxation for four different EU core groups: 1) EU2: France and Germany, 2) EU6: France, Germany, Belgium, Italy, Luxembourg and the Netherlands, 3) EU15[11] and 4) the Eurozone. Table 3 shows the gains and losses from a centralized taxation for the median voters in different countries and for the different groups. Losses are highlighted and correspond to countries that would be against a centralized taxation. The second-last row gives the percentage of countries in favor of a centralized solution and the last row illustrates the percentage of residents represented by these countries.

We can see from table 3 that a centralized income taxation cannot be passed either by unanimity or by the double majority rule, no matter which group is considered. Even for France and Germany only, which are similar in terms of GDP per capita, a centralized taxation would fail. However, the implied transfers are small compared to those for a larger group. Thus, the currently- observed coordination of Germany and France in fiscal and social policy is not implausible.

Although the centralized taxation cannot be passed in either group, the extent of the losses for the median voter varies significantly between different groups. It tends to grow when the number of member states increases. For example, the median voter in Belgium would loose under an EIT for all 27 member states almost four times more than under a centralized taxation for the EU15. The median voter in Germany looses 1372 Euro under the EIT27, which is almost ten times more than under a centralized taxation for the EU6. These higher losses for the median voter imply that the implementation of a centralized taxation becomes more difficult, because the required compensation in order to pass the reform also increases.

At the same time, however, the implied transfers between the member states increase, when more countries are in the Union. For example, the net transfer per capita for Germany increases from 127 under a centralized taxation for the EU6 to 1900 under the EIT27. The growing value of implied transfers shows that the more countries are included in the Union and the more heterogeneous they are in terms of income and inequality, the more effective is centralized taxation and thus the stronger the need for a

[11] These countries are, in addition to the six founding members: Austria, Denmark, Finland, Greece, Ireland, Portugal, Spain, Sweden and the United Kingdom.

fiscal union. This leads to the controversy we observe: while the need for a fiscal union is stronger, the more countries are included and the more heterogeneous they are, it becomes at the same time more difficult to implement a common fiscal policy.

*Table 3: Gains and Losses for the Median Voter for v = 2*

| Country | EU2 | EU6 | EU15 | Eurozone | EU27 |
|---|---|---|---|---|---|
| France | 101 | -49 | 70 | -607 | -1473 |
| Germany | -156 | -148 | 28 | -661 | -1372 |
| Belgium | | -727 | -639 | -1310 | -2252 |
| Italy | | 968 | 1178 | 482 | -137 |
| Luxembourg | | -16986 | -17218 | -17820 | -19637 |
| Netherlands | | -1889 | -1791 | -2463 | -3387 |
| Austria | | | -1071 | -1741 | -2689 |
| Denmark | | | -4321 | | -6167 |
| Finland | | | -1511 | -2179 | -3155 |
| Greece | | | 3157 | 2452 | 1945 |
| Ireland | | | -5101 | -5774 | -6696 |
| Portugal | | | 4601 | 3890 | 3465 |
| Spain | | | 2146 | 1466 | 854 |
| Sweden | | | -2864 | | -4740 |
| United Kingdom | | | -2041 | | -3474 |
| Cyprus | | | | 2689 | 2120 |
| Estonia | | | | 5596 | 5205 |
| Malta | | | | 5138 | 4605 |
| Slovakia | | | | 5816 | 5311 |
| Slovenia | | | | 3673 | 2979 |
| Bulgaria | | | | | 8150 |
| Czech Republic | | | | | 5010 |
| Hungary | | | | | 5889 |
| Latvia | | | | | 6117 |
| Lithuania | | | | | 6475 |
| Poland | | | | | 6615 |
| Romania | | | | | 7424 |
| % Countries in favour | 50 | 17 | 40 | 53 | 56 |
| % Residents in favour | 44 | 26 | 69 | 42 | 34 |

Could the implementability of a centralized taxation change with different preferences for redistribution than in our focal simulation? We checked for the case of $\upsilon = 0.1$ mid v = 5 for all different groups. The gains and losses of the median voter are given in table 6 and table 7 in the appendix. For all cases, a centralized taxation is not implementable. However, the extent of losses for the median voter tends to increase with the value of v. A higher value of $\upsilon$ implies a stronger distributional preference of the social planer and thus more redistribution under the optimal taxation. Consequently, implementing a centralized taxation becomes more difficult when the distributional preference becomes stronger.

