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European fiscal solidarity: an EU-wide optimal income tax approach

Laura Seelkopf*

European University Institute,
Via dei Roccettini 9,
I-50014 San Domenico di Fiesole, Italy
Email: laura.seelkopf@EUI.eu
*Corresponding author

Hongyan Yang

Helmut-Schmidt-Universität Hamburg,
Holstenhofweg 85,
22043 Hamburg, Germany
Email: yangh@hsu-hh.de

Abstract: The current financial crisis has brought Europe to a critical juncture. In this paper, we map fiscally the 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 in reducing 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 optimal EU-wide income redistribution across the Union. While the need for centralised 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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Biographical notes: Laura Seelkopf is currently a Jean Monnet Fellow at the Robert Schuman Centre of Advanced Studies at the European University Institute. She works on tax and social policy inside and outside developed economies.

Hongyan Yang worked as a Post-Doc Researcher at the Helmut-Schmidt University Hamburg. She received her PhD in Economics from the University of Konstanz in Germany. She is currently working in tax consultancy in Hamburg.

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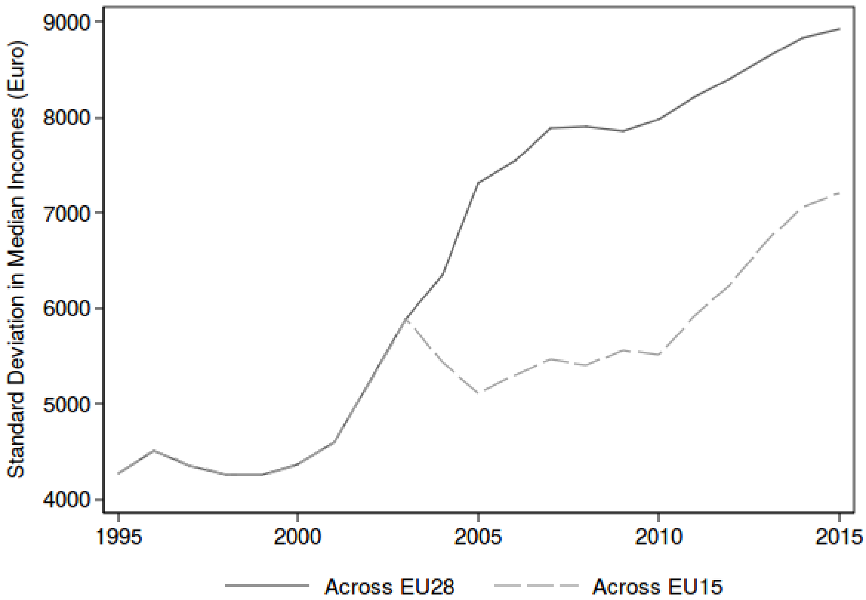
1 Introduction

Europe is at a crossroads. Before the financial crisis, the only way for the European Union (EU) to proceed seemed to be towards 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 or the Front National in France) call for less fiscal and monetary integration and a backwards move to a single market. While this scenario seemed to be ever more likely after the Brexit referendum, Emmanuel Macron's recent victory in France, on a distinctively pro-European ticket, indicates the opposite. The past and present 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" (Hollande, 2012). A look back in time, especially given the relatively small transfers within the EU, illustrates what a world without any EU-wide fiscal redistribution would look like. What is less easy to imagine is the other side of the spectrum and this is what we depict in this article: a fully integrated European tax and welfare state.

While equality in living standards via a common economic and social policy has been envisaged at the European level for decades (Council – Commission of the European Communities, 1970; Commission of the European Communities, 1977), the reality looks different. As Figure 1 illustrates, median incomes across the European member states have increased in their heterogeneity rather than converged. This is even true if we look only at the EU15. EU-wide income inequality (measured by the disposable income Gini) remains around 31, and has even increased slightly since 2005 (EU-SILC Survey, 2017). Hence, market integration and freedom of movement was clearly not enough to equalise the living standards of Europeans across the territory.

