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A European Wealth Tax for a Fair and Green Recovery

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Executive summary

The European Union faces the twin crises of Covid-19 and climate change. Confronting both crises leads to an unprecedented demand on public resources which in turn leads to the question of how to raise the required funds a) without jeopardising a weak economy recovering from the pandemic and b) without undermining broad political support for climate action.

This paper investigates the potential of a European net wealth tax to raise substantial revenues while supporting the economy and the consensus on climate action. To achieve this, household survey data from the European Central Bank (covering 22 EU countries) are analysed. To address the problem of under-reporting of wealth at the top of the distribution in survey data, a Pareto distribution is fitted to the right tail of the data and used to create an amended data set which also represents these missing rich, whose wealth goes unreported.

The Pareto-amended data show that household wealth is highly concentrated among the wealthiest households: the richest 1% hold 32% of total net wealth in the EU22 while the poorest half of all households only hold about 4.5% of total net wealth.[2] These data are then used to estimate revenues for four different tax models. The results show that annual revenues between €192 billion (1.6% of GDP) and €1,281 billion (10.8% of GDP) across the EU22 are possible. **Non-progressive (flat tax) designs yield revenues at the low end of this range while strongly progressive designs are responsible for the high revenue estimates at the upper end of this range.** Conversely, the models' ability to actively reduce the current concentration of wealth in Europe varies with the degree of progressivity of the tax design. **In sum, a net wealth tax exhibits high revenue potential, which is a direct result of the observed high levels of inequality and is far larger than that for other proposals currently being discussed at the European level.**

A combination of clever design choices, more resources and better infrastructure for the EU's tax authorities would make a European net wealth tax feasible. With respect to the tax design, high exemption thresholds between €1 million and €2 million, paired with progressive tax rates and a broad tax base, imply that only the richest 1% to 3% of all households are taxed and thus the problem of illiquid tax subjects is avoided, while keeping the revenue potential high. Boosting tax authorities' resources to enforce the tax and to build appropriate infrastructure, such as real estate valuation databases and company registers, will ensure high levels of compliance and enforcement. Best practice examples such as Switzerland (valuation) and Norway (third party reporting) exist and can be used as a point of reference for successful implementation. To strengthen compliance an implementation at the European level is desirable.

The results of this paper show that overall, a European net wealth tax has the potential to make a substantial contribution to the EU's efforts to organise a decisive response to the twin crises of Covid-19 and climate change. A net wealth tax is not only attractive because its revenue potential ranks amongst the highest of the potential alternatives that are currently being discussed at the European level, but also because of its ability to reduce historically high levels of wealth inequality in Europe.

[2] A full tabulation of the wealth distribution in the EU22 can be found in the Appendix. For individual country tables consult the Online Appendix.

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1. Introduction

The European Union faces the twin crises of climate change and potentially the deepest recession in a century due to Covid-19. Tackling them both will require an unprecedented mobilisation of (public) resources. The challenge of climate change alone is likely to require additional investment of €850 billion or about 6% of GDP per year in the EU27 (Wildauer et al 2020). The Covid recession will require further resources due to the expected contraction of the EU economy by 8% in 2020, twice as deep as in the 2009 recession. Raising substantial tax revenues within this context without jeopardising the economic recovery and without introducing strongly regressive taxes, which hit low-income households hardest, poses a significant challenge. The Organisation for Economic Co-operation and Development (OECD) has repeatedly called for its member countries to use property taxes to raise revenues without hampering fragile economies after the 2009 financial crisis (Rawdanowicz et al 2013, OECD 2020). In addition, several economists have called for increased wealth taxation to raise public revenues and to reduce and correct market inequalities (Piketty 2014, Landais et al 2020, Saez and Zucman 2019, Advani et al 2020). When it comes to the issue of raising revenues to fight climate change, Chancel and Piketty (2015) argue for strongly progressive income taxes, since globally the richest 10% of the population are responsible for 45% of all carbon emissions. In addition, direct carbon taxation is strongly regressive and risks undermining the political will to act, as demonstrated by the *Gilets jaunes* movement in France, which erupted initially in response to increased fuel taxation.

These considerations point towards wealth taxation as a tool to generate urgently needed public revenues to fight climate change in a just way, while endangering neither the economic recovery nor social and political stability. A key obstacle in the public debate on the issue is the lack of data and empirical evidence with respect to the distribution of wealth among private households. This makes it difficult to estimate the revenue potential of net wealth tax proposals, which would be key for an informed debate on the matter.

This paper makes use of the European Central Bank's (ECB) efforts to improve the available information on the balance sheet positions of private households by means of the Household Finance and Consumption Survey (HFCS). This survey provides vital input for the associated policy-debate as it allows us to estimate the revenue potential of four different net wealth tax proposals based on 22 EU countries (referred to as EU22).[3] In contrast to existing studies and

[3] Austria, Belgium, Croatia, Cyprus, Germany, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, and Spain.

estimates (such as Landais et al 2020) our analysis is based on much more recent and detailed data, covering 22 European countries.

Our findings can be summarised as follows: first, the revenue potential of a European net wealth tax is substantial and lies between 1.6% and 3.0% of GDP annually when considering moderate proposals for wealth taxation and taking into account some degree of tax evasion. A highly progressive tax model would have a revenue potential of up 10.8% of GDP (in the first year). Second, how much revenue is raised depends crucially on the design features of the tax. We find that setting high exemption thresholds, which would significantly simplify the administration by sparing cash-poor but asset-rich households, does not inhibit the revenue potential if paired with a progressive tax structure. Even moderately progressive tax designs have the potential to generate revenues of up to 3% of GDP annually, while leaving 99% of all households exempt.

The remaining paper is structured as follows: in section 2 we briefly review some of the recent proposals for increasing fiscal revenues at the European level. In addition, we will summarise Europe's experience with net wealth taxes. Both discussions will serve as a reference point for our own wealth tax revenue estimates. Section 3 discusses some of the difficulties involved in accurately measuring the distribution of wealth among households and presents the strategy we apply to tackle these data challenges. We then present a breakdown of the wealth distribution across the EU22. Section 4 presents the different tax models and the corresponding revenue estimates, section 5 discusses key implementation issues, and section 6 concludes.

2. Raising revenues for a green recovery

Against the backdrop of the climate crisis, the Covid-19 pandemic has spurned a debate on the funding of society for the duration of the pandemic and the funding of a European green transition. This section provides an overview of current debates on how additional resources could be mobilised. Special attention is devoted to proposals which are particularly suitable for being implemented at the European level. In the second part of this section, we summarise past experiences with net wealth taxes in Europe. Overall, this section will serve as the point of reference when discussing our results.