## 6 CONCLUSION

European policy- makers as well as scholars have called for a closer fiscal integration among the member states. Especially during the current crisis the relevance of an integrated European fiscal policy has increased. In this paper, we simulate the optimal European income taxation from a welfare point of view. Our simulation shows that an optimal European redistribution scheme needs to be centrally decided. An EU-wide income taxation implies a strong redistribution from the rich to the poor member states, reducing the income inequality significantly, especially for the poorer countries.

Comparing the implied transfers between countries to the actual transfers illustrates that the implied transfers needed for optimal redistribution are much higher than the ones actually taking place. Additionally, small donors pay less and the newer member states receive less than they should according to our simulation. This is in line with research on the political determinants of EU budget allocation (Rodden, 2002; Aksoy and Rodden, 2009).

If we look at the winners and losers of such an European income tax, the implementation does not seem to be feasible, at least not if we only look at the immediate monetary implications. In addition, we also checked the implementability of a centralized taxation for different EU groups. The comparison reveals the paradox behind a common European fiscal policy: The more heterogeneous member states join the Union, the stronger is the need for a centrally implemented policy to reduce disparities in living standards. Yet, the same factors that increase the demand for an EIT make its implementation less likely.

Our analysis highlights that a centralized European income taxation is not feasible only under monetary considerations. Yet, the recent crisis shows that there are also other factors which scholars and policy-makers should keep in mind. If policy-makers want to create a more equal union, the people of Europe have to either believe in the stabilizing effects of a common fiscal policy or have to show a strong sense of European-wide solidarity. In fact, the political developments during the recent crisis point towards more, not less fiscal integration. Although the Europeans have not taken on Greece as the West Germans have East Germany, they have provided considerable bailout funds, not only for Greece, but also for other indebted member states. The countries moved from a purely monetary union towards a common fiscal policy under the European Stability Mechanism and the Fiscal Compact and even towards a coordinated pension policy as advocated by France and Germany. Thus, the way to more equal living conditions might well emerge from troubled times. As recent research into the history of economic crises illustrates "in periods of deep depression the center of a fiscal union gains more control over fiscal affairs. This process seems to be well under way in the euro area presently" (Bordo and Jonung, 2011, 28).

## REFERENCES

Aksoy, D., and J. Rodden. 2009. “Getting into the game: legislative bargaining, distributive politics, and EU enlargement.” *Public Finance & Management* 9/4.

Atkinson, A. 1970. “The measurement of inequality.” *Journal of Economic Theory* 2:244-263.

Atkinson, T. 2002. “Social Inclusion and the European Union.” *Journal of Common Market Studies* 40/4:625-643.

Bargain, O., M. Dolls, C. Fuest, D. Neumann, A. Peichl, N. Pestel, and S. Siegloch. 2013. “Fiscal union in Europe? Redistributive and stabilizing effects of a European tax-benefit system and fiscal equalization mechanism.” *Economic Policy* 28/75:375-422.

Bordo, M.D., and A.M.L. Jonung. 2011. “A Fiscal Union for the Euro: Some Lessons from History.” *NBER Working Paper* 17380.

Breuss, F. 2009. “Lacking "Europeanisation" of National Business Cycles as a Risk for the Euro Area.” *Austrian Economic Quarterly* 2:91-104.

Casella, A. 2005. “Redistribution policy: A European model.” *Journal of Public Economics* 89:1305-1331.

Commission of the European Communities. 1977. “Report of the study group on the role of public finance in European integratin (MacDougall Report I).”

Council - Commission of the European Communities. 1970. “Report to the Council and the Commission on the realization by stages of economic and monetary union in the Community (Werner Report).”

de la Fuente, A., and R. Domenech. 2001. “The Redistributive Effects of the EU Budget: An Analysis and Proposal for Reform.” *Journal of Common Market Studies* 39/2:307-330.

