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The increase of wealth inequality in many EU countries has spurred interest in wealth taxation. While taxes on wealth for a long time have played only a marginal role in the public finance and taxation literature, more recently a variety of arguments are brought forward in favour of (higher) wealth taxation. At the same time, tax competition has led to an almost complete disappearance of recurrent net wealth taxes in Europe. By dealing with non- and under-reporting in the Household and Consumption Survey (HFCS) data set provided by the European Central Bank, we are able to estimate the wealth distribution within 20 EU countries and the revenue potential of a progressive EU-wide net wealth tax.

# A European Net Wealth Tax

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## Abstract

The increase of wealth inequality in many EU countries has spurred interest in wealth taxation. While taxes on wealth for a long time have played only a marginal role in the public finance and taxation literature, more recently a variety of arguments are brought forward in favour of (higher) wealth taxation. At the same time, tax competition has led to an almost complete disappearance of recurrent net wealth taxes in Europe. By dealing with non- and under-reporting in the Household and Consumption Survey (HFCS) data set provided by the European Central Bank, we are able to estimate the wealth distribution within 20 EU Member States and the revenue potential of a progressive EU-wide net wealth tax.

# 1   Introduction[1]

Although the taxation of wealth has a longer tradition and history in tax practice compared to other taxes such as the personal income and the corporate tax, and although it has been and still is hotly debated in the political discourse, it has traditionally attracted surprisingly little attention in the public finance and taxation literature (Cremer and Pestieau, 2011). Only recently, against the background of increasing wealth inequality (Piketty and Zucman, 2015; Alvaredo et al., 2017), which is exceeding income inequality in most industrialised countries (Keeley, 2015; Brys et al., 2016), the taxation of top incomes and wealth has moved up the agenda: in the academic literature (see, e.g., Atkinson/Piketty, 2010; Boadway et al., 2010; Cremer and Pestieau, 2011; Kopzcuk, 2013; Piketty, 2014; Kuypers et al., 2018) as well as in more policy-oriented contributions (see, e.g., Iara, 2015; IMF, 2013, 2017). This is not least due to the fact that tax policy is one determinant of growing income and wealth inequality, due to the continuous erosion of the progressivity of tax systems over the last decades (Förster et al., 2014; Alvaredo et al., 2017). In particular, there is renewed interest in the taxation of net wealth, which currently is applied in only very few countries worldwide.

A common objection against a tax on net wealth is that it cannot be enforced effectively on the national level due to tax avoidance and tax competition based on the international mobility of assets (Boadway, et al., 2010). However, as Cremer and Pestieau (2011) point out, this (at least with regard to financial assets) valid argument should not lead to the conclusion that the tax should be eliminated, but rather calls for strengthening international cooperation. Remarkably practically no proposals of an internationally coordinated approach to implement a net wealth tax can be found in the literature: one rare exception being Thomas Piketty's (2014) concept of a progressive global wealth tax, or at least a European wealth tax in a first step to counter the ongoing erosion of wealth taxation. Our paper estimates the potential revenues of a net wealth tax introduced in a harmonised design on an EU-wide basis. We thus address another common argument against a net wealth tax, namely that its revenue potential is limited.

The paper very briefly reviews the most important pros and cons of wealth-related taxes in general and net wealth taxes in particular (chapter 2). We then provide an overview of the current situation with regard to wealth-based taxes in Europe in general and net wealth taxes in particular (chapter 3). In chapter 4, based on the European Central Bank's Household and

Consumption Survey (HFCS, second wave), the revenue potential of an EU-wide net wealth tax is estimated. Chapter 5 concludes.

## 2   The net wealth tax – a disputed tax

For a long time taxes on wealth have played only a marginal role in the public finance and taxation literature. The standard result of optimal capital income taxation theory, namely a zero capital income tax rate (Atkinson and Stiglitz, 1976; Judd, 1985; Chamley, 1986), was extended to a wealth tax, which is seen as equivalent to a tax on capital income. Only recently the Atkinson-Stiglitz and the Chamley-Judd result of zero optimal capital taxation has been challenged by several theoretical papers arguing for positive capital income taxes (see in particular Diamond and Saez, 2011; Piketty and Saez, 2012; Saez and Stantcheva, 2016). Related is a growing body of current research bringing forward a variety of arguments in favour of (higher) wealth taxation.

One first justification for wealth-based taxes is their relative growth-friendliness. Recent cross-country econometric analyses (e.g. Arnold et al., 2011; Acosta et al., 2012[2]) lend strong support to the hypothesis that wealth-related taxes represent the comparatively least growth-damaging tax category. As their impact on individual decisions about labour supply and investment in (human) capital is rather limited, (certain) wealth-related taxes should have relatively small growth-inhibiting effects. According to the "tax and growth-hierarchy" corroborated empirically by these studies, a revenue-neutral shift of the tax burden towards taxes on wealth, in particular away from taxes on earnings, would improve tax systems' overall growth-friendliness. Related is the argument that increasing wealth inequality can be expected to impact negatively on economic growth via various channels (Bagchi and Svejnar, 2013; Ostry et al., 2014; Cingano, 2014; Iara, 2015; Stiglitz, 2016): among them a negative impact of wealth concentration on equality of opportunity (Keeley, 2015).

Another argument for the taxation of wealth is based on distributional considerations. Wealth, besides income and consumption, is a central indicator for individual taxpayers' taxable capacity (Messere et al., 2003; Kuypers et al., 2018). The IMF (2013) even regards wealth as better ability-to-pay indicator than income. Wealth adds to the ability to pay by increasing prestige as well as individual security and options for economic and political influence (Iara, 2015). An increasing number of authors argue for a joint income-wealth-perspective in distributional analysis and accordingly the design of socially inclusive tax systems.[3] Recently, deepening wealth inequality has provoked the call for more redistribution by tax policy in general and by wealth taxes in particular: the more as the general progressivity of tax systems has been declining since the beginning of the 1980s in many OECD and EU countries (Piketty et al., 2013; Förster, et al., 2014; Brys et al., 2016; IMF, 2017; Alvaredo et al., 2017). Piketty et al. (2013) point out that income flows often cannot be determined easily particularly for top

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[2] For a more critical perspective see Xing (2012) and Baiardi et al. (2017).

[3] See Kuypers et al. (2018) and the literature cited therein.

wealth holders, which provides an important rationale for a progressive wealth tax. Also negative social and political externalities of growing income and particularly wealth inequality are increasingly attracting the attention of economists (Stiglitz, 2012, 2016; Atkinson, 2015), motivating the taxation of wealth beyond the traditional distributional arguments (see, e.g., Kopczuk, 2010).

That net wealth taxes have been phased out in most European and OECD countries during the last decades (most recently in France as of 2018), and that a number of other countries refused to introduce them in the first place (see chapter 3 for details), was motivated by several arguments: the most relevant ones, as illustrated by a survey conducted by the OECD in the end of the 1970s among 21 OECD countries (OECD, 1979), being valuation difficulties and costs of tax collection, as well as double taxation issues and the impossibility to enforce net wealth taxes due to tax base mobility.