2.1. An overview of current debates

As part of the Circular Economy Action Plan, which is one of the main blocks of the European Green Deal, member states' contributions to the European budget will be linked to the production of unrecycled, **single-use plastic waste** (EUCO 2020). This new funding arrangement came into effect in January 2021 and introduces incentives for member states to reduce the use of single-use plastics. The proposed Single-Use Plastics Directive (EC 2018a) sets out a concrete action plan on how to reduce plastic waste across the European Union. Importantly, however as it was presented, member states have significant leeway over which measures to rely on to meet these goals. This means that without newly introduced plastic taxes by individual member states, no additional fiscal resources are raised via these channels.

The European Commission is also looking into reforming the European Energy Directive (EC 2019). Currently the **taxation of energy** is not consistently linked to negative production externalities such as greenhouse gas emissions or nuclear waste. It would be desirable to set minimum tax rates across the EU and link these to the specific negative externalities of each energy carrier. In addition, ending direct and indirect (eg, preferential tax treatment) subsidies for fossil fuels could free up to €55 billion per year across the EU for alternative uses, according to a study funded by the European Commission (Trinomics 2018). Ending fossil fuel subsidies would include ending the exemption of aviation and maritime fuels from taxation.

Eliminating fossil fuel subsidies is closely tied to the reform of the **Emissions Trading System (ETS)** and the introduction of a **Carbon Border Adjustment Mechanism (CBAM)**. The latter scheme would tax carbon-intensive imports, which is often regarded as a prerequisite for extending the ETS's coverage to include energy intensive sectors that are faced with competition from abroad, addressing so-called 'carbon leakage'. The European Council agreed at its meeting in July 2020 that the Commission should work on a proposal for a CBAM and a corresponding reform of the ETS with the aim of incorporating the aviation and maritime sector into the ETS. The European Commission estimates that a reformed ETS could raise additional revenues of between €3 billion and €10 billion a year across Europe (EC 2020). Krenek et al (2018) estimate the revenue potential of a CBAM to be between €27 billion and €84 billion a year.

It is important to note, however, that all revenue sources are expected to decline over time with the successful implementation of low carbon technologies or a reduction in the use of plastics.

Since the 2008-09 financial crisis, the European Commission has been considering a **Financial Transaction Tax (FTT)** which is yet to be agreed upon between the member states. Several countries have successfully raised large revenues from an FTT in the recent past, including Switzerland with revenues of about 0.5% of GDP and the United Kingdom with revenues of about 0.2% of GDP, as well as Taiwan with 0.8% of GDP (Matheson 2011). Recent estimates of the revenue potential from a financial transaction tax in the EU are consistent with this international experience and vary from 0.3% of GDP to 1.4% of GDP (Pekanov and Schratzenstaller 2019; European Commission 2013; Schulmeister 2011). The revenue potential depends on several factors including the tax rates and the tax base (the taxable transactions and instruments, residency and issuance rules), the size of the financial sector, and the nature of exemptions. Member states have failed to reach an agreement on the FTT and currently the proposal languishes at the bottom of a legislative agenda where its progress is periodically reviewed.[4]

In 2016 the European Commission proposed a **Common Consolidated Corporate Tax Base (CCCTB)** across the EU.[5] During the first phase, member states would adopt a common (harmonised) set of rules for determining a company's taxable profits. The second phase would effectively see to the abolition of transfer pricing in favour of 'formulary apportionment', which means that profits of multinational companies are allocated to the different countries in which the company operates by a formula based on total territorial sales, capital stock and workers employed. Based on the data of Tørsløv et al (2020) €47 billion in corporate income tax was lost in 2017 across the 16 countries within the European Union for which data are available, and which are classified by the authors as non-tax havens.[6] This amounts to 0.4% of GDP for this group of countries. Going beyond the problem of corporate tax avoidance would involve tackling the substantial gap between statutory corporate income tax rates and effective tax rates in the European Union. For example, while Germany has a statutory corporate income tax rate of 30%, its effective tax rate is below 14%. Closing the gap between the statutory and effective tax rate across these 16 EU countries would yield an additional €136 billion in revenues (1.3% of GDP). Reversing the secular trend of cuts to the corporate income tax rate (Marques 2021) and applying a common corporate income tax rate of 35% across these countries would increase corporate income tax revenues by €403 billion (3.8% of GDP).

[4] Council of the European Union (2019) Outcome of the Council meeting: Economic and Financial Affairs, 3699th Council meeting, 10336/19, 14 June 2019.
[5] COM(2016) 685 final.
[6] This includes Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden.

In general, the debate on the reform of the EU's own resources resurfaced during the European Council negotiations on the recovery plan and the EU budget for the 2021-2027 period. The council agreement includes an outline of EU-wide taxes that may complement the existing own resources and boost the recovery. The European Commission roadmap also introduces consultations for a **digital levy**, that is meant to ensure a fairer contribution from multinationals operating in the digital sphere. Concrete policy options are yet to be presented, but such an initiative has to be compatible with the international agreement at the G20 level on the reform of global corporate taxation, which remains a priority.

2.2. Europe's experience with net wealth taxes

The taxation of wealth can be traced back to classical antiquity and it was in widespread use throughout Europe during the 19th and 20th centuries (Lehner 2000). However periodic net wealth taxes have been falling out of favour since the 1990s[7] with the result that at the time of writing only three countries in Europe still have some form of periodic net wealth taxation: Norway, Switzerland and Spain (OECD 2018).[8] Table 1 summarises the historic and current experience of periodic net wealth taxes in Europe. The picture which emerges is that revenues in most cases were modest at around 0.2% of GDP with two notable exceptions: Switzerland (0.93% of GDP) and Norway (0.47% of GDP) which are two of the three countries that are still levying a periodic net wealth tax.

Two broad patterns emerge from Table 1 and the analysis of the European experiences on wealth taxation:

1) Historically there is much variation in the exemption thresholds of different countries. With a few exceptions most countries opted for relatively low thresholds and a variety of exemptions – with the consequence that a relatively large share of the population was subjected to a complicated wealth tax. Most countries granted various exemptions on diverse classes of assets: pension assets, primary residences, agricultural assets, business assets, 'difficult-to-value' assets, and assets of national cultural value (see OECD 2018). Saez and Zucman (2019) argue that the combination of low thresholds and numerous exemptions eroded the tax base while simultaneously opening many legal avenues to the extremely wealthy for avoiding the tax. This led to declining political support and eventual termination of net wealth taxation in most countries.

[7] A similar process can be observed in the case of inheritance taxation, where the decline started in the 1970s.

[8] Note that the Netherlands incorporated its wealth tax as a component of personal income tax in 2001, and that it is calculated as a presumptive return on assets.

2) Most countries opted for a single tax rate usually around or below 1%, while only a few countries implemented progressive schemes with more than two tax bands.