Figure 1 Standard deviation in median income across EU15 and EU28



Source: Eurostat (2017)

The aim of this paper is not to argue for or against European fiscal centralisation or propose its exact design, but to illustrate what an *optimal* EU-wide redistribution would look like. Income redistribution takes the form of a flat-rate tax and a lump-sum transfer. We adopt a method by Kopczuk et al. (2005) to simulate the optimal Europe-wide income tax. Based on income distribution in the member states we calculate an optimal European income tax (EIT) and compare it with the simulated optimal decentralised solution (DEC) as well as with current international transfers. From this analysis we draw several conclusions.

First, it is only a centralised EIT that can reduce the large income inequalities between 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. Secondly, 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 she receives now in net EU funds per capita. Third, our calculations show that an EIT cannot be passed if citizens are concerned only about their income. 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, such as the Eurozone. We still find that the implementation of an EIT would not be feasible for monetary considerations alone – although redistribution among a smaller core group makes it less costly. Here, our simulation illustrates the paradox behind a common European fiscal policy: the more unequal member states the Union has, the more necessary is a centralised fiscal policy. Yet at the same time, the increasing number of heterogeneous member states makes an implementation of such an EU-wide policy ever more unrealistic.

While policymakers and intellectuals call more and more for a European "scheme of transnational and interpersonal redistribution" (van Parijs, 2017), the literature on common EU tax policy is concerned largely with the internalisation of negative externalities stemming from closer market integration. Thus, researchers argue in favour of tax harmonisation to avoid competition between member states (Sørensen et al., 2000; Goodspeed, 2002; Ganghof and Genschel, 2008) as well as a coordinated fiscal policy to stabilise the Eurozone (Wildasin, 1991; Obstfeld et al., 1998; Farina and Tamborini, 2004; Breuss, 2009; Bordo et al., 2013; Bargain et al., 2013). Yet any common fiscal policy is thought of as a means to enable national redistribution within member states rather than achieving stronger income equality between member states. European-wide redistributive taxation seems to have entered the scholarly agenda only with the beginning of the fiscal crisis (Lambert, 2011; Bargain et al., 2013).

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), the fairness criterion will shift and redistribution will occur at the European level.

Bargain et al. (2013) simulate 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 it does under the national system. This implies that redistribution across countries happens only by changing the net tax burden of the households. They also show the strong redistributive effects of such an EU-tax. Nevertheless, because of the constraints exercised by national systems, the level of redistribution is much lower than in our analysis.

Different to the existing literature, our paper simulates optimal income taxation for all 27 EU countries, under the single constraint of budget balance in the Union. Our model analyses the optimal level of redistribution across all European residents, no matter what their nationalities are, while in Lambert (2011) and Bargain et al. (2013) 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.

The remainder of the paper is structured as follows: the next section introduces briefly the model of Kopczuk et al. (2005). We then describe our data and discuss our simulation results. The last section concludes.

2 A model of centralised income taxation

In this section we briefly describe the simulation method developed by Kopczuk et al. (2005).[1] The model is based on the standard optimal income taxation theory, which illustrates the trade-off between equity and efficiency. A benevolent government 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 labour income, and there is only one period and one consumption good. Consequently, labour income taxation is the sufficient mean of redistribution.

The government implements its redistributive policy through a flat-rate income tax and a non-individualised lump-sum transfer (demogrant). Such a tax is an indirect progressive taxation. Saez and Piketty (2012) conclude that a proportional tax with a lump-sum transfer is a reasonable first approximation of an actual tax system. The lump-sum transfer can take different forms, such as basic income, food stamps or income tax credit. The optimal policy is calculated by maximising a social welfare function, which is the sum of individual utilities in consumption and leisure. A higher tax rate implies a higher level of redistribution. At the same time, however, it lowers the residents' incentives to work and thus the total income. The optimal income taxation thus balances the gains from a more equal income distribution against the efficiency costs arising from a lower incentive to work.