Evaluation difficulties are one of the most common arguments against a recurrent net wealth tax (see, e.g., Boadway et al., 2010). Indeed there is only scant empirical evidence on tax collection costs in general and for net wealth taxes in particular: which does not only have to do with methodological and data problems, but also with the low worldwide prevalence of net wealth taxes and their sometimes rather short life span. According to a brief survey over three older studies for Germany prepared by the Scientific Advisory Council of the German Ministry of Finance, collection costs of the German net wealth tax, which was abolished in 1997, in relation to its revenues were substantially higher compared to other taxes (Wissenschaftlicher Beirat, 2013). Sandford and Morrissey (1985) obtain similar results for the Irish net wealth tax levied from 1975 to 1978.

Piketty et al. (2013) point out that for top wealth holders, net wealth taxes may be less costly in terms of collection costs compared to income taxation if market values are available or can be determined more easily. Moreover, recent progress in information and communication technology should enable a significant reduction of tax collection costs. It is often argued that the comparatively high collection costs of wealth-based taxes in general and of net wealth taxes in particular are particularly problematic in face of their relatively limited proceeds. Indeed, the data presented in section 3.1 below shows that wealth taxes in general and net wealth taxes in particular have never raised and are still not raising substantial revenues. However, this appears to be rather the result of tax avoidance and of the general reluctance of governments to levy wealth-based taxes at all and to do so at substantial tax rates and on a broad tax base. At the same time, levying wealth taxes on the very wealthy few would reduce collection costs relative to tax revenues.

A second point of criticism against a net wealth tax is related to issues of double taxation resulting from the taxation of assets on the one hand and of capital incomes derived from these assets on the other hand. The severity of double taxation depends on net wealth tax rates on the one hand and on capital income tax rates on the other hand. As a general trend, the tax burden on capital incomes has been reduced all over the EU in the last few decades. Between 1998 and 2015, the EU28 (EU15) average tax rate for interest incomes has

been decreased from 23.5 (33.3) percent to 22.2 (28.7) percent and for dividend incomes from to 26.3 (36.3) percent to 21.9 (28.4) percent. At an EU28 (EU15) average of 39.2 (50.2) percent, top income tax rates on earned income are substantially higher compared to capital income tax rates in 2015. In some Member States this is the result of the introduction of flat income taxes (Keen et al., 2006; Nicodème, 2007; Evans and Aligica, 2008), while all EU Member States applying directly progressive income tax schedules have to some degree dualised their personal income tax systems (Schratzenstaller, 2004), taxing all or at least some kinds of capital incomes at source at rather moderate and proportional rates which are considerably lower than top income tax rates applied on earned income and other (e.g. pension) incomes. Moreover, most income tax systems do not tax imputed rents at all or only moderately (Fatica and Prammer, 2017). Thus the "ideal" of comprehensively and progressively taxing all types of income regardless of their source, on which particularly Western European personal income tax systems have traditionally been based on, has been substantially eroded during the last three decades, creating a taxation gap leaving room for a net wealth tax. Moreover, for those capital incomes which have not been taxed properly due to exemptions or tax evasion, a net wealth tax will act as a complementary tax (Piketty et al., 2013). For properly taxed capital incomes, the combined tax burden from a net wealth tax and capital income taxes can be limited by introducing a cap, as in the French example.

Another strong objection against a net wealth tax is the fear that mobile capital cannot be taxed effectively in open economies, as tax subjects relocate their assets to avoid the tax (Messere et al., 2003; Owens, 2006; Boadway et al., 2010). Growing cross-border mobility of financial assets as well as the rise of tax havens, facilitated by the emergence of information and communication technology and the elimination of formal barriers to cross-border capital transfers (e.g. capital controls), have indeed rendered the effective enforcement of net wealth taxes increasingly difficult. This is one of the main reasons why economists as well as international organisations (see, e.g., IMF, 2011) in the majority advocate against the introduction of net wealth taxes or recommend replacing them by taxes on less mobile wealth, in particular by a property tax on real estate.

Generally, there is scant empirical evidence on the economic effects of net wealth taxes (Kopczuk, 2013), regarding extent and consequences of international net wealth tax competition as well as elasticities of taxable wealth. In the last years, a few authors undertook to identify the impact of net wealth taxes on real economic activity (as for example wealth accumulation and entrepreneurship) on the one hand and on taxable, i.e. reported wealth on the other hand. It is still a matter of dispute in the literature whether a net wealth tax primarily affects real economic decisions or just reduces reported wealth due to tax avoidance and/or evasion.[4] Among the small body of recent research is the study by Seim (2017), who estimates net-of-tax-rate elasticities of taxable wealth between 0.09 and 0.27 for Sweden. Further analysis suggests that about one third of the estimated elasticities is caused

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[4]  See Brülhart et al. (2017) for a review of the very few existing studies and their limitations.

by under-reporting of asset values, and that tax-payers rather respond by tax evasion and avoidance than by adjusting their savings.

Moreover, studies disentangling the various tax avoidance channels via which reported wealth is reduced are missing. Existing empirical evidence on reported wealth does not allow to identify and to quantify international capital flight as one distinct tax avoidance/evasion channel. There are no econometric analyses directly addressing the question whether net wealth taxes lead to outflows of mobile capital.

However, two kinds of evidence for some impact of wealth taxation on the relocation of assets exist. First, recent estimations suggest that considerable amounts of private wealth are hidden in tax havens; whereby one central motivation quite obviously is to escape taxation (see, e.g., Lane and Milesi-Ferretti, 2010; Zucman, 2014; Johannesen and Zucman, 2014). Secondly, several case studies corroborate the theoretical expectation that wealth taxes cause (illicit) offshore transfers of assets. After the abandonment of all foreign exchange controls in Sweden in 1989, for example, an outflow of large fortunes to tax havens like Switzerland or Luxemburg could be observed, providing one strong motivation for the government to discontinue the net wealth tax in 2007 (Henreksen and Du Rietz, 2014). Pichet (2007) finds a considerable volume of capital flight out of France since the introduction of the French net wealth tax.

A recent study by Brülhart et al. (2017) for Switzerland gives support to the plausible assumption that the effect of net wealth taxes on reported wealth is the more pronounced the more integrated the regions involved are. According to the authors' estimations, the semi-elasticity of reported wealth with respect to the net wealth tax rate amounts to 0.35 in aggregate, i.e. a rise in wealth taxation by one percentage point would decrease reported wealth by 35 percent. Moreover, Brülhart et al. (2017) find that financial assets seem to be more responsive to net wealth taxation than non-financial assets. They interpret their results as suggesting that wealth holders primarily respond by reducing their wealth holdings, not by moving to jurisdictions with lower tax rates.[5] Again, these analyses do not uncover the channels via which wealth holdings are lowered. As indicated above, reported wealth holdings may be reduced by real responses (i.e. by lowering accumulation of wealth) or by decreasing reported wealth through hiding it from tax authorities. Which one of these mechanisms is working in the Swiss case cannot be determined without further analysis, e.g. by exploring whether there is some relationship between the savings rate and the taxation of net wealth.