(Re)Introducing net wealth taxation in Europe should thus follow the principle of relying on relatively high thresholds (aimed at the top 1% of the population) without any additional exemptions. This approach would ensure that numerous and complicated exemptions do not provide loopholes for the very wealthy, while solving administrative problems such as liquidity concerns (Saez and Zucman 2019).

Table 1: Net wealth taxation in Europe

	Average tax revenues share (in % of GDP)	**Sample years**	**Year law repealed**	**Threshold** (in 2019 euros)	**Tax rates**
Austria	0.17%	1970-1993	1994	17,230	1%
Denmark	0.21%	1966-1996	1997		
Finland	0.09%	1970-2005	2006	303,132	0.8%
France	0.22%	2008-2017	2018	823,836	0.5% to 1.5%
Germany	0.14%	1970-1996	1997	83,192	1%
Iceland	0.23%	1970-1997	2006	518,048	1.5%
Netherlands	0.21%	1969-2000	2001	123,245	0.7%
Norway	0.47%	1989-2018	active	150,000	0.85%
Spain	0.18%	1999-2018	active	167,129	0.2% to 2.5%
Sweden	0.20%	1965-2006	2007	191,245	1.5%
Switzerland	0.93%	1998-2017	active	79,548	0.53% to 0.73%

Source: The threshold and tax rates for Switzerland apply to the Canton of Bern due to the approximately 20,000 administrative districts having their own wealth taxes. The threshold applies across the Canton (12% of the national population) and the tax rates are the aggregated marginal effective net wealth tax rates across the Canton for the average and upper taxpayer. Sources: NO and ES: Ernst & Young (2019); CH: Brülhart et al (2016); France: Institut des Politiques Publiques (2020); NL: Lehner (2000); rest: OECD (2018).

3. Measuring household wealth in Europe

Providing a definition of household wealth is a necessary starting point for any discussion on the distribution of wealth. This paper focuses on net wealth – we are looking at the value of all assets minus outstanding liabilities. For the sake of readability, we use wealth and net wealth as synonyms and explicitly use the term gross wealth when referring to the value of assets before subtracting liabilities. Furthermore, the revenue estimations presented in the next section are based on household data and thus assume that the tax subjects are households. We will come back to these definitions when introducing the tax simulations.

3.1. Data sources and measurement challenges

Obtaining a detailed picture of the distribution of wealth in Europe is difficult due to the limited availability of data. In general, three types of data are used. The first is tax data, ideally directly obtained from net wealth taxes. However, since Spain is the only EU country as of 2020 which still has a wealth tax, this option is not viable for providing insights into the distribution of wealth in Europe. Alternatively, tax data on capital incomes can be used to deduce the value of the underlying asset from which the taxed income stream derived. While this approach is widely used (Garbinti et al 2020), it can only provide an adequate picture of the distribution of wealth if there are few exemptions of capital income taxation, and at the same time if high net worth individuals do not hide or shield their capital income from taxation. In general, assets which do not generate income flows, which are subject to taxation, cannot be assessed with this method. Alternatively, estate tax data are used in the literature (Atkinson 2018, Alvaredo et al 2018).

The second source of data is so-called rich lists put together by journalists. The best-known example of such a rich list is the *Forbes World's Billionaires List*. Similar, more specialised lists exist for several European countries. While such lists can provide valuable information on the wealthiest individuals and families in a country, it is clear that they represent only rough estimates based on the stock market valuation of holdings in listed companies and on the research carried out by the providers of the various rich lists. The detailed methods applied in this context are often undisclosed and can vary substantially across different providers and countries. These observations imply that relying solely on such lists at best provides a picture of the wealth distribution limited to the very rich, and potentially suffers from measurement error and cross-country inconsistencies.

The third data source is household surveys, usually conducted by central banks. The Survey of Consumer Finances (SCF) in America is a longstanding example of high-quality household surveys on households' balance sheets. The ECB's Household Finance and Consumption Survey (HFCS) is a recent attempt to bring existing surveys such as those of the Italian and French central banks into a unified framework, and to collect data in countries which did not have such surveys before. Survey data come with the major advantage of providing a rich set of additional information about the household. A serious drawback is the potential that the resulting picture of the distribution of household wealth is seriously distorted if more affluent households do not participate, as is generally the case and has been documented in the past (Kennickell & McManus 1993, Kennickell 2017a, Kennickell 2017b, Vermeulen 2016, Schröder et al 2020). This problem is known as differential non-response bias. Some central

banks (like the US Fed) and some countries in the HFCS (most importantly France and Spain) address the problem of lower participation among affluent households by deliberately including a disproportionately large number of affluent households in the gross sample. The result is that the net sample will include a sizeable number of households from the tail of the distribution even if the overall rejection rate among the wealthy is high. This technique is called oversampling and crucially requires information on household wealth before the data collection starts. Traditionally, tax information is required in order to implement oversampling.[9] To some extent, a high-quality oversampling approach combines the advantages of exploiting tax-data (data source 1) and implementing a survey methodology (data source 3).

3.2. The approach of this paper

This study uses data from the ECB's Household Finance and Consumption Survey (HFCS) and thus relies on household survey data. This means any wealth tax revenues based on this data source will be severely underestimated if the problem of differential non-response among rich households is not addressed. The HFCS differs from its US counterpart (Survey of Consumer Finances) in that each European country which participates in the HFCS carries out the data collection itself. The ECB provides a standardised framework determining what type of data are collected, as well as the broad methodological approach (ECB 2017). Crucially, however, there is no unified approach to tackling differential non-response across participating countries. This means the extent to which individual country data capture the tail of the distribution varies considerably. This can be seen when comparing the mean of the richest 5 observations across the 22 countries which participated in the third wave of the HFCS. For France, which implements stringent oversampling based on tax data, the mean of the richest 5 observations is €189 million. For the Netherlands the corresponding value is €8 million and for Germany it is €31 million. In order to deal with the apparent under-representation of affluent households in many countries, this paper follows the approach of Eckerstorfer et al (2016) and Vermeulen (2018) in order to address the under-representation of high-net-worth households in the HFCS.

This means that we first add observations from journalists' rich lists to the survey data and then fit a type I Pareto distribution to the tail of the data where the length of the Pareto tail is determined by an algorithm that searches for the best fit. After the Pareto tail is estimated, it is used to extrapolate those parts of the distribution which are missing in the raw survey data.

[9] Other forms of oversampling exist and rely on information such as excessive electricity consumption (Cyprus in the HFCS) or ownership of listed companies (German Socio-economic Panel).

This extrapolated tail is combined with the lower body of the survey data to construct an amended data set, which is used to estimate the wealth tax models discussed below.