There exists a continuum of workers who differ only in their abilities. The distribution of abilities is assumed to be log-normal. The economy consists of two sectors, which respectively produce tradable goods T and non-tradable goods N. The price of tradable goods is assumed to be 1, while the price of non-tradable 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 labour to supply in order to maximise 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 $w = a$ and those with a lower ability work in the other sector with a wage rate of $w = p_t a^d$. 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 labour:

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

The sub-utility function in consumption is Cobb-Douglas, with the parameter δ denoting the share of tradable goods in total consumption. The relative importance of consumption to leisure *L* is given by the parameter *a* and the elasticity of substitution between consumption and leisure is determined by γ. The equilibrium of the economy is characterised by the condition that the demand for non-tradables meets the supply; the demand for tradables is equal to the supply plus the net transfer that the country receives, since transfers can only take the form of tradables. Note that transfers received, either as money or as certain goods, can also be spent on non-tradables. This determines the price of non-tradables as well as the 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 and *d*, and two country-specific parameters, i.e., the 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 labour supply in EU-countries of 0.20. For the calibration the tax rate is assumed to be $t = 0.34$ in all countries, which is the unweighted average implicit tax rate on labour in 2007 in EU-countries (see European Commission, 2011: Table 2–3.1). The implicit tax rate on labour is defined as direct taxes, indirect taxes and compulsory actual social contributions paid by employers and employees, on employed labour income (see European Commission, 2011: Box D.2). Including social security contributions allows us to compare countries with tax-financed welfare states to those with mandatory social security systems. Moreover, the government budget constraint is assumed to be fulfilled in all countries so that the country-specific demogrant can be pinned down.

The calibration is done in two steps. First, for given α, δ and *d*, the ability distribution parameters in each country are adjusted to match its mean income and Gini coefficient of consumption. This yields the price of non-tradables and the respective PPP indices. For the next step, the parameters α, δ and *d* are adjusted to generate the average labour supply of 0.20 and to minimise the standard deviation of the simulated PPPs from the actual PPPs. The calibration leads to parameter values of $\delta = 0.79$, $d = 0.12$ and $\alpha = 0.66$.

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): $W = \sum (1-v)^{-1} \cdot u^{1-v}$. Here, *u* is the individual utility and the parameter *v* determines the extent of the redistributive concern. The smaller *v*, the less important is redistribution for the government.[3] For the baseline simulation we use $v = 2$. For robustness checks we set *v* also at other values, as Tables A1 and A2 in the appendix illustrate.

3 An optimal EIT

Our data are from 2007 and stem from Eurostat. 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. Table 1 gives an overview of the EU 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. The columns illustrating the net transfers between the member states show data 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.[4] The operating budgetary balance is taken from the 'EU budget 2009 financial report' (European Commission 2009).

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 EIT. We then discuss the implied transfers between member states via EIT in light of the actual transfers. In the second part we evaluate whether it is possible to implement an EIT across distinct EU core groups.

3.1 Implications of an optimal European income taxation

The simulation results for the optimal taxation for each of the 27 member states and the optimal EU taxation are summarised in Table 2. A higher Gini-coefficient 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. 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 decentralised tax rates in most of the individual member states. This implies that the within country income inequality is lower in 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 decentralised taxation in the poorest EU country, Bulgaria. Yet, it is lower than that of the decentralised system in eleven relatively rich countries. All residents in these eleven countries would lose in the reform of an optimal decentralised taxation to an optimal EIT, because they pay more taxes while receiving a lower lump-sum transfer.

Since the average implicit tax rate used for the calibration includes social security contributions, the simulated optimal tax rates include social security contributions as well. Thus, the demogrants in the model include both lump-sum transfers paid out in cash and benefits from social security programs. The implied between-country transfers by an optimal EIT would be done first on the national level. For countries without public social security systems, the demogrants would be fully paid to individuals, who in turn could decide how much of it to spend on private insurance. In the more realistic case that public social security programs are in place, each government would keep a part of the total demogrants in order to finance (nationally decided) public security programs and pay the rest out to their individual citizens.