We therefore interpret the existing empirical results as not contradicting our assumption that tax subjects' reactions make it increasingly difficult to enforce a tax on net wealth in a purely

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[5] To our knowledge the Brülhart et al. (2017) study is the only one investigating potential effects of net wealth taxes on locational choices of taxpayers. Their finding of low tax-induced mobility corresponds well to the results of the few existing empirical analyses determining the impact of estate or inheritance taxes on locational choices, which generally show very modest effects (see Brülhart and Parchet (2014) for Switzerland, and Smith Conway and Rork (2006) for the United States).

national context. Responses by taxpayers probably take the form of manipulations of reported wealth via various channels including hiding wealth abroad in low- or no-tax jurisdictions rather than moving tax payers' locations abroad. Although there is no systematic and elaborated empirical evidence on international net wealth tax competition, the development of wealth taxation in Europe during the last few decades lends some support to the hypothesis that a race-to-the-bottom-type of tax competition based on the international mobility particularly of financial assets has led to the almost complete disappearance of net wealth taxes and the observable shift within wealth taxation towards property taxes on immobile real property (see chapter 3). The tax base elasticities and low mobility of tax payers found in the existing empirical studies suggest that at least part of this specific downward tax competition in the realm of net wealth taxes may be – following Brülhart and Parchet (2014) – characterised as "alleged" tax competition. However, in combination with the still extensive options to make use of tax havens worldwide to hide wealth from domestic tax authorities (Zucman, 2014), this tax competition – be it alleged or actually existing – calls for a supranationally coordinated approach.

# 3 Current situation of wealth taxation in the EU

## 3.1 Revenues from wealth-related taxes: size and structure

Wealth-related taxes play a minor role within overall tax systems in the EU, gauged by their shares in overall tax revenues as well as in GDP (see Graph 1). In 2014, wealth-related taxes yield 4.3 percent of overall tax revenues and 1.6 percent of GDP on average for the EU28. In the euro area (EA19), wealth-related taxes make up for 4.2 percent of overall tax revenues and 1.6 of GDP, in the EU15 they amount to 5.8 percent of overall tax revenues and 2.2 percent of GDP. Although their weight has slightly increased compared to 2002, the contribution of wealth taxes to public budgets is rather modest.

The use of the various options for wealth-related taxes differs considerably in the EU (Ernst & Young, 2014). The property tax on real estate is levied in 25 EU Member States. An inheritance and gift tax exists in 20, and a real estate acquisition tax in 21 Member States. A net wealth tax has become an exception in the EU, notably in parallel to the erosion of capital income taxation discussed in section 2.3.2. Accordingly, the structure of overall revenues from wealth-related taxes has shifted considerably in the longer run (see Graph 2).

*Graph 1: Wealth-related taxes in the EU, 2002 and 2014*
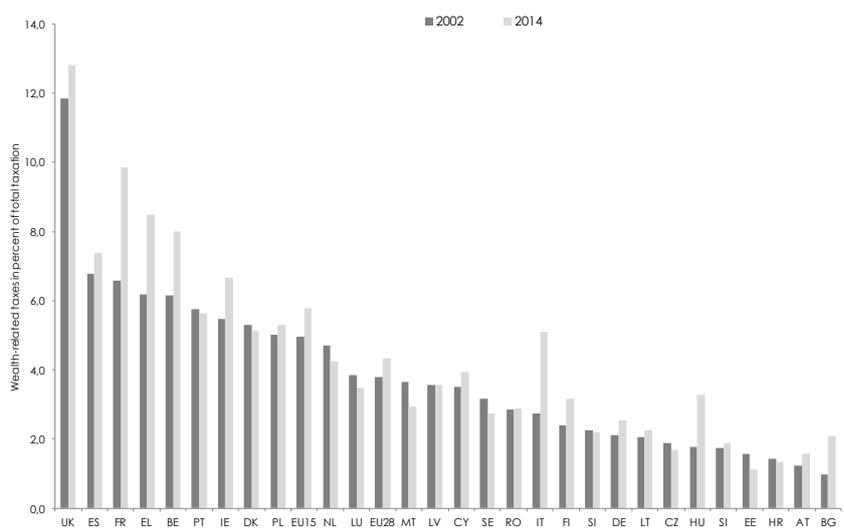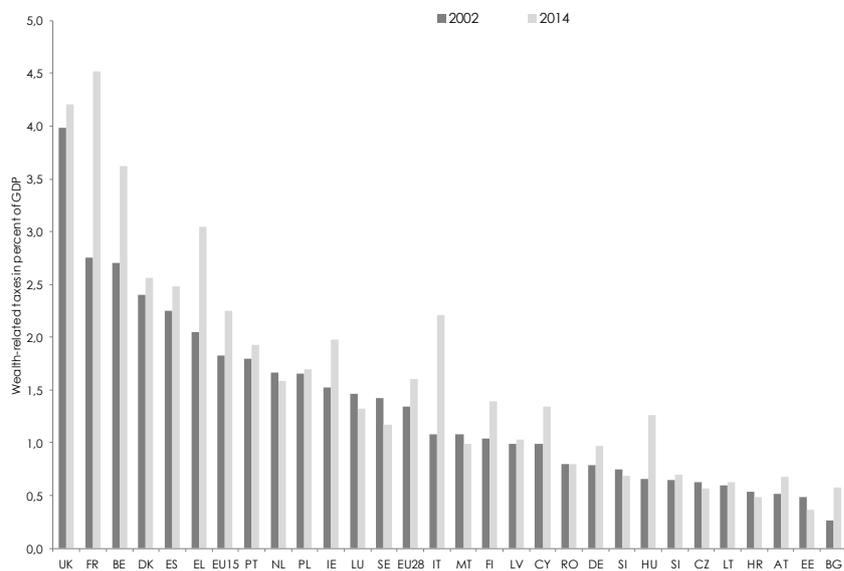


Source: European Commission (2016a).