While rich list observations are not available for all countries in our sample,[10] we aimed at a consistent approach for correcting for the under-representation of wealthy households in the top 1% of the distribution. In order to achieve this, we estimated a simple linear regression of the proportional increase of total net wealth held by the richest 1% of households before and after the Pareto model was fitted to the data ($Top1_{Pareto}/Top1_{HFCS}$) on the effective oversampling rate of the top 1% (EOR_{Top1}) and the overall response rate ($RESP$) based on the results of the 10 countries for which rich list data were available. We then corrected the wealth holdings of the households comprising the top 1% in the remaining countries, conditional on their effective oversampling and response rates. A cruder approach could have been to correct the top wealth brackets of those countries for which no rich lists are available simply based on the average correction of the 10 countries for which rich lists were available. However, conditioning on the effective oversampling and general response rate allowed us to take into account differences in survey quality across countries.

3.3. The Pareto distribution

Before we present the results of amending the HFCS survey data with a Pareto tail, this section briefly highlights the unique features of the Pareto distribution and why it is particularly useful to model the distribution of household wealth. The most important characteristic of the type I Pareto distribution is that it exhibits an extremely heavy tail. With distributions which do not exhibit a heavy tail, observations far from the mean (for example billionaires in the case of household wealth) are so unlikely that in any practical application the result would be that they are excluded from the model. From the fact that extreme wealth in the form of multi-millionaires and billionaires exists, however, it is clear that such distributions cannot be used to model household wealth. With a heavy-tailed distribution like the Pareto distribution, extreme observations such as billionaires are a central part of the model. In fact, Vilfredo Pareto, the economist after whom the distribution is named, used it to study the distribution of income and wealth in Italy. The occurrence of extreme values is not unique to economics or the distribution of income and wealth. Pareto tails occur in many applications inside and outside economics, such as studying the distribution of city sizes, the distribution of earthquake intensities, rainfall and wave intensity (see Gabaix 2009 for a survey). The uniting theme across these applications is that a Pareto distribution is used to model phenomena where a few

[10] We have rich list observations for Austria, Belgium, Cyprus, France, Germany, Greece, Italy, Netherlands, Portugal, Slovenia, and Spain.

observations (ie, a few members of the population) are completely different from the bulk of the observations.

Using Pareto distributions to model the distribution of wealth can be justified both by the fact that extreme outliers (ie, billionaires) do occur, and also on theoretical grounds. More than 60 years ago Wold and Whittle (1957) showed that if wealth can be passed on to heirs, a Pareto distribution will occur independent of the starting distribution. The smaller the average number of heirs, the more unequal the distribution becomes. More recent so-called 'exchange trading models' focus on the interaction of the model's agents, who are characterised by different saving propensities (Aydiner et al 2018, Chatterjee and Chakrabarti 2007, Bouchaud and Mezard 2000). Das and Yarlagadda (2005) for example show that different interaction forms lead to a Pareto distribution of wealth. Crucially, only those models which exhibit a theoretical mechanism that yields a Pareto distribution can reproduce the observed degree of inequality in the data. Saving rates increasing in wealth are among the most important of these mechanisms (Benhabib and Bisin 2018, p. 1284). Altogether, there is a sound basis for the decision to model the tail of the wealth distribution as Pareto.

3.4. Descriptive statistics

This section summarises the results obtained from fitting the Pareto models to the data and compares the amended data sets including the Pareto tail with the raw sample data. Table 2 contains the results for the 22 EU countries in our sample. Fitting a Pareto tail to the data for those countries for which rich list data are available leads to a considerable upward revision of the wealth holdings of the richest 1% of households. The upward revision is reflected by an increase in the top 1% wealth share as well as by a (corresponding) increase in the total wealth holdings of the individual countries. In the case of Germany, for example, the raw survey data report total net wealth of €9,394 billion and a top 1% wealth share of 19% and zero billionaires. After adding the Pareto tail, total net wealth increases to €12,520 billion, a top 1% wealth share of 38% and an estimated number of 211 billionaires. The fact that the raw data do not include any billionaires is an obvious indication of the under-reporting of wealth held by the most affluent households. For the data set as a whole (EU22) our approach leads to an increase of aggregate net wealth from €35.7 trillion to €43.6 trillion and the top 1% share increases from 18% to 32%. We provide a fully tabulated summary of the wealth distribution for the EU22 in the Appendix (see Table 8 for average wealth per percentile, Table 9 for percentile cut-offs and Table 10 for total wealth in each percentile). The Online Appendix contains equivalent tabulations for all 22 countries in our sample. It is important to keep in mind that these point

estimates are subject to substantial statistical uncertainty. We address this issue in section 4.4 below.

Table 3 puts our results into perspective and compares them with other available information of the top tail of the wealth distribution in Europe. The challenge is that high quality distributional data of household wealth in Europe other than HFCS data are scarce. One exception is Germany, where the German Institute for Economic Research (DIW) produced a data set on household wealth, using publicly available information on German shareholders to oversample high-net-worth individuals (Schröder et al 2020). The explicit goal of the sample design was to adequately observe the top tail of the wealth distribution. Based on this data set the DIW estimates the top 1% wealth share to be 35.3%, which is well in line with our results. The same holds for the top 5% and top 10% share (Table 3). When it comes to the number of billionaires in Germany, the *Manager Magazin* publishes a German rich list and for the year 2017 it included 170 billionaires. Given that many of the list entries represent entire family clans, representing more than 1 household, our estimate of 211 billionaires is again well aligned with the available exogenous information on the richest households in Germany.

Another country for which additional information on the top tail of the wealth distribution is available outside the HFCS is France. Garbinti et al (2020) for example report top wealth shares for France in 2014 of 55.3% for the top 10%, 43.1% for the top 5% and 23.4% for the top 1%. Our corresponding results are 55.9%, 43.9% and 27.5% respectively (Table 3). When it comes to the number of French billionaires, the magazine *Challenge* reports 68 French billionaires in 2017 in comparison with 79 billionaires according to our estimates. Since the *Challenge* list includes family clans as well, these two results are again well aligned.

Krenek and Schratzenstaller (2018) estimate wealth holdings in Europe and focus on closing the gap between the total financial assets reported in the HFCS compared to national accounts data. Their final estimate of total net wealth across the 22 countries in our sample is €49,599bn compared to our estimate of €43,629 billion (Table 3). This demonstrates that aiming to close the under-reporting gap at the top of the distribution might not be enough to correct for the general under-reporting of wealth in household surveys, which would lead to a downward bias in our results. Compared to Krenek and Schratzenstaller (2018) the estimates of the total net wealth in our sample are conservative since they are roughly €6 trillion lower.

Finally, if we compare the number of billionaires in our amended data set including the Pareto tail with the raw survey data and the national rich lists we use, we find that our Pareto model produces 461 billionaires across the 10 countries in our sample for which we could obtain rich

list data. This compares with zero billionaires in the raw survey data and with 431 billionaires on the 10 national rich lists.