Table 1 Income, inequality and transfers across the EU

Country	*Pop (million)*	*GDPpc (PPP)*	*Gini (Cons.)*	*Net transfers*			*Exch. rate*	*PPP*
				Million	*P.C.*	*%GDP*		
Luxembourg	0.5	68,605	0.27	–139.8	–291	–0.42		1.11
Netherlands	16.4	33,056	0.28	–2,864.3	–175	–0.53		1.03
Denmark	5.5	30,610	0.25	–604.4	–111	–0.36	7.451	1.33
Sweden	9.1	31,231	0.23	–994.8	–109	–0.35	9.25	1.16
Germany	82.3	28,860	0.30	–7,415.2	–90	–0.31		1
Belgium	10.6	28,876	0.26	–8,68.2	–82	–0.28		1.07
UK	61.0	28,985	0.33	–4,155.3	–68	–0.24	0.684	1.17
Austria	8.3	30,676	0.26	–563.2	–68	–0.22		1.04
France	63.8	26,883	0.27	–2,997.3	–47	–0.17		1.08
Italy	59.4	25,884	0.32	–2,013.5	–34	–0.13		0.98
Finland	5.3	29,355	0.26	–171.6	–32	–0.11		1.13
Cyprus	0.8	23,133	0.30	–10.5	–13	–0.06		0.86

Note: PPP exchange–rate adjusted where applicable. Sorted by transfers per capita.

Source: Eurostat (2007)

Table 1 Income, inequality and transfers across the EU (continued)

Country	*Pop (million)*	*GDPpc (PPP)*	*Gini (Cons.)*	*Net transfers*			*Exch. rate*	*PPP*
				Million	*P.C.*	*%GDP*		
Romania	21.5	10,366	0.38	595.8	28	0.27	3.335	0.55
Bulgaria	7.7	10,024	0.35	335.1	44	0.44	1.956	0.39
Slovenia	2.0	22,100	0.23	88.6	44	0.20		0.76
Czech Rep.	10.3	19,923	0.25	656.7	64	0.32	27.766	0.61
Malta	0.4	19,125	0.26	28.1	69	0.36		0.68
Spain	44.9	26,169	0.31	3,651.8	81	0.31		0.88
Slovakia	5.4	16,971	0.25	617.8	114	0.67		0.66
Poland	38.1	13,601	0.32	5,136.4	135	0.99	3.784	0.59
Ireland	4.4	36,935	0.31	662.1	152	0.41		1.15
Hungary	10.1	15,570	0.26	1,605.9	160	1.03	251.35	0.63
Estonia	1.3	17,263	0.33	226.2	169	0.98		0.67
Latvia	2.3	13,925	0.35	488.8	215	1.54	0.7	0.65
Portugal	10.6	19,643	0.37	2,474.4	233	1.19		0.79
Lithuania	3.4	14,746	0.34	793.2	235	1.59	3.453	0.56
Greece	11.2	22,925	0.34	5,437.2	486	2.12		0.87
EU	496.5	24,948	0.31	-	-	-	-	-

Note: PPP exchange–rate adjusted where applicable. Sorted by transfers per capita.

Source: Eurostat (2007)

Table 2 Simulated decentralised and centralised optimal tax policies across the 27 EU member states with $v = 2$