*Graph 2: Structure of revenues from wealth-related taxes, 1990 and 2013*
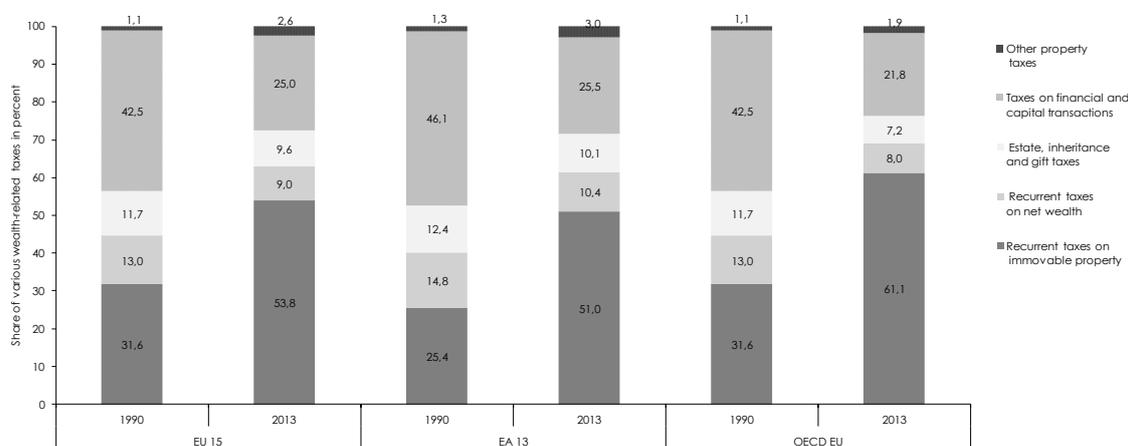


Source: OECD (Revenue Statistics 1965-2014), Paris, 2015. Arithmetic averages. Austria: excluding one-off revenues from tax agreement with Switzerland.

Between 1990 and 2013 the share of net wealth taxes in overall revenues from wealth-related taxation declined from 13 percent to 9 percent in the EU15, from almost 15 percent to 10.4 percent in the EA13, and from 13 percent to 8 percent in those EU countries for which OECD data are available. In all country groups regarded, taxes on financial and capital transactions as well as estate, inheritance and gift taxes have also been losing in importance since 1990. In contrast, recurrent taxes on immovable property (in particular real estate taxes) have been extending their share markedly since 1990, to over 50 percent of wealth-related tax revenues in the EU15 and the EU13 and to over 60 percent in the EU-OECD-countries.

## 3.2 Net wealth taxes in Europe: historical development and status quo

Table 1 gives an overview of the current situation concerning net wealth taxes in Europe. It focuses on recurrent net wealth taxes levied on all kinds of assets, which excludes specific wealth taxes on specific assets, like motor vehicles (as, e.g., in Bulgaria or Denmark) or water vessels (as, e.g., in Slovenia).[6] In the beginning of the 20th century, several of the now EU Member States and other European countries introduced a net wealth tax or transformed a formerly existing one into a net wealth tax with modern design. Almost all of these countries (with the exception of Switzerland, Norway, and Luxembourg for corporations) have abolished their net wealth taxes starting in the beginning of the 1990s; often after several reforms cutting tax rates or extending tax exemptions.

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[6] For an overview over specific wealth taxes in the EU, see Ernst & Young (2014).

*Table 1: Net wealth taxes in Europe*

| Country | Tax subject[6] | Tax rates and exemptions | Tax revenues in % of GDP[1] | Introduced in | Selected modifications[2] |
|---|---|---|---|---|---|
| **Abolished net wealth taxes** | | | | | |
| Ireland | Personal | 1% Tax-exempted amount: £ 70,000 ((€ 107,100) for singles; £ 100,000 (€ 153,000) for couples; £ 2,500 (€ 3,800) per child | 0.09 | 1975 | Abolished in 1978 |
| Austria | Personal | 1% Tax-exempted amount: ATS 150,000 (€ 10,900) per family member; additionally ATS 150,000 (€ 10,900) for individuals over age 60 | 0.14 | 1923 | Major revisions in 1934, 1939, 1955 Increased in 1977 Abolished in 1994 |
| | Corporations | 1% tax exemption limit[4]: ATS 150,000 (€ 10,900) | 0.33 | | |
| Italy | Corporations | 0.75% | 0.29 | 1992 | Abolished in 1995 |
| Denmark | Personal | 2.2% Tax-exempted amount: DKR 630,000 (€ 85,600) for adults or couples; DKR 630,000 (€ 85,600) per child | 0.06 | 1903 | Abolished in 1997 |
| Germany | Personal | 1% Tax-exempted amount: DM 120,000 (€ 61,354) per family member | 0.11 | 1893 (Prussia) | Major revisions in 1923, 1974 Decreased in 1978 Abolished in 1997 |
| | Corporations | 0.6% Tax exemption limit[4]: DM 20,000 (€ 10,226) | 0.13 | | |
| The Netherlands | Personal | 0.7% Tax-exempted amount: € 90,756 for individuals | 0.18 | 1892 | Major revisions in 1964, 1980 Abolished in 2001 and replaced by 30% income tax on a fictitious return of 4% on financial assets (corresponds to a net wealth tax of 1.2%) |
| Finland | Personal | 0.8% Tax-exempted amount: € 250,000 for individuals | 0.08 | 1920 | Major revisions in 1967, 1975, 1976, 1977 Increased in 1978 Decreased in 2005 Abolished in 2006 |
| Luxembourg | Personal | 0.5% Tax-exempted amount: € 2,500 for adults; € 2,500 per child | 0.55 | 1913 | Major revisions in 1919, 1941 Abolished in 2006 for individuals/households |
| Sweden | Personal | 1.5% Tax-exempted amount: SKR 1.5 million (€ 160,351) for singles, SKR 3 million (€ 320,702) for couples | 0.19 | 1911 | Major revision in 1934 Increased in 1938, 1947, 1972, 1984 Decreased in 1986, 1992 Decreased and replacement of progressive tax schedule by uniform tax rate in 1993 Abolished and re-introduced in 1994 Decreased in 2002, 2003, 2006 Abolished in 2007 |
| | Corporations | 0.15% Tax-exempted amount: SKR 15,000 (€ 1,604) | 0.01 | | |

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| Country | Type | Details | | Year | Revisions |
|---|---|---|---|---|---|
| Iceland | Personal | 1.5% - 2% (above ISK 150 million (€ 1 million ) for singles, above ISK 200 million (€ 1.3 millions) for jointly taxed individuals) Tax-exempted amount: ISK 75 million (€ 0.5 million) for singles, ISK 100 million (€ 0.65 millions) for jointly taxed individuals | 0.48 | 1096/97 | Major revisions in 1556, 1874, 1877, 1909, 1921 Decreased in 2003 Abolished in 2006 Re-introduced temporarily n 2010 Increased in 2011 Increased in 2012 and replacement of uniform tax rate by progressive tax schedule Abolished in 2015 *Abolished in 2006* |
| | *Corporations* | *0.6%* | | | |
| **Existing net wealth taxes** | | | | | |
| Switzerland (Zurich)[3] | Personal | 0,110%-0.657 Tax-exempted amount: CHF 77,000 (€ 73,389) | 0.89 | 1840 (Canton of Basle City) | Gradual introduction by all cantons between 1840 (Canton of Basle City) and 1970 (Canton of Glarus) |
| | *Corporations* | 0.16425% | 0.24 | | |
| Luxembourg | *Corporations* | *0.5%* | *1.5* | 1913 | *Major revisions in 1919, 1941* *Abolished in 2006 for individuals/households* |
| Norway | Personal | 0.7% municipal level Tax-exempted amount: NOK 1 million (€ 106,200) for individuals 0.15 national level Tax-exempted amount: NOK 1.2 million (€ 127,500) for individuals | 0.3 | 1918 | Increased in 2002 and replacement of uniform tax rate by progressive tax schedule at national level Decreased in 2007, 2008 Increased in 2009 and replacement of progressive tax schedule by uniform tax rate at national level Decreased in 2010, 2012, 2014 |
| Spain | Personal | 0.2% - 2.5% (above € 10.696 million) Tax-exempted amount: € 700,000 for individuals | 0.11 | 1977 | Abolished in 2007 Re-introduced temporarily in 2011, since then prolonged several times |
| France | Personal | 0.5% - 1.5% (above € 10 million) Tax-exempted amount: € 800,000 for individuals | 0.24 | 1982 | Abolished in 1986 Re-introduced in 1989 Decreased in 2012 Increased in 2013 Major revision in 2018: restriction to real estate |