Table 2: Wealth distribution in Europe

	Raw survey data			Pareto model		
	Total wealth (€bn)	**Top 1% share** (% of total wealth)	**Billionaires**	**Total wealth** (€bn)	**Top 1% share** (% of total wealth)	**Billionaires**
Austria*	985	23%	0	1,525	47%	44
Belgium*	1,789	16%	0	2,127	29%	22
Cyprus*	152	22%	0	207	46%	7
Germany*	9,394	19%	0	12,520	38%	211
Estonia	66	25%	0	91	45%	0
Spain*	4,568	20%	0	4,649	21%	8
Finland	553	14%	0	623	24%	0
France*	7,097	17%	0	8,207	28%	79
Greece*	391	9%	0	458	21%	1
Croatia	159	19%	0	213	39%	0
Hungary	292	20%	0	358	35%	0
Ireland	678	15%	0	787	27%	0
Italy*	5,468	12%	0	6,787	27%	57
Lithuania	108	15%	0	133	31%	0
Luxembourg	203	20%	0	263	38%	0
Latvia	36	19%	0	43	33%	0
Malta	68	17%	0	90	38%	0
Netherlands*	1,450	21%	0	1,813	36%	25
Poland	1,278	14%	0	1,641	33%	0
Portugal*	668	23%	0	724	29%	7
Slovenia*	119	15%	0	129	21%	0
Slovakia	192	12%	0	242	31%	0
EU22	**35,713**	**18%**	**0**	**43,629**	**32%**	**461**

*Rich list information was available and used to fit the Pareto tail. Sources: Household Finance and Consumption Survey and authors' calculations.

Overall, Table 3 demonstrates that the approach taken in this paper to address the under-representation of high-net-worth households in survey data, and in the third wave of the HFCS in particular, yields plausible and robust results. Comparing key measures of wealth concentration based on the Pareto-amended data with several other data sources indicates that our model is well in line with these alternative data sources.

Table 3: Assessing the model fit

German top wealth shares	Raw survey*	Survey + Pareto*	Schröder et al 2020*
Top 1%	18.6%	37.7%	35.3%
Top 5%	40.8%	55.2%	54.9%
Top 10%	55.4%	66.3%	67.3%
French top wealth shares	**Raw survey***	**Survey + Pareto***	**Garbinti et al 2020***
Top 1%	17.1%	27.5%	23.4%
Top 5%	35.5%	43.9%	43.1%
Top 10%	49.2%	55.9%	55.3%
	Raw survey**	**Survey + Pareto****	**Krenek and Schratzenstaller 2018****
Total wealth EU22	35,713	43,629	49,599
	Raw survey	**Survey + Pareto**	**National rich lists**
Billionaires in the EU22	0	461	431

*% of total wealth holdings, **€bn. Source: raw survey estimates are from the HFCS's third wave and the survey + pareto results are based on the authors' calculations (eg. Table 2).

4. The revenue potential of a European net wealth tax

This section presents the rationale behind the wealth tax models we study, explains how the revenue estimates are obtained, and presents the results including estimates of the likely upper and lower bounds of our estimates.

4.1. Tax models

Model I (**flat tax model**) serves as a simple and easy to understand baseline. It exhibits a constant tax rate of 2%, starting for net wealth holdings above €1 million. This €1 million threshold leaves 97% of the population exempt. The constant tax rate means that a billionaire household is taxed in the same way as a millionaire household. The tax rate of 2% is low compared to average rates of return on wealth. Jordà et al (2019) report a return in excess of 9% on equity wealth for example. If tax rates are below the rate of return, the tax can be paid out of the resulting capital income and the concentration of wealth will not decrease and will potentially increase further over time. This means the flat tax model is not expected to be able to reduce current levels of wealth inequality.

Model II (**mildly progressive model**) exhibits a progressive structure which means the tax rate increases with net wealth. A billionaire household faces a higher tax rate than a millionaire

household. The tax rate starts at 1% on net wealth beyond €1 million (leaving 97% of the population exempt), increases to 2% beyond €2 million (corresponding to richest 1% of all EU22 households, which is roughly 1.9 million households)[11] and finally increases to 3% on net assets beyond €5 million (corresponding to the richest 0.3% of all EU22 households, which is roughly 550,000 households). Even though tax rates increase with net wealth in the mildly progressive model II, they remain well below the return on wealth. Thus, model II is only expected to slow down the tendency of increasing wealth inequality but is not expected to stop it or reduce current inequalities.

Model III (**strongly progressive model**) also exhibits a progressive structure. However, in contrast to model II, tax rates increase faster and are likely to be close to or above actual rates of return on wealth. In addition, model III starts at a higher threshold: a rate of 2% applies to net assets beyond €2 million which means 99% of all households are exempt. The rate increases to 3% beyond €5 million (richest 0.3% or 550,000 households), 5% beyond €10 million (richest 0.1% or 220,000 households), 7% beyond €50 million (richest 0.01% or 23,000 households), 8% beyond €100 million (richest 0.005% or 9,000 households) and the final bracket levies a rate of 10% on net assets beyond €500 million (richest 0.001% or 1,200 households).[12] The tax rates in the highest brackets of this model are similar to the rates of returns reported in the literature. For example, Jordà et al (2019) estimate the average rate of return on equities at roughly 9%, Fagereng et al (2020) use Norwegian tax data and show that the rate of return on net wealth is above 10% at the 90th percentile. Bach et al (2020) use Swedish tax data and estimate the return in excess of the Swedish interest rate to be 8% for the richest 0.01% of tax subjects. This means the strongly progressive model III is expected to decrease current levels of inequality over time.

Model IV (**wealth cap model**) represents a fundamentally different approach by introducing an effective maximum level of wealth and by defining tax brackets based on multiples of average wealth. It was proposed by Thomas Piketty (2020). Average net wealth across the EU22 is roughly €260,000 (based on the Pareto tail amended data). Piketty suggests a tax of 0.1% for wealth holdings beyond half the average, a rate of 1% for holdings beyond twice the average, 2% for net wealth beyond 5 times the average, going up to 60% beyond 1,000 times the average and 90% beyond 10,000 times the average, which is equivalent to €2.6 billion. Piketty's wealth cap model would still leave 59% of all households exempt. It is characterised by marginal tax rates which are substantially above the rate of return on net wealth and thus

[11] Differences from the tables reported in the Appendix are due to rounding.
[12] We rounded these numbers and they should be interpreted as noisy estimates.

would be expected to sharply reduce current wealth inequality. Model IV introduces an effective maximum level of wealth (cap) at 1,000 times the average (€260 million). Table 4 summarises the four models.