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	10,585	9,701	0.40	0.42	0.27	0.27	0.24	0.23	32,478	31,449	32,478	27,933
Belgium	0.31	0.42	9,915	9,701	0.39	0.42	0.27	0.27	0.24	0.22	31,658	29,993	31,658	27,089
Bulgaria	0.45	0.42	1,589	9,701	0.57	0.45	0.32	0.07	0.17	0.07	3,561	3,122	3,561	11,511
Cyprus	0.37	0.42	7,119	9,701	0.46	0.48	0.29	0.24	0.21	0.17	19,234	16,995	19,234	19,554
Czech Republic	0.32	0.42	3,923	9,701	0.38	0.43	0.26	0.14	0.24	0.12	12,312	8,164	12,312	14,434
Denmark	0.32	0.42	13,273	9,701	0.38	0.39	0.26	0.28	0.24	0.25	41,650	42,325	41,650	34,239
Estonia	0.42	0.42	4,501	9,701	0.54	0.54	0.31	0.18	0.19	0.12	10,684	8,709	10,684	14,750
Finland	0.33	0.42	10,983	9,701	0.40	0.41	0.27	0.27	0.24	0.23	33,699	32,921	33,699	28,787
France	0.33	0.42	9,657	9,701	0.40	0.42	0.27	0.26	0.23	0.22	29,163	27,627	29,163	25,718
Germany	0.38	0.42	10,554	9,701	0.47	0.48	0.29	0.30	0.21	0.21	27,747	27,605	27,747	25,705
Greece	0.43	0.42	7,832	9,701	0.55	0.55	0.31	0.28	0.18	0.16	18,241	17,434	18,241	19,808
Hungary	0.32	0.42	3,187	9,701	0.38	0.42	0.26	0.11	0.24	0.10	10,001	6,046	10,001	13,206
Ireland	0.39	0.42	15,841	9,701	0.49	0.48	0.30	0.35	0.20	0.24	40,592	44,112	40,592	35,275
Italy	0.41	0.42	9,711	9,701	0.51	0.51	0.30	0.30	0.19	0.19	23,805	22,977	23,805	23,611
Latvia	0.45	0.42	3,680	9,701	0.57	0.55	0.32	0.16	0.17	0.10	8,192	6,476	8,192	6,723
Lithuania	0.42	0.42	3,229	9,701	0.54	0.51	0.31	0.13	0.19	0.09	7665	5,627	7,665	5,836
Luxembourg	0.34	0.42	25,929	9,701	0.42	0.40	0.28	0.34	0.23	0.29	76,428	86,451	76,428	59,821
Malta	0.31	0.42	4,209	9,701	0.38	0.44	0.26	0.15	0.24	0.13	13,430	9,019	13,430	9,216
Netherlands	0.34	0.42	11,584	9,701	0.42	0.43	0.28	0.29	0.23	0.23	34,145	32,831	34,145	33,970
Poland	0.41	0.42	3,046	9,701	0.51	0.49	0.30	0.12	0.19	0.09	7,467	5,218	7,467	5,397
Portugal	0.47	0.42	6,495	9,701	0.60	0.59	0.32	0.26	0.16	0.14	13,893	12,769	13,893	13,186
Romania	0.47	0.42	2,378	9,701	0.62	0.53	0.33	0.11	0.16	0.08	5,030	4,177	5,030	4,366
Slovakia	0.31	0.42	3,524	9,701	0.36	0.41	0.25	0.12	0.25	0.12	11,535	6,972	11,535	7,141
Slovenia	0.28	0.42	4,922	9,701	0.33	0.40	0.24	0.17	0.26	0.16	17,837	12,609	17,837	12,934
Spain	0.40	0.42	8,620	9,701	0.49	0.50	0.30	0.28	0.20	0.18	21,719	20,095	21,719	20,710
Sweden	0.28	0.42	10,670	9,701	0.34	0.36	0.24	0.25	0.26	0.24	38,369	35,259	38,369	36,591
UK	0.41	0.42	13,050	9,701	0.52	0.51	0.30	0.34	0.19	0.22	31,708	32,601	31,708	33,662
EU	0.37	0.42	8,872	9701	0.52	0.54	0.36	0.30	0.18	0.18	23,724	22,355	23,724	23,083

The consumption Gini-coefficient for the EU is 0.36 in an optimal decentralised system, while an EU-wide taxation reduces it to 0.30. Interestingly, almost all poor countries have a higher income tax rate under national taxation than under the EIT, implying that the former cannot reduce their inequality much, only an EIT can do so. In Bulgaria, the Gini-coefficient in consumption is reduced from 0.32 under a decentralised 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 before-tax labour income for the EU from 0.52 under the decentralised taxation, to 0.54. Again, because of the strong redistribution from rich to poor countries, the average labour supply in poor countries decreases because of the dominating income effect, while the average labour supply in three rich countries actually increases (Denmark, Ireland and Luxembourg).

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

Table 3 Simulated and real transfers per capita in the EU

	Transfer P.C.		*Simulated/actual*
	Simulated	*Actual*	
Donor countries			
Luxembourg	–2,6630	–291	92
Ireland	*–8,837*	*152*	*–58*
Denmark	–8,086	–111	73
Sweden	–5,676	–109	52
Netherlands	–4,575	–175	26
UK	–4,445	–68	65
Finland	–4,134	–32	129
Austria	–3,516	–68	52
Belgium	–2,904	–82	35
Germany	–1,900	–90	21
France	–1,910	–47	41
Italy	–222	–34	7
Recipient countries			
Spain	997	81	12
Greece	2,374	486	5
Cyprus	*2,559*	*–13*	*–197*
Portugal	4,159	233	18
Slovenia	4,265	44	97

Note: Sorted by simulated transfers.