Farina, F., and R. Tamborini. 2004. ““Set a Sufficiently Ambitious Budget Target and Let the Automatic Stabilizers Work”. Will it Really Work in the European Monetary Union?” *Open economies review* 15:143-168.

Ganghof, S., and P. Genschel. 2008. “Taxation and democracy in the EU.” *Journal of European Public Policy* 15/1:58-77.

Goodspeed, T.J. 2002. “Tax competition and tax structure in open federal economies: Evidence from OECD countries with implications for the European Union.” *European Economic Review* 46:357-374.

Hollande, F. 2012. “Merkel, Hollande discuss bailout ahead of EU summit.” www.france24.com/en/20120627-merkel-hollande-france-germany- economy-eurozone-bailout.

Kauppi, H., and M. Widgren. 2004. “What determines EU decision making? Needs, power or both?” *Economic Policy,* pp. 221-266.

Kopczuk, W., J. Slemrod, and S. Yitzhaki. 2005. “The limitations of decentralized world redistribution: An optimal taxation approach.” *European Economic Review* 49:1051-1079.

Lambert, P.J. 2011. *Social Ethics and Normative Economics*, Marc Fleurbaey and Maurice Salles and John A. Weymark, chap. Positional Equity and Equal Sacrifice: Design Principles for an EU-Wide Income Tax? pp. 241-260.

Mattila, M. 2006. “Fiscal transfers and redistribution in the European Union: do smaller member states get more than their share?” *Journal of European Public Policy* 13/1:34-51.

Obstfeld, M., and G. Peri. 1998. “Regional Nonadjustment and Fiscal Policy: Lessons for EMU.” *NBER Working Paper,* pp. 1-67.

Rodden, J. 2002. “Strength in Numbers? : Representation and Redistribution in the European Union.” *European Union Politics* 3:151-175.

Saez, E., and T. Piketty. 2012. “Optimal labor income taxation.” *NBER Working Paper Series* 18521.

Schneider, C.J. 2010. “Domestic Elections and Distributional Bargaining in the European Union.” Unpublished.

Sprensen, P.B., P. Bacchetta, and B. Jullien. 2000. “The Case for International Tax Co-Ordination Reconsidered.” *Economic Policy* 15/31:429-472.

Wildasin, D.E. 1991. “Income Redistribution in a Common Labor Market.” *The American Economic Review* 81/4:757-774.

# APPENDIX

## Model of Kopczuk, Slemrod and Yitzhaki

This appendix gives additional formal details of the model in section 2. Individuals choose consumption of tradable and non-tradable goods as well as leisure to maximize their utility $u(T, N, L)$, subject to the budget constraint

$$T^D + p_i T^S = G + (1 - t)\, w\,(a)\,(1 - L).$$

The total income of the worker with ability $a$ consists of his after tax labor income and the received transfer $G$, whereby the wage rate is denoted by $w$ and $t$ is the flat-rate of labor tax. The consumption of the two types of goods is given from utility maximization by

$$T^D = \delta\,(G + (1 - t)\, w\,(a)\,(1 - L)),$$
$$N^D = \frac{1 - \delta}{p_i}\,(G + (1 - t)\, w\,(a)\,(1 - L)).$$

Each individual spends the fraction $\delta$ of his total income on tradable goods and the rest on non-tradables. He works only in one sector and the production functions in both sectors are

$$T^s = \int_{S_T} a\,(1 - L\,(a))\, dF\,(a),$$
$$N^s = \int_{S_N} a^d\,(1 - L\,(a))\, dF\,(a).$$

The integration is taken over the set of individuals who work in tradable and non-tradable sector, respectively. The production of tradable goods is equal to the efficiency unit of labor supply, whereas the production of non-tradables depends less on workers' ability, i.e. $0 \leq d < 1$ .