Table 4: Tax models I to IV

	Model I "flat tax"	**Model II "mildly progressive"**	**Model III "strongly progressive"**	**Model IV "wealth cap"**	
Approach	Flat rate	Progressive rate – slowing growth of inequality	Progressive rate – reducing inequality	Progressive rate – introducing a wealth cap	
% of population exempt	97%	97%	99%	59%	
Tax brackets	**Tax rates**			**Tax brackets**	**Tax rates**
from €1 million €1 million ≈ top 3% or 5.4 million households	2%	1%		0.5 times av. wealth	0.1%
from €2 million €2 million ≈ top 1% or 1.9 million households		2%	2%	2 times av. wealth	1%
from €5 million € 5 million ≈ top 0.3% or 550,000 households		3%	3%	5 times av. wealth	2%
from €10 million €10 million ≈ top 0.1% or 220,000 households			5%	10 times av. wealth	5%
from €50 million €50 million ≈ top 0.01% or 23,000 households			7%	100 times av. wealth	10%
from €100 million €100 million ≈ top 0.005% or 9,000 households			8%	1,000 times av. wealth	60%
from €500 million €500 million ≈ top 0.001% or 1,200 households			10%	10,000 times av. wealth	90%

Average wealth in the EU22 is €260,000 (based on Pareto tail amended data). The tax brackets for model IV therefore start at €130,000 (0.5 times average); €520,000 (2 times the average); €1.3 million (5 times the average); €2.6 million (10 times the average); €26 million (100 times the average); €260 million (1,000 times the average) and €2.6 billion (10,000 times the average).

4.2. Revenue estimation

We apply these four tax models to data from the ECB's Household Finance and Consumption Survey (HFCS) on 22 EU countries.[13] The HFCS is a large-scale household survey from which

[13] Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, and Spain.

we obtain measures of household net wealth. This means our wealth measure subtracts all outstanding liabilities from the value of all household assets. Thus, if a household has assets in the form of its primary residence (€800,000), two luxury cars (€250,000) and bank accounts (€400,000), while also having an outstanding mortgage (€300,000) and a car loan (€50,000), this household's net wealth would be equal to €1,100,000. The HFCS provides information about household gross wealth across five different categories: the first is real estate assets, which includes the main residence and any other real estate assets. The second asset category includes the value of self-employed and non-self-employed privately held businesses. The third category consists of current and savings accounts. The fourth category consists of financial assets such as bonds, stocks and private pension wealth held directly or in managed accounts. The fifth category includes any other assets such as cars and other valuables. Net wealth is calculated as the difference between the value across all asset categories minus all outstanding liabilities such as mortgages, car loans, consumer loans etc.

Tax revenues are calculated in the following way: if we use the household from the previous paragraph, with net wealth of €1,100,000 and the flat tax model (model I) with an exemption threshold of €1 million and a tax rate of 2% as an example, this household would be taxed at €2,000 per year. If the threshold went up to €2 million, this household would be fully exempt. The revenue estimates in Table 5 are the results of equivalent calculations for all observations in our sample, which are then scaled up to the actual population size of the country. Revenues are estimated for all four tax models, first based on the raw survey data which do not adequately capture the tail of the wealth distribution (column 1). Secondly, we estimate tax revenues based on the Pareto tail amended survey data (column 2). Third, we use the Pareto amended survey data with a reduced the tax base (ie, household net wealth) to account for tax evasion (column 3). Fourth, we use the Pareto amended survey data and a strongly reduced tax base due to tax evasion (column 4). To quantify the degree of tax evasion of tax subjects we rely on established estimates in the literature (Bach and Beznoska 2012). We calculate the potential revenues by factoring in evasion in two manners; in column 3, we reduce the tax base of each tax subject in the following manner: real estate assets by 20%, financial assets by 24%, directly held companies by 13% and any other assets by 100%. To simulate a strong evasion reaction by tax subjects we double the reduction factors for financial assets (48%) and directly held companies (26%).

4.3. Results

Our results are presented in Table 5. We provide revenue estimates based on our sample of 22 EU countries in billion euros (2017 prices), in % of 2017 GDP (€11,862 billion) and in % of

general government total revenue (2017). Table 5 contains so-called 'point estimates' which represent the best result given the available data. They do not provide any information about the unavoidable uncertainty which is attached to the results of statistical models. We will address the statistical uncertainty associated with our results in the next subsection.

Table 5: Tax revenue estimates for models I to IV

		(1) Raw survey data	(2) Survey data + Pareto tail	(3) Survey data + Pareto tail + evasion	(4) Survey data + Pareto tail + strong evasion
Model I flat tax	in billion €	117	271	192	164
	in % of GDP	1.0%	2.3%	1.6%	1.4%
	in % of gov rev	2.1%	5.0%	3.5%	3.0%
Model II mildly progressive	in billion €	103	316	224	190
	in % of GDP	0.9%	2.7%	1.9%	1.6%
	in % of gov rev	1.9%	5.8%	4.1%	3.5%
Model III strongly progressive	in billion €	88	505	357	303
	in % of GDP	0.7%	4.3%	3.0%	2.6%
	in % of gov rev	1.6%	9.3%	6.6%	5.6%
Model IV wealth cap	in billion €	249	1,837	1,281	1,081
	in % of GDP	2.1%	15.5%	10.8%	9.1%
	in % of gov rev	4.6%	33.7%	23.5%	19.9%

Estimated tax revenues for models I to IV, reported in billion € (2017 prices), in % of 2017 GDP and in % of total government revenue for the EU22 (Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, and Spain). The tax bands and the corresponding rates are presented in Table 4. Source: Own calculations and HFCS.

Three general observations emerge from Table 5: first, the results show that raising substantial revenues of more than 1.5% of GDP (€180 billion) with a net wealth tax is possible even after taking potential tax evasion into account (columns 3 and 4 of Table 5). Second, opting for highly progressive tax rates would allow governments to raise substantially more: 3% of GDP (€350 billion) with model III and 11% of GDP (€1,280 billion) with Piketty's wealth cap model. These are significant volumes given that these are estimates of annual revenues.[14] In comparison, the EU's Covid recovery fund is equal to €750 billion over 10 years or roughly €75 billion annually. Put differently, the estimated revenues of the strongly progressive model III amount to €300 billion annually, which is roughly the same amount the EU currently plans to hand out in the form of grants as part of the Covid recovery fund over a decade. Third, only a small fraction of the population would be taxed. Households with net wealth beyond €1 million represent the richest 3% of all households across the 22 EU

[14] For the wealth cap model, a drop in revenues would be expected after the maximum level of wealth is established.

countries in our sample, and households with net wealth beyond €2 million represent the richest 1% of all households in the EU22.

Despite the efforts in this paper, our data are still suffering from an under-representation of extremely wealthy households, since for those countries where no rich lists were available[15] we only upscaled existing households. This approach does not yield billionaire observations or observations with net-wealth holdings of hundreds of million for those countries. The implication is that the reported wealth tax revenues are still likely to underestimate the true potential. In particular, revenue estimates for models III and IV are most seriously affected because they tax multimillionaire households more than models I and II.