Table 3 Simulated and real transfers per capita in the EU (continued)

	Transfer P.C.		*Simulated/actual*
	Simulated	*Actual*	
Recipient countries			
Malta	5,828	69	84
Estonia	6,041	169	36
Czech Republic	6,270	64	98
Slovakia	6,700	114	59
Latvia	6,875	215	32
Hungary	7,160	160	45
Lithuania	7,248	235	31
Poland	7,433	135	55
Romania	7,866	28	281
Bulgaria	8,388	44	191

Note: Sorted by simulated transfers.

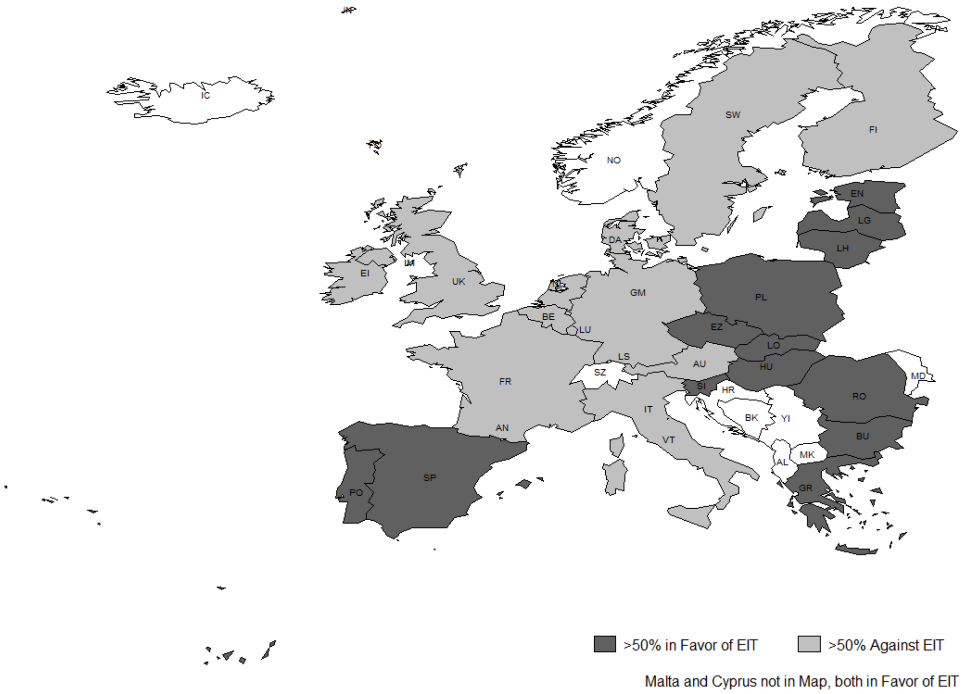
What does the optimal EIT imply for the transfers between EU countries? The implied transfers per capita are shown in Table 3, ordered from the highest payment to the lowest. Luxembourgers would pay the highest transfers while Bulgarians would receive the highest transfers, according to our simulation. Moreover, 12 countries would pay and the other 15 countries would be recipients. In sum, only a common EIT is able to effectively reduce income inequality. Because of the higher income inequality between, rather than within, member states, a decentralised solution cannot do so.

3.2 Is it possible to implement an optimal EIT?

Given that fiscal policy decisions at the EU-level follow the unanimity rule, implementing a centralised income distribution is not deemed possible. Nevertheless, we are interested in how it would look like if the decision would shift to majority rule and difficult its implementation is, in terms of how many countries lose and how much they lose in the centralised income redistribution. We apply the median-voter theory and deduce the position of an individual country by looking at whether and how much the median voter would win or lose from centralised taxation. We also check the feasibility of centralised taxation for different EU country groups and for different extents of redistributional concern (i.e., for different values of v).

Figure 2 highlights the winners and losers from an EIT. The countries in light grey are those in which the resident at the 50th percentile loses in an EIT compared to the decentralised solution. Since the resident at the 50th percentile is the median voter, we argue that the countries whose median voter loses from an EIT are against an EIT and the countries whose median voter wins are in favour of an EIT. The countries in dark grey are in favour 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, an EIT cannot be passed as it requires unanimity.