The worker chooses the sector with the higher wage rate to work in and his wage rate is with an ability of a given by

$$w(a) = \begin{cases} a & a > p_i a^d, \\ p_i a^d & \text{otherwise.} \end{cases}$$

The equilibrium of the economy is characterized by the equalization of demand and supply of non-tradable goods. The price of the non-tradable goods determines the sector where the individual works and his wage rate. For given wage rate and tax policy, the labor decision and the consumption of each individual can be solved and thus also the aggregate demand and supply of the non-tradables. Therefore, the price of non-tradable adjusts to bring the economy into equilibrium.

## Tables

*Table 4: Income, Inequality and Transfers across the European Union.*
*PPP exchange-rate adjusted where applicable.*
*Sorted by Transfers per capita. Data from Eurostat for 2007.*

| Country | Pop | GDPpc | Gini | Net Transfers | | | Exch. | PPP |
|---|---|---|---|---|---|---|---|---|
| | million | (PPP) | (Cons.) | million | p.c. | %GDP | Rate | |
| Luxembourg | 0.5 | 68605 | 0.27 | -139.8 | -291 | -0.42 | | 1.11 |
| Netherlands | 16.4 | 33056 | 0.28 | -2864.3 | -175 | -0.53 | | 1.03 |
| Denmark | 5.5 | 30610 | 0.25 | -604.4 | -111 | -0.36 | 7.451 | 1.33 |
| Sweden | 9.1 | 31231 | 0.23 | -994.8 | -109 | -0.35 | 9.25 | 1.16 |
| Germany | 82.3 | 28860 | 0.30 | -7415.2 | -90 | -0.31 | | 1 |
| Belgium | 10.6 | 28876 | 0.26 | -868.2 | -82 | -0.28 | | 1.07 |
| UK | 61.0 | 28985 | 0.33 | -4155.3 | -68 | -0.24 | 0.684 | 1.17 |
| Austria | 8.3 | 30676 | 0.26 | -563.2 | -68 | -0.22 | | 1.04 |
| Prance | 63.8 | 26883 | 0.27 | -2997.3 | -47 | -0.17 | | 1.08 |
| Italy | 59.4 | 25884 | 0.32 | -2013.5 | -34 | -0.13 | | 0.98 |
| Finland | 5.3 | 29355 | 0.26 | -171.6 | -32 | -0.11 | | 1.13 |
| Cyprus | 0.8 | 23133 | 0.30 | -10.5 | -13 | -0.06 | | 0.86 |
| Romania | 21.5 | 10366 | 0.38 | 595.8 | 28 | 0.27 | 3.335 | 0.55 |
| Bulgaria | 7.7 | 10024 | 0.35 | 335.1 | 44 | 0.44 | 1.956 | 0.39 |
| Slovenia | 2.0 | 22100 | 0.23 | 88.6 | 44 | 0.20 | | 0.76 |
| Czech Rep. | 10.3 | 19923 | 0.25 | 656.7 | 64 | 0.32 | 27.766 | 0.61 |
| Malta | 0.4 | 19125 | 0.26 | 28.1 | 69 | 0.36 | | 0.68 |
| Spain | 44.9 | 26169 | 0.31 | 3651.8 | 81 | 0.31 | | 0.88 |
| Slovakia | 5.4 | 16971 | 0.25 | 617.8 | 114 | 0.67 | | 0.66 |
| Poland | 38.1 | 13601 | 0.32 | 5136.4 | 135 | 0.99 | 3.784 | 0.59 |
| Ireland | 4.4 | 36935 | 0.31 | 662.1 | 152 | 0.41 | | 1.15 |
| Hungary | 10.1 | 15570 | 0.26 | 1605.9 | 160 | 1.03 | 251.35 | 0.63 |
| Estonia | 1.3 | 17263 | 0.33 | 226.2 | 169 | 0.98 | | 0.67 |
| Latvia | 2.3 | 13925 | 0.35 | 488.8 | 215 | 1.54 | 0.7 | 0.65 |
| Portugal | 10.6 | 19643 | 0.37 | 2474.4 | 233 | 1.19 | | 0.79 |
| Lithuania | 3.4 | 14746 | 0.34 | 793.2 | 235 | 1.59 | 3.453 | 0.56 |
| Greece | 11.2 | 22925 | 0.34 | 5437.2 | 486 | 2.12 | | 0.87 |
| EU | 496.5 | 24948 | 0.31 | - | - | - | - | - |