Finally, Table 5 contains a seemingly paradoxical result: when using the raw survey data (column 1), the flat tax model I (threshold €1 million) yields annual revenues of €117 billion compared to €88 billion by the strongly progressive model III (threshold €2 million). This result vanishes as soon as the Pareto tail is added to the data and the under-representation of wealthy households is at least partially taken into account. In columns 2, 3 and 4, the strongly progressive model III always yields higher estimates than the flat tax model I. This highlights **the problem of under-reporting in the raw survey data and the importance of correcting it in order to obtain a realistic assessment of different tax models.**

Comparing the results in this study with recent revenue estimates in the scientific literature yields the following picture: Revenue estimates of a European net wealth tax range from 1.05% of GDP (Landais et al 2020) to 1.47% of GDP (Krenek and Schratzenstaller 2018). The former propose a mildly progressive tax of 1% on net wealth holdings in excess of €2 million, which is roughly the top 1% of households in the EU27. For net wealth beyond €8 million a 2% tax rate is applied and beyond €1 billion a tax rate of 3%. The mildly progressive model II is most comparable to Landais et al's proposal and yields estimated revenues of 1.9% of GDP. Given the more progressive nature of model II compared to Landais et al, the results are very similar. The only other study of a European net wealth tax (Krenek and Schratzenstaller 2018) applies a tax rate of 1% beyond net wealth of €1 million and 1.5% beyond €1.5 million. Based on this revenue estimates of 1.5% of GDP are obtained. In comparison the flat tax model I in this study is estimated to yield revenues of 1.5% of GDP.

[15] These are Croatia, Estonia, Finland, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, and Slovakia.

4.4. Statistical significance

The data, on which the results in Table 5 are based, represent a sample of the population in the EU22. Whenever conclusions about the population are drawn based on a sample, these conclusions exhibit some degree of uncertainty due to the randomness with which participating households were selected. The HFCS comes with a set of 1,000 so-called 'replicate weights' which simulate 1,000 alternative possible data sets and thus provide information on the variability of the available data and the results based on them. We used these replicate weights to calculate 1,000 alternative revenue estimates for each entry in Table 5 and thus obtained a range of 1,000 possible results. Ordering them from the lowest to the highest result for each model, we then used the middle 95% as our 'range of plausible results' or our 95% confidence interval. These ranges are reported in Table 6 below.

Table 6: Confidence intervals for estimated tax revenues (€bn)

		(1) Raw survey data	(2) Survey data + Pareto tail	(3) Survey data + Pareto tail + evasion	(4) Survey data + Pareto tail + strong evasion
Model I flat tax	UPPER	145	302	215	184
	POINT	**117**	**271**	**192**	**164**
	LOWER	92	247	173	147
Model II mildly progressive	UPPER	134	359	256	219
	POINT	**103**	**316**	**224**	**190**
	LOWER	77	282	198	168
Model III strongly progressive	UPPER	121	598	427	362
	POINT	**88**	**505**	**357**	**303**
	LOWER	64	435	306	258
Model IV wealth cap	UPPER	303	2,302	1,622	1,372
	POINT	**249**	**1,837**	**1,281**	**1,081**
	LOWER	203	1,521	1,054	888

The rows labelled 'POINT' contain the point estimate from Table 5 and are reproduced here for convenience. The rows labelled 'UPPER' contain the upper bound and the rows labelled 'LOWER' contain the lower bound of the 95% confidence interval we calculated, based on a set of 1,000 replicate weights from the HFCS.

While it is expected for some variation to be found in the estimates presented in Table 6, the fundamental result is that the lower bound is always substantially higher than zero. This means that our results strongly suggest that introducing an annual tax on net wealth has the potential to generate substantial revenues. Our lowest estimate for the raw survey data is €64 billion and €147 billion after including the Pareto tail but assuming strong tax evasion. On the other hand, the upper bounds are substantial. For example, the strongly progressive model III could yield up to €427 billion annually under the assumption of moderate tax evasion.

5. A well-designed European Net Wealth Tax

Taxation of wealth is often met with fierce resistance, sometimes seconded by the argument that it is not practically feasible. This section looks at some of the practical concerns around implementation of a net wealth tax. Firstly, a wealth tax will benefit from implementation at the European level or at least from a consistent implementation at the national level across member states. The reason is that **taxing wealth across the EU will increase tax authorities' enforcement power and will reduce the ability for tax evasion**. While these are clear benefits of an implementation on the European level, they do not by any means imply that national wealth tax initiatives are not viable. The successful implementation in Switzerland, Norway and Spain demonstrates the converse (see section 2.2). Also, the revenue potential at the national level remains high (Heck et al 2020). All four proposed models share the common feature of a deliberately broad tax base, meaning no exemptions are granted. This simplifies administrative burdens and cross-country implementation, especially in combination with high thresholds.

Secondly, the issue of how assets are valued is an important question. The basic principle should be to value assets at their current market price. For some assets, such as bank accounts or publicly traded securities, market values are readily available. Real estate is taxed in some form in many countries already and, as a result, valuations are available. In those cases where real estate taxation is based on historic values, transaction data need to be used to build databases of market valuations which can be used together with expert valuations to calculate taxable wealth. For harder to value assets such as privately held businesses for which no transaction record or comparable assets exist, tax authorities can rely on two options. On the one hand, the value can be estimated based on a formula taking past profitability, turnover and key business characteristics into account. Switzerland does this successfully and the Internal Revenue Service (IRS) in America uses formulas to value stock options for income taxation purposes (Saez and Zucman 2019). On the other hand, if a formula-based approach is not feasible, owners can be given the opportunity to pay the tax liability in shares (Saez et al 2021).

Thirdly, the issue of valuation is closely tied to the broader question of enforcement and to what extent tax authorities are given the tools they need. Starving tax authorities of adequate funding, and not providing them with the adequate tools, is surely more of a political choice than an economic imperative. To enforce a wealth tax, tax authorities need additional resources in terms of staff and funding as well as specialised infrastructure (databases for

asset valuations, automatic information exchange with financial institutions, as well as beneficial ownership registries). This infrastructure will not only allow proper enforcement of a net wealth tax but will also be crucial in the more general fight against tax evasion and organised crime (ICRICT 2019). In addition to this 'fairness dividend', this infrastructure will enable tax authorities to automate the calculation of outstanding tax liabilities to a high degree and issue pre-populated tax statements. Several tax authorities use these practices already and in doing so greatly reduce the administrative burden on tax subjects (OECD 2006, Saez and Zucman 2019).