Figure 2 Winners and losers in a centralised EIT system for the 27 EU member states



Given recent calls for a Core-Europe, or a multi-speed Europe, we also simulate the centralised 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[5]

4 the Eurozone.

Table 4 shows the gains and losses from centralised taxation for the median voters in different countries and for the different groups. Losses are highlighted and correspond to countries that would be against centralised taxation.

We can see from Table 4 that centralised income taxation cannot be passed either, no matter which group is considered. Nevertheless, 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 lose under an EIT for all 27 member states almost four times more than under centralised taxation for the EU15. The median voter in Germany loses 1,372 Euro under the EIT27, which is almost ten times more than under centralised taxation for the EU6. These higher losses for the median voter imply that the implementation of centralised taxation becomes more difficult, because the required compensation in order to pass the reform also increases.

Table 4 Gains and Losses for the median voter for $v = 2$

Country	*EU2*	*EU6*	*EU15*	*Eurozone*	*EU27*
France	101	–49	70	–607	–1,473
Germany	–156	–148	28	–661	–1,372
Belgium		–727	–639	–1,310	–2,252
Italy		968	1,178	482	–137
Luxembourg		–1,6986	–1,7218	–17,820	–19,637
Netherlands		–1,889	–1,791	–2,463	–3,387
Austria			–1,071	–1,741	–2,689
Denmark			–4,321		–6,167
Finland			–1,511	–2,179	–3,155
Greece			3,157	2,452	1,945
Ireland			–5,101	–5,774	–6,696
Portugal			4,601	3,890	3,465
Spain			2,146	1,466	854
Sweden			–2,864		–4,740
UK			–2,041		–3,474
Cyprus				2,689	2,120
Estonia				5,596	5,205
Malta				5,138	4,605
Slovakia				5,816	5,311
Slovenia				3,673	2,979
Bulgaria					8,150
Czech Republic					5,010
Hungary					5,889
Latvia					6,117
Lithuania					6,475
Poland					6,615
Romania					7,424
% Countries in favour	*50*	*17*	*40*	*53*	*56*
% Residents in favour	*44*	*26*	*69*	*42*	*34*

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 centralised taxation for the EU6, to 1,900 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 centralised taxation and thus the need for fiscal union is stronger. This leads to the controversy we observe: while the need for fiscal union is stronger, the more countries that are included and the more heterogeneous they are, the more difficult it becomes to implement a common fiscal policy.

Could the feasibility of centralised taxation change with different preferences for redistribution than in our focal simulation? We checked for the case of $v = 0.1$ and $v = 5$ for all different groups. The gains and losses of the median voter are given in Table A1 and Table A2 in the appendix. For all cases, centralised 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 v implies a stronger distributional preference of the social planner and thus more redistribution under the optimal taxation. Consequently, implementing centralised taxation becomes more difficult when the distributional preference becomes stronger.

4 Conclusions

In this paper, we simulate the optimal European income tax and show that an optimal European redistribution scheme needs to be decided upon centrally. An EU-wide income taxation implies a strong redistribution from the rich to the poor member states, reducing income inequality significantly, especially for 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 those that actually take place.

So far the EU-transfers have been mostly granted to financing infrastructure investments, whereas our model of redistribution implies unconditional transfers. This could cause problems such as insufficient investments or bailout expectations. However, conditional transfers also face problems such as principal-agent problems and corruption. Although our paper focuses only on redistribution and there is no investment decision in our model, a flat-tax plus demogrant system would imply that the governments redistribute the transfers to their residents (eventually after financing public social security programs), who then decide over how much of their resources to spend on labour, investment and consumption. This would leave less scope for corruption than the current system and should increase the acceptance of a Europe-wide redistribution scheme.

If we look at the winners and losers of such an income tax in Europe, implementation does not seem to be feasible, at least not if we look only at the immediate monetary implications. In addition, we also checked the feasibility of centralised 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 centralised European income taxation is not feasible if only monetary considerations are at play. Yet, the recent crisis shows that there are also other factors which scholars and policymakers should keep in mind. If policymakers want to create a more equal union, the people of Europe have to believe either in the stabilising effects of a common fiscal policy or have to show a strong sense of European-wide solidarity. 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. Countries have 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 centre of a fiscal union gains more control over fiscal affairs. This process seems to be well under way in the euro area presently" [Bordo et al., (2013), p.483].