*Table 5: Simulated decentralized and centralized optimal tax policies across the 17 Eurozone countries with $\upsilon = 2$*

| Country | Tax Rate | | Demogrant | | Labour Gini | | Consumption Gini | | Mean Labour Supply | | Mean Labour Income | | Mean Consumption | | Per-capita Transfer |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | Dec. | EIT | |
| Austria | 0.33 | 0.38 | 10585 | 9919 | 0.40 | 0.41 | 0.27 | 0.27 | 0.24 | 0.23 | 32478 | 31983 | 32478 | 29675 | -2308 |
| Belgium | 0.31 | 0.38 | 9915 | 9919 | 0.39 | 0.41 | 0.27 | 0.27 | 0.24 | 0.23 | 31658 | 30526 | 31658 | 28775 | -1751 |
| Cyprus | 0.37 | 0.38 | 7119 | 9919 | 0.46 | 0.47 | 0.29 | 0.25 | 0.21 | 0.18 | 19234 | 17425 | 19234 | 20683 | 3258 |
| Estonia | 0.42 | 0.38 | 4501 | 9919 | 0.54 | 0.52 | 0.31 | 0.19 | 0.19 | 0.12 | 10684 | 8988 | 10684 | 15471 | 6483 |
| Finland | 0.33 | 0.38 | 10983 | 9919 | 0.40 | 0.41 | 0.27 | 0.27 | 0.24 | 0.24 | 33699 | 33470 | 33699 | 30594 | -2876 |
| France | 0.33 | 0.38 | 9657 | 9919 | 0.40 | 0.41 | 0.27 | 0.26 | 0.23 | 0.22 | 29163 | 28142 | 29163 | 27303 | -839 |
| Germany | 0.38 | 0.38 | 10554 | 9919 | 0.47 | 0.47 | 0.29 | 0.30 | 0.21 | 0.21 | 27747 | 28118 | 27747 | 27288 | -830 |
| Greece | 0.43 | 0.38 | 7832 | 9919 | 0.55 | 0.54 | 0.31 | 0.29 | 0.18 | 0.17 | 18241 | 17845 | 18241 | 20942 | 3097 |
| Ireland | 0.39 | 0.38 | 15841 | 9919 | 0.49 | 0.47 | 0.30 | 0.35 | 0.20 | 0.25 | 40592 | 44715 | 40592 | 37540 | -7175 |
| Italy | 0.41 | 0.38 | 9711 | 9919 | 0.51 | 0.50 | 0.30 | 0.30 | 0.19 | 0.20 | 23805 | 24082 | 23805 | 24795 | 713 |
| Luxembourg | 0.34 | 0.38 | 25929 | 9919 | 0.42 | 0.39 | 0.28 | 0.33 | 0.23 | 0.29 | 76428 | 87204 | 76428 | 63785 | -23419 |
| Malta | 0.31 | 0.38 | 4209 | 9919 | 0.38 | 0.42 | 0.26 | 0.16 | 0.24 | 0.14 | 13430 | 9555 | 13430 | 15821 | 6266 |
| Netherlands | 0.34 | 0.38 | 11584 | 9919 | 0.42 | 0.42 | 0.28 | 0.29 | 0.23 | 0.23 | 34145 | 34527 | 34145 | 31247 | -3281 |
| Portugal | 0.47 | 0.38 | 6495 | 9919 | 0.60 | 0.58 | 0.32 | 0.26 | 0.16 | 0.14 | 13893 | 13520 | 13893 | 18271 | 4751 |
| Slovakia | 0.31 | 0.38 | 3524 | 9919 | 0.36 | 0.40 | 0.25 | 0.13 | 0.25 | 0.12 | 11535 | 7448 | 11535 | 14520 | 7072 |
| Slovenia | 0.28 | 0.38 | 4922 | 9919 | 0.33 | 0.39 | 0.24 | 0.18 | 0.26 | 0.17 | 17837 | 13351 | 17837 | 18166 | 4815 |
| Spain | 0.39 | 0.38 | 8533 | 9919 | 0.49 | 0.49 | 0.30 | 0.28 | 0.20 | 0.19 | 21856 | 21166 | 21856 | 22994 | 1828 |
| Eurozone | 0.37 | 0.38 | 9660 | 9919 | 0.48 | 0.48 | 0.31 | 0.30 | 0.19 | 0.20 | 26196 | 25946 | 26196 | 25946 | 0 |