Sources: OECD (1979, 1988, 2017); Messere et al. (2003); Bundesministerium der Finanzen (2016); Ernst & Young (2014); own research and compilation. – [1]) For abolished taxes: last year of existence; for exisiting taxes: 2014. – [2]) Due to lack of comprehensive information, the modifications recorded here may be incomplete for some countries. Modifications may be in the form of variations of the tax rate or of the size of tax exemptions – [3]) Levied by cantons at differing rates. – [4]) Above this threshold, the whole taxable net wealth was liable for taxation. – [5]) Initially limited to two years; most recent extension until 2018. – [6]) Personal: at individual or household level. – [7]) 2015.

Among the last EU Member States to discontinue their net wealth taxes were Finland and Sweden in 2006 and 2007, respectively: both countries had held on to their net wealth taxes longer than most other countries as a compensation for the regressive dual income tax introduced in the beginning of the 1990s (Messere et al., 2003).

Only very few countries adopted net wealth taxes as late as in the last quarter of the past century. Of these, Ireland and Italy discontinued their net wealth taxes after a few years. Currently a net wealth tax still exists in France, where it has just been drastically restricted, however, and (after being re-introduced temporarily in 2011) in Spain.

The few net wealth taxes still in existence apply either a progressive tax schedule or a single flat rate, mostly at the federal or national level. Norway and Switzerland are exceptions insofar as their net wealth taxes are not a (pure) federal tax but are levied both at the municipal and the national level (Norway) or by cantons (Switzerland), respectively. Norway, Spain and France tax private individuals/households only, while Luxembourg exclusively taxes corporations and Switzerland taxes both private individuals/households and (at considerably lower rates) corporations. Iceland and Spain introduced a net wealth tax temporarily in 2010 and 2011, respectively, as one fiscal consolidation measure after experiencing severe budgetary problems in the aftermath of the financial and economic crisis; both countries after having discontinued it shortly before. France has just drastically narrowed the tax base, taxing only real estate as of 2018 and exempting all other assets, inter alia due to fear of tax flight.

Overall, countries that have never levied a net wealth tax constitute a majority in Europe vis-à-vis those countries having taxed net wealth in the past or still doing so. In particular, not a single one of the "new" EU Member States which have acceded to the EU from 2004 on has ever levied a net wealth tax. Also in the OECD net wealth taxes have never been applied widely: the European OECD countries outside the EU included in Table 1 are the only OECD countries having had or still having a net wealth tax. Neither the United States nor Japan have ever levied such a tax or consider introducing one.[7] To our knowledge, outside the OECD world net wealth taxes are not common either: India discontinued the tax (which it had adopted in 1957) in 2015; Brazil has been discussing its introduction for the last 30 years without result; and China has never had a net wealth tax.

In terms of GDP, existing net wealth taxes yield rather modest revenues: between 0.11 percent in Spain and 1.5 percent in Luxembourg. Also historically, as Table 1 shows, net wealth taxes have never contributed much to overall tax revenues.

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[7] In 2000, US President Donald Trump had pledged for the introduction of a one-off levy of 14.25 procent on net wealth for the super-rich to pay back public debt (Trump and Shiflet, 2000). However, his current tax plans do not foresee any tax on net wealth.

# 4 Potential revenues of an EU-wide net wealth tax

The basis for our estimation of the revenue potential of an EU-wide net wealth tax is the Household, Finance and Consumption survey (HFCS) conducted by the European Central Bank. The second wave of the HFCS released at the end of 2016 provides information about the composition and distribution of wealth in 20 EU Member States (18 euro area countries plus Hungary and Poland) for the year 2014. The two shortcomings of this survey, especially with regard to questions of inequality, are differential non-reporting, i.e. that non-reporting is positively correlated with wealth, and under-reporting of wealth.

Using the strong empirical evidence that wealth at the top end of the wealth distribution indeed follows a Pareto distribution, Vermeulen (2014 and 2016) suggests to deal with differential non-reporting by including observations from rich lists into the sample in a first step, and then in a second step to estimate the alpha coefficients of the respective Pareto distributions.[8] The second issue is the under-reporting of certain assets in surveys like the HFCS, meaning that aggregate wealth for a given country in the survey is considerably lower compared to the aggregates displayed in national (financial) balance sheets. For example, compared to national balance sheets, up to 88 percent of financial wealth is missing in the HFCS. Vermeulen (2016) suggests the introduction of weights for the relevant types of assets so that the totals of the survey match the totals of the national balance sheets. Our paper is the first one to estimate top wealth for all 20 EU Member States included in the HFCS based on a common framework; thus extending the recent analysis by Bach et al. (2018).

## 4.1 Methodology

By drawing inspiration from several studies on the topic, such as Eckerstorfer et al. (2016) and Dalitz (2016), we improve the basic approach of Vermeulen (2014 and 2016) which is aimed at dealing with the two fundamental problems outlined above. Only the most important steps shall be outlined here, as the basic concept is described in detail in Vermeulen (2014) and Bach et al. (2015).[9]

The tail density function of the Pareto distribution is given by

$$f(w_i) = \begin{cases} \frac{\alpha w_{min}^{\alpha}}{w_i^{\alpha+1}} & \text{if } w_i \geq w_{min} \\ 0 & \text{if } w_i < w_{min} \end{cases} \tag{1}$$

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[8] The HFCS is a multiple imputed data set, meaning that missing entries for certain variables are determined via a complex bayesian estimation. This is done in order to also harvest the information of incomplete observations. For each observation there are five implicates. For variance estimation, the survey provides bootstrap replicate weights. Vermeulen's approach in dealing with differential non-response has the positive side effect that the in-between-imputation variance of estimated alpha parameters is strongly reduced. This is due to the fact that including the very rich who, with regard to net wealth, can be regarded as complete observations, i.e. having the same value in all imputations, "anchors" the Pareto distribution at its very top end.