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Notes

1 Please see the online appendix for more details or Kopczuk et al. (2005).

2 Since Estonia started the flat tax revolution more and more countries, especially in Eastern Europe have introduced a flat tax. Also Western European countries such as Germany have been discussing its introduction. Although the most member states still have a directly progressive system, we use a flat tax in our simulation for reasons of simplicity. Moreover, a more flexible taxation system, such as a direct progressive taxation, would imply an even stronger redistribution. Thus, our results on the difficulty in implementing the centralised income taxation would only be strengthened.

3 For $v = 0$, we have a utilitarian welfare function and for $v = \infty$ we have a Rawlsian welfare function. If $v = 1$ the welfare function becomes $\sum \ln U$.

4 These include agricultural subsidies to farmers and fishers, money from the European 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 programs is justified, regardless of what the declared goals of the program are (Mattila 2006).

5 These countries are, in addition to the six founding members: Austria, Denmark, Finland, Greece, Ireland, Portugal, Spain, Sweden and the UK.

Appendix

A1 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 maximise their utility $u(T, N, L)$, subject to the budget constraint

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

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

$$T^D = \delta\big(G + (1-t)w(a)(1-L)\big),$$

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

Each individual spends the fraction 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

$$T^s = \int_{S_T} a\big(1 - L(a)\big)\, dF(a),$$

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

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

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

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

The equilibrium of the economy is characterised by the equalisation 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 labour 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 goods adjusts to bring the economy into equilibrium.

Table A1 Gains and losses for the median voter for $v = 0.1$

Country	*EU2*	*EU6*	*EU15*	*Eurozone*	*EU27*
France	101	33	157	–445	–1,247
Germany	–156	–142	69	–523	–1,114
Belgium		–561	–471	–1,077	–1,951
Italy		733	990	404	–75
Luxembourg		–14,683	–15,051	–15,710	–17,695
Netherlands		–1,552	–1,463	–2,070	–2,955
Austria			–828	–1,435	–2,342
Denmark			–3,688		–5,518
Finland			–1,222	–1,830	–2,770
Greece			2,671	2,091	1,749
Ireland			–4,603	–5,206	–6,037
Portugal			3,935	3,360	3,114
Spain			1,911	1,315	871
Sweden			–2,361		–4,189
UK			–1,889		–3,113
Cyprus				2,436	2,000
Estonia				4,984	4,775
Malta				4,654	4,267
Slovakia				5,254	4,896
Slovenia				3,352	2,782
Bulgaria					7,450
Czech Republic					4,623
Hungary					5,420
Latvia					5,594
Lithuania					5,933
Poland					6,070
Romania					6,753
% Countries in favour	*50*	*33*	*40*	*53*	*56*
% Residents in favour	*44*	*53*	*69*	*42*	*34*

Table A2 Gains and losses for the median voter for $v = 5$

Country	*EU2*	*EU6*	*EU15*	*Eurozone*	*EU27*
France	20	–84	14	–706	–1,605
Germany	–62	–131	29	–699	–1,494
Belgium		–836	–763	–1,481	–2,417
Italy		1,112	1,311	579	–153
Luxembourg		–18,321	–18,610	–19,287	–20,830
Netherlands		–2,070	–1,984	–2,704	–3,623
Austria			–1,219	–1,937	–2,887
Denmark			–4,764		–6,608
Finland			–1,695	–2,411	–3,380
Greece			3,437	2,699	2,052
Ireland			–5,467	–6,185	–7,132
Portugal			5,023	4,281	3,693
Spain			2,339	1,592	891
Sweden			–3,176		–5,040
UK			–2,116		–3,668
Cyprus				2,880	2,188
Estonia				6,053	5,491
Malta				5,495	4,838
Slovakia				6,218	5,574
Slovenia				3,881	3,101
Bulgaria					8,599
Czech Republic					5,253
Hungary					6,186
Latvia					6,462
Lithuania					6,826
Poland					6,974
Romania					7,842
% Countries in favour	*50*	*17*	*40*	*53*	*56*
% Residents in favour	*44*	*25*	*69*	*42*	*34*