*Table 6: Gains and Losses for the Median Voter for $\upsilon = 0.1$*

| Country | EU2 | EU6 | EU15 | Eurozone | EU27 |
|---|---|---|---|---|---|
| France | 101 | 33 | 157 | -445 | -1247 |
| Germany | -156 | -142 | 69 | -523 | -1114 |
| Belgium | | -561 | -471 | -1077 | -1951 |
| Italy | | 733 | 990 | 404 | -75 |
| Luxembourg | | -14683 | -15051 | -15710 | -17695 |
| Netherlands | | -1552 | -1463 | -2070 | -2955 |
| Austria | | | -828 | -1435 | -2342 |
| Denmark | | | -3688 | | -5518 |
| Finland | | | -1222 | -1830 | -2770 |
| Greece | | | 2671 | 2091 | 1749 |
| Ireland | | | -4603 | -5206 | -6037 |
| Portugal | | | 3935 | 3360 | 3114 |
| Spain | | | 1911 | 1315 | 871 |
| Sweden | | | -2361 | | -4189 |
| United Kingdom | | | -1889 | | -3113 |
| Cyprus | | | | 2436 | 2000 |
| Estonia | | | | 4984 | 4775 |
| Malta | | | | 4654 | 4267 |
| Slovakia | | | | 5254 | 4896 |
| Slovenia | | | | 3352 | 2782 |
| Bulgaria | | | | | 7450 |
| Czech Republic | | | | | 4623 |
| Hungary | | | | | 5420 |
| Latvia | | | | | 5594 |
| Lithuania | | | | | 5933 |
| Poland | | | | | 6070 |
| Romania | | | | | 6753 |
| % Countries in favor | 50 | 33 | 40 | 53 | 56 |
| % Residents in favor | 44 | 53 | 69 | 42 | 34 |

*Table 7: Gains and Losses for the Median Voter for v = 5*

| Country | EU2 | EU6 | EU15 | Eurozone | EU27 |
|---|---|---|---|---|---|
| France | 20 | -84 | 14 | -706 | -1605 |
| Germany | -62 | -131 | 29 | -699 | -1494 |
| Belgium | | -836 | -763 | -1481 | -2417 |
| Italy | | 1112 | 1311 | 579 | -153 |
| Luxembourg | | -18321 | -18610 | -19287 | -20830 |
| Netherlands | | -2070 | -1984 | -2704 | -3623 |
| Austria | | | -1219 | -1937 | -2887 |
| Denmark | | | -4764 | | -6608 |
| Finland | | | -1695 | -2411 | -3380 |
| Greece | | | 3437 | 2699 | 2052 |
| Ireland | | | -5467 | -6185 | -7132 |
| Portugal | | | 5023 | 4281 | 3693 |
| Spain | | | 2339 | 1592 | 891 |
| Sweden | | | -3176 | | -5040 |
| United Kingdom | | | -2116 | | -3668 |
| Cyprus | | | | 2880 | 2188 |
| Estonia | | | | 6053 | 5491 |
| Malta | | | | 5495 | 4838 |
| Slovakia | | | | 6218 | 5574 |
| Slovenia | | | | 3881 | 3101 |
| Bulgaria | | | | | 8599 |
| Czech Republic | | | | | 5253 |
| Hungary | | | | | 6186 |
| Latvia | | | | | 6462 |
| Lithuania | | | | | 6826 |
| Poland | | | | | 6974 |
| Romania | | | | | 7842 |
| % Countries in favor | 50 | 17 | 40 | 53 | 56 |
| % Residents in favor | 44 | 5325 | 69 | 42 | 34 |

## Biographical Note

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