Fourth, often concerns are raised about the high administrative costs of net wealth taxes and it is claimed that revenues would fall short of the costs. Based on the revenue estimates presented in section 4.3 it is hard to imagine administrative costs of such magnitudes. Studies which report revenues that fall short of, or are close to, the estimated administrative costs reach this conclusion either because of extremely low tax rates (below 1% annually) or because of unrealistically high cost estimates. The latter are usually high not because of the cost of running the infrastructure but because of the estimated cost of compliance on the side of taxpayers. We deliberately abstain from providing such an estimate. Those countries which successfully levy wealth taxes demonstrate that compliance costs can be kept at a reasonable level. In addition, high compliance costs often stem from deliberate complexity in order to evade taxes. It is thus unclear why such costs should be used as an argument against taxation. Most importantly, however, having proper infrastructure in place which allows for highly automated assessment of the tax liability and pre-filled tax records has the potential to substantially reduce the administrative burden on tax subjects.

Lastly, in addition to imposing reporting duties on domestic financial institutions, the EU should use its size to put pressure on foreign jurisdictions, and tax havens in particular, to provide information on tax subjects holding assets in these jurisdictions (automatic information exchange). The US FACTA agreement demonstrates that such information requirements can be enforced.

Overall, the implementation of a European net wealth tax requires some practical problems to be overcome. None of them, however, represent a fundamental or insurmountable obstacle.

6. Conclusion

This paper provides revenue estimates for a range of possible tax designs of a European net wealth tax. While such revenue estimates are crucial for an informed public debate on the topic, producing realistic estimates is difficult due to the lack of data available on the wealth holdings of the most affluent households in Europe. We address this problem in two steps, first we use the ECB's new Household and Finance and Consumption Survey (HFCS) as our primary data source. Second, we model the tail of the wealth distribution with a type I Pareto distribution, which we fit to the survey data. A full tabulation of the wealth distribution in the EU22 can be found in the Appendix and in individual country tables in our Online Appendix. Based on this amended data set we derive the following conclusions:

First, household wealth is highly concentrated among the wealthiest households in the EU22: the richest 1% hold 32% of total net wealth while the poorest half of all households only hold about 4.5% of total net wealth. **This means that the ability of the wealthiest households to pay for the costs of the Covid-19 and climate crises is much higher than previously suggested.** Focusing on taxing the richest 1% or richest 3% of households can be justified not only by their ability to pay but also by the fact that rich households tend to leave larger carbon footprints. While highly subjective, many perceive wealth taxes as fair because of their ability to reduce or even inverse endogenous tendencies towards an increasing concentration of wealth. Hence, they might be a key tool for maintaining public support for the difficult transition towards a low resource intense and carbon neutral economy. This latter point becomes especially important if highly regressive energy taxes are required for a successful transition away from fossil fuels. Lastly, taxing wealth at the top is unlikely to hamper fragile post-Covid recoveries, unlike the generation of revenues via consumption taxes.

Second, this paper shows that a European net wealth tax can raise substantial revenues even when taking tax evasion into account. The high revenue potential is the flip side of the observed high levels of wealth concentration. We consider our estimates to be conservative and probably still an underestimation of the true potential due to the under-representation of rich households, which is still likely to persist to some extent in our data despite applying the best available methods to address it. The only other tax proposal that is discussed in this paper, and that exhibits a similar revenue potential, is a harmonised corporate income tax with a common minimum tax rate of 35% across the EU27. The combined revenue potential of the proposals discussed in section 2 together with a net wealth

tax lies between 2.2% and 8.3% of GDP annually (see Table 7)[16]. This would be a big step towards mobilising the 6.1% of GDP needed annually for the carbon neutrality transformation of the economy (Wildauer et al 2020).

Table 7: Tax revenues in % of GDP

	Low Estimate	Upper Estimate
Net wealth tax	1.0% [A]	2.9% [B]
Financial Transaction Tax	0.4% [C]	0.9% [D]
Harmonised corporate income tax	0.2% [E]	3.5% [F]
End fossil fuel subsidies	0.3% [G]	0.3% [G]
ETS reform	0.1% [H]	0.1% [H]
Carbon Border Adjustment Mechanism	0.2% [I]	0.5% [I]
Total	**2.2%**	**8.3%**
Green Deal Requirement	**1.3%** [J]	**6.1%** [K]

Table entries are based on the following sources. A: Landais et al (2020); B: Authors' calculation, strongly progressive model III with tax evasion effects (Table 5, column 3); C: European Commission (2013); D: Schulmeister (2011); E: Refers to a harmonised tax base only, no harmonised rates. Based on Tørsløv et al (2020); F: Calculation based on a harmonised rate of 35% using data from Tørsløv et al (2020). G: Based on Trinomics (2018); H: Based on EC (2020); I: Based on Krenek et al (2018); J: Based on EC (2018b) Table 10, excluding transport; K: Based on Wildauer et al (2020). All monetary values have been transformed into 2019 prices and scaled with the respective country aggregate GDP figures for 2019. For sources G, I and J that is the EU28, for sources A, D, E, H and K that is the EU27, for source B it is the EU22 as used in this study, for source F it is the EU16 non-tax haven as defined in footnote 5 and for source C it is Austria, Belgium, Greece, France, Germany, Italy, Portugal, Slovakia, Slovenia and Spain.

Third, a combination of clever design choices, more resources and better infrastructure for the EU's tax authorities would make a European net wealth tax feasible. With respect to the design of the tax, high exemption thresholds between €1 million and €2 million would not only exempt the vast majority of households (97% to 99%) but combined with a broad tax base and paired with progressive tax rates, would mean a wealth tax is able to generate substantial revenues while eliminating many of the problems that undermined past net wealth taxes in Europe, such as illiquid tax subjects and loopholes due to complicated exemption rules. Boosting tax authorities' resources to enforce the tax and to build appropriate infrastructure, such as real estate valuation databases and company registers, will ensure high levels of compliance and enforcement. Best practice examples such as Switzerland (valuation) and Norway (third party reporting) exist and can be used as a point of reference for successful implementation.

Therefore, based on the findings of this report we recommend the implementation of a European net wealth tax. Such a tax should feature a progressive design, like models III and IV in combination with high exemption thresholds between €1 and €2 million. Implementation

[16] The studies used in Table 7 are based on different country groupings. See the table for the full details. This means the totals of 2.2% and 8.3% need to be interpreted carefully and the changing country composition needs to be considered.

at the European level is desirable as it reduces the room for tax evasion and avoidance and European cooperation increases tax authorities' enforcement power. A European wealth tax along these lines would not only provide the resources needed for the transformation of Europe into a sustainable society but would also be a highly effective tool to reduce the concentration of wealth in the hands of the richest 1% of households (roughly 1.9 million families in the EU22) which currently hold 32% of total net wealth. Lastly, using such a tax to connect and upgrade Europe's tax authorities and their infrastructure