[9] For an in-depth analysis and critical review of the methodology see Dalitz (2016).

where $w_i$ is the net wealth of household i, $w_{min}$ is the lower bound of the Pareto distribution, and α is the shape parameter which is to be estimated. The lower α, the fatter is the tail of the distribution and the more unequally wealth is distributed among households.

The complementary cumulative distribution function (ccdf) is obtained the following way:

$$P(W \leq w_i) = F(w_i) = \int_{w_{min}}^{w} f(t)dt = 1 - (\frac{w_{min}}{w_i})^\alpha \; ; \; \forall w_i \geq w_{min} \tag{2}$$

$$P(W > w_i) = 1 - P(W \leq w_i) = (\frac{w_{min}}{w_i})^\alpha \; ; \; \forall w_i \geq w_{min} \tag{3}$$

If, in a finite population of N households, every household possesses wealth at or above $w_{min}$, we can denote by $N(w_i)$ the number of households that possess wealth at or above $w_i$. Wealth in this population is said to follow a power law if it is distributed according to the following relationship:

$$\frac{N(w_i)}{N} \cong (\frac{w_{min}}{w_i})^\alpha \; ; \; \forall w_i \tag{4}$$

This implies that the fraction of households with wealth at or above $w_i$ follows the regularity of a power function. If a random sample of the population is drawn, we can denote by $n(w_i)$ the number of sample observations that possess wealth at or above $w_i$, which is also called the rank of the observation. The relative frequency in the sample is an estimate of the relative frequency in the population:

$$\frac{n(w_i)}{n} \cong \frac{N(w_i)}{N} \; ; \; \forall w_i \tag{5}$$

Now we can combine the relative frequency of the sample with the ccdf:

$$\frac{n(w_i)}{n} \cong (\frac{w_{min}}{w_i})^\alpha \; ; \; \forall w_i \tag{6}$$

In order to estimate α with OLS, the logarithm of (6) is taken:

$$\ln \frac{n(w_i)}{n} = -\alpha \ln \frac{w_i}{w_{min}} \tag{7}$$

Vermeulen (2014) emphasises the importance of taking into account the complex survey design of the HFCS. In the HFCS the survey weight for each observation stands for the number of households that this sample point represents. In a first step the households have to be ranked again: the wealthiest household with $w_1$ has a survey weight of $N_1$, etc. The relative frequency of the wealthiest household is $\frac{N_1}{N}$, the relative frequency of the second household is

$\frac{N_1+N_2}{N}$, etc. Now the rank of $n(w_i)$ can be replaced by the sum of all survey weights of sample observations at or above a wealth level of $w_i$. Finally the sample size n can be replaced by the population size N, whereas N is the sum of all survey weights of the sample points with wealth at or above $w_{min}$ (Vermeulen, 2014).

It should be noted, however, that usually shape parameters of power laws are estimated via maximum likelihood estimation. Vermeulen (2014) provides a pseudo maximum likelihood estimator, which also accounts for the complex survey design of the HFCS. However, after conducting a Monte Carlo simulation in which both estimators were tested, he decided to go along with OLS instead of MLE.

The more important remaining question, however, is how to determine $w_{min}$. Vermeulen (2014) circumvents the problem by providing three different scenarios, estimating α for lower bounds of € 500,000, € 1 million, and € 2 million. Bach et al. (2015) employ a graphical approach in determining the "correct lower bound", which they find for Germany, France, Spain and Greece to be at € 500,000. Both approaches are criticised in Eckerstorfer et al. (2016) who estimate the Pareto parameters for Austria based on the HFCS data of the first wave. The authors rightly point out that the "correct" lower bound is crucial: a lower bound that is in fact too low would bias the results, whereas a lower bound which is too high would ignore useful information. Following Clauset et al. (2009), Eckerstorfer et al. (2016) compare the goodness-of-fit of 30 combinations of lower bound and shape parameter and subsequently choose the best fitting combination. They apply the Cramer-van Mises criterion to test the goodness-of-fit. As Dalitz (2016) concludes, the Cramer-van Mises criterion and the Kolmogorov-Smirnov criterion (KS) typically show the same qualitative dependency on $w_{min}$. This means that both criteria yield very similar optimal choices for $w_{min}$. Normally, the goodness-of-fit is measured by the distance between the empirical cumulative distribution function $F_{emp}(w)$ and the fitted cumulative distribution function $F_{fit}(w)$. Clauset et al. (2009) prefer the KS which is the maximum distance between the two distributions ($N(w_i)$ and $N(w_{min})$, here being the sum over all weights at or above either $w_i$ or $w_{min}$):

$$KS = \max_{w \geq w_{min}} |F_{fit}(w) - F_{emp}(w)| = \max_{w_i \geq w_{min}} \left| \left(\frac{w_i}{w_{min}}\right)^{-\alpha} - \frac{N(w_i)}{N(w_{min})} \right| \tag{8}$$

For our purposes we indeed use the KS in order to test the goodness-of-fit of 580 Pareto distributions, each with a different lower bound, starting at € 100,000 and increasing it in steps of € 5,000 until a lower bound of € 3 million is reached, above which in some countries there are few if any data points left.

Our contribution in this regard is to implement this goodness-of-fit criterion in the adjustment process described below.

## 4.2    Adjustment to national balance sheets

As mentioned above, the totals of financial assets and liabilities in the HFCS are not even close to the ones recorded in national balance sheets. On average 74 percent of financial assets and 40 percent of liabilities are missing in the HFCS compared to national balance sheets. This is why Vermeulen (2016) proposes to reweigh the data in the HFCS so that they match national accounts. We follow the author in this approach as neglecting 74 percent of European financial assets would result in a dramatic under-estimation of the potential revenues of a net wealth tax. Basically, Vermeulen (2016) adjusts the HFCS data so that the totals of real assets, financial assets and liabilities from the Pareto tail combined with the ones below the Pareto tail match their counterparts in the national balance sheets.

We make only one exception to this approach: we do not adjust the real assets for several reasons. First, the differences between real assets in the national balance sheets and the ones in the HFCS are far less drastic compared to financial assets and liabilities. Secondly, the sub-categories used to determine total real assets in the national balance sheets are often very different from the ones used in the HFCS. The most obvious example is that valuables such as jewellery and art are not at all accounted for in the national balance sheets. Thirdly, for some countries households' real assets are simply not existent in national balance sheets. Fourthly, and most importantly, however, it is questionable whether the estimates of statistical offices regarding house prices etc. are superior in comparison to the self-evaluation of households. Note, however, that through correcting for the non-reporting by estimating the Pareto tail of the wealth distribution, the totals of real assets are increased anyway.

## 4.3    Estimation procedure

First, we reweigh financial assets and liabilities so that the aggregates match their counterparts in the national balance sheets, thus accounting for under-reporting.

In a second step 275 observations of the Forbes rich list (Europe 2016 and Hungary 2015) are added to the sample. Unfortunately, there are no entries on the list for 6 of the 20 Member States considered in the HFCS. Then, for every Member State 580 Pareto distributions, each with a different lower bound ($w_{min}$), are fitted and the distribution with the best fit according to the KS is chosen, thus dealing with the differential non-response issue.

Thirdly, once the optimal lower bound is chosen, the ratios of aggregate financial assets to aggregate net wealth and aggregate liabilities to aggregate net wealth above the respective $w_{min}$ (excluding the observations from the rich list) are obtained. These ratios are important because we assume that the composition of wealth within the Pareto tail is similar to the one we observe in the real (reweighted) data. Thus, we will be able to split the Pareto tail into its components, which include financial assets, liabilities, and real assets as a residual.

In a fourth step the sum of financial assets within the tail and below $w_{min}$ is compared with its counterpart in the national balance sheet. The same is done for liabilities. As the Pareto tail increases overall net wealth, these sums will be higher than their counterparts in the national

balance sheets. This is why the weights from step one have to be reduced until after the fourth step of this procedure the sums of financial assets and liabilities exactly match their counterparts in the national balance sheets.

Our contribution to this procedure is to allow for a change in the lower bound in every round of reweighing. As every set of reweighted data for a given Member State has its own optimal Pareto distribution, this feature adds to the preciseness of the estimate.

In a fifth step the variance of our coefficients is estimated according to the HFCS methodological report of the second wave (European Central Bank, 2016): each observation in the HFCS has a final estimation weight $r_i$. There are M implicates (multiple imputation) indexed by $m$, and B replicate weights $r_{ib}$ indexed by $b$. In the HFCS, $M = 5$ and $B = 1000$. For each implicate m, the estimator of interest $\alpha_m$ is calculated using the estimation weight $r_i$. The variance of this estimator is estimated using the bootstrap replicate weights as follows: for each of the B replicates, using the replicate weight $r_{ib}$, calculate $\alpha_{mb}^*$, with mean across replicates $\bar{\alpha}_m^* = \frac{1}{B}\sum_{b=1}^{B}\alpha_{mb}^*$. The partial variance for implicate m is $U_m = \frac{1}{B-1}\sum_{b=1}^{B}(\alpha_{mb}^* - \bar{\alpha}_m^*)^2$. This is the standard bootstrap variance used in complete case analysis.

The total variance is then calculated according to the MI formula:
$T = W + \left(1 + \frac{1}{M}\right)Q$, where W is the within variance $W = \frac{1}{M}\sum_{m=1}^{M}U_m$ and Q is the between-imputation variance, $Q = \frac{1}{M-1}\sum_{m=1}^{M}(\alpha_m - \bar{\alpha})^2$, and the final estimator of interest is $\bar{\alpha} = \frac{1}{M}\sum_{m=1}^{M}\alpha_m$.

We employ all 1,000 replicate weights for variance estimation. Observations from the Forbes rich list are assigned replicate weights of one. Even the small standard errors we obtain for countries like Germany are significantly higher than those reported in Bach et al. (2015), where the replicate weights are not used at all. The high standard errors for countries like Slovakia, Latvia and Luxembourg indicate that our estimates for potential tax revenues from these countries should be regarded with extra caution.

Sixthly, the number of households H within the two tax brackets applied for the revenue estimation (€ 1 million to € 5 million and everything above € 5 million) and the total wealth X within these brackets are obtained by using the following formulae:

$$H(a, b) = n \int_b^a f(w)dw \qquad (9)$$
$$X(a, b) = n \int_b^a w\, f(w)dw \qquad (10)$$

Finally, the study on the effects of wealth taxation in Switzerland by Brülhart et al. (2017) allows us to take into account the tax-induced response of the tax base on an empirically valid basis. Compared to other OECD countries, Switzerland has the highest, albeit decreasing taxes on wealth and especially on net wealth. Its federalised structure is responsible for significant variation in net wealth taxation between the cantons and even municipalities. The

authors' finding that an increase of the tax rate on net wealth of 1 percentage point decreases the tax base by 35 percent appears as an enormous but rather plausible effect.

We propose a progressive tax schedule, thus following the example of several existing and historical net wealth taxes. Indeed, a progressive tax schedule may be justified particularly based on potential negative social externalities by an over-accumulation of wealth motivated by status effects (Boadway et al., 2010). In addition, several other arguments, as supporting equality of opportunity by a certain extent of wealth redistribution, the ability of the very wealthy to achieve above-average returns, the existing under-taxation of capital incomes vis-à-vis earnings within income taxation, or differing motives for wealth accumulation in lower compared to higher income/wealth groups, justify progressive wealth taxation. Our estimations of potential revenues from an EU-wide net wealth tax are based on a tax design similar to the one suggested by Piketty (2014), applying a simple progressive tax schedule with two tax rates: 1 percent for net wealth above € 1 million, 1.5 percent for net wealth above € 5 million.[10]

As HFCS data on net wealth refer to households, the proposed net wealth tax is levied on a household basis. Therefore, also tax exemptions pertain to the household level. As Table 1 shows, usually tax exemptions are granted on an individual basis, mostly for each adult living in the taxed household, in some cases (though mostly at a considerable lower level) also for children. Our model deviates from this design and rather corresponds to the Swedish model applied until 2002, which granted a household-based tax exemption identical for singles and couples.[11] With a threshold of € 1 million, households would receive a rather generous basic allowance so that the tax can be targeted more closely at large wealth holders. The tax should be introduced based on a harmonised design by all EU Member States. As a prerequisite for its effective enforcement a European wealth register combined with some form of information exchange on wealth holdings abroad needs to be introduced.

## 4.4   Estimation results

Our estimations yield potential revenues of € 156.2 billion (1.47 percent of total GDP) for the 20 EU Member States included (see Table 2). Considering the imminent exit of the United Kingdom from the EU, this estimate can serve as a good approximation to the potential revenues of an EU-wide net wealth tax. Potential tax revenues range from 0.5 percent of GDP or less (Slovakia, Hungary, Poland) to 2 percent of GDP or more (Belgium and Cyprus). 8 out of the 20 EU Member States considered can expect revenues between 1.1 percent and 1.7 percent of GDP.

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[10]) Piketty (2014) suggests a two-tier tax schedule with tax rates of 1 percent and 2 percent, alluding to the option to tax very high net wealth, for example above € 1 billion, at even higher rates of maybe 5 percent or 10 percent; however, for the sake of simplicity we base our revenue estimations on a two-rate-schedule.

[11] ) Since then, the tax exemption for couples was twice as high as the tax exemption for singles until the abolishment of the tax.

*Table 2: An EU-Wide Net Wealth Tax – Key Figures for 20 Selected EU Member States*

| Country | Total net wealth in billion € | Revenues in billion € | Revenues in % of GDP | Effective tax rate in %[1] | Affected households in % | $\alpha$ coefficients[4] (standard errors) | Lower bound[4] in thousand € |
|---|---|---|---|---|---|---|---|
| Austria | 1,433 | 4.9 | 1.50 | 0.35 | 6.28 | 1.50 (0.052) | 413 |
| Germany | 12,653 | 47.5 | 1.63 | 0.38 | 4.74 | 1.36 (0.010) | 512 |
| Belgium | 2,397 | 8.1 | 2.02 | 0.34 | 10.63 | 1.87 (0.111) | 1,760 |
| Latvia[2] | 62 | 0.2 | 0.78 | 0.29 | 0.67 | 1.24 (0.219) | 128 |
| Slovakia[2] | 151 | 0.1 | 0.08 | 0.04 | 0.26 | 2.03 (0.154) | 119 |
| France | 9,976 | 31.5 | 1.47 | 0.32 | 5.81 | 1.41 (0.048) | 3,000 |
| Hungary | 303 | 0.5 | 0.44 | 0.15 | 0.55 | 1.50 (0.041) | 193 |
| Spain | 5,794 | 15.2 | 1.47 | 0.26 | 5.19 | 1.51 (0.081) | 1,974 |
| Poland | 1,671 | 1.9 | 0.45 | 0.11 | 0.88 | 1.75 (0.071) | 227 |
| Slovenia[2] | 139 | 0.3 | 0.69 | 0.18 | 1.70 | 1.58 (0.106) | 247 |
| Estonia[2] | 73 | 0.2 | 0.79 | 0.22 | 1.24 | 1.44 (0.108) | 250 |
| Malta[2][3] | 56 | 0.1 | 1.58 | 0.24 | 4.76 | 1.62 (0.067) | 283 |
| Luxembourg[2] | 190 | 0.9 | 1.87 | 0.49 | 25.00 | 1.75 (0.175) | 2,039 |
| Greece | 620 | 1.3 | 0.74 | 0.21 | 1.64 | 1.56 (0.090) | 279 |
| Ireland | 647 | 2.6 | 1.37 | 0.41 | 7.99 | 1.53 (0.072) | 915 |
| Italy | 8,941 | 28.0 | 1.73 | 0.31 | 5.85 | 1.53 (0.018) | 490 |
| Portugal | 892 | 2.0 | 1.16 | 0.23 | 3.49 | 1.87 (0.092) | 891 |
| Cyprus[3] | 159 | 0.7 | 3.94 | 0.44 | 7.10 | 1.27 (0.091) | 1,610 |
| Finland | 665 | 1.5 | 0.73 | 0.23 | 3.60 | 1.73 (0.034) | 625 |
| Netherlands | 2,776 | 8.7 | 1.31 | 0.31 | 6.38 | 1.60 (0.040) | 593 |
| Total | 49,599 | 156.2 | 1.47 | 0.31 | 4.84 | - | - |

Source: Own estimations and calculations. – [1] Revenues in relation to total net wealth. – [2] Estimates without observations from the Forbes rich list. – [3] Due to insufficient data the financial assets and liabilities of Cyprus could not be matched with the respective national balance sheets. – [4] Mean estimates above all 5 implicates.

Not surprisingly, for 6 of the in total 8 "new" Member States included (with Cyprus and Malta as exceptions) revenue/GDP ratios are estimated at below 0.9 percent of GDP. Similarly, in the "new" Member States (again with the exception of Cyprus and Malta) the share of

affected households (who are liable for taxation as their net wealth is above € 1 million) is mostly well below 2 percent of all households. In comparison, in the group of 12 "old" Member States this share ranges between 3.49 percent (Portugal) and 25 percent (Luxembourg).

Effective tax rates, determined as relation between potential tax revenues and total net wealth, lie below 0.5 percent in all countries regarded.

By how much an EU-wide approach would in fact reduce the considerable tax base elasticities found by Brülhart et al. (2017) is of course speculative. Their findings might at first sight be confusing, as the authors conclude that the mobility of people does not seem to be the driving force behind the reduction of the tax base when net wealth taxation is increased. However, this just means that instead of relocating their places of residence, people "adjust" wealth reported to tax authorities when taxation is increased. The mobility of financial assets certainly is an important factor in this "adjustment" process, especially as the authors' findings also indicate that financial assets are more responsive to changes in net wealth taxation than non-financial assets. If an EU-wide net wealth tax together with a (financial) wealth registry could reduce the elasticities found by Brülhart et al. (2017) from 0.35 to just 0.3, the taxation scheme outlined above would yield € 174 billion instead of the € 156 billion per annum estimated above.

One striking result is the difference between actual revenues of existing net wealth taxes and potential revenues according to our estimations. The actual revenues of the French wealth tax amount to 0.24 percent of GDP – one sixth of estimated revenues of 1.47 percent of GDP. In Spain, actual revenues of 0.11 percent of GDP are an even smaller fraction of estimated revenues (1.47 percent of GDP). This discrepancy results first of all from the differences in tax design: both the Spanish and the French net wealth tax are levied on an individual basis, with tax-free basic allowances of € 700,000 and € 800,000, respectively; while the proposed net wealth tax in this paper refers to households and foresees a basic allowance of € 1 million. Also the threshold from which the top tax rate kicks in is considerably higher (€ 10 millions) compared to the one we assume (€ 5 millions). On the other hand, the tax rates in the lower zones of the tax schedule are lower in the existing French and Spanish net wealth taxes. Moreover, our estimation assumes that all kinds of assets without any exceptions are captured by the tax, and that they are taxed based on their market values (which is often a problem for existing net wealth taxes, particularly for real estate property). Finally, we have to emphasise that our estimations do not include any form of private offshore wealth.[12] Alstadsaeter et al. (2017) analyse the distribution of offshore wealth and find that tax evasion and the usage of tax havens is most prevalent at the top end of the wealth distribution, implying that the potential revenues of net wealth taxes are even larger than estimated in this paper if determined measures from the international community to tackle this issue were to be taken.

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[12] See Hebous (2014) and Zucman (2014) for the issue of private wealth hidden in tax havens.

## 5 Conclusions

The aim of this paper is to demonstrate that potential revenues of a net wealth tax are rather substantial in the 20 EU Member States for which net wealth data from the HFCS are available, even if the tax specifically targets the upper tail of the wealth distribution by granting rather generous basic allowances. Correcting for non-response and under-reporting of the households in the top tail of the wealth distribution improves the representation of these households in the potential tax base of a net wealth tax. Our estimations show that an EU-wide progressive net wealth tax with a basic allowance of € 1 million per household would yield revenues in the order of magnitude of about 1.5 percent of GDP on average for the 20 EU Member States included, while affecting only 4.8 percent of households and resulting in an effective tax rate of about 0.3 percent of net wealth. These estimation results suggest that in face of the highly unequal distribution of wealth fears are unsubstantiated that a net wealth tax necessarily would have to affect a substantial share of households to yield sizeable revenues, if top wealth holders are considered properly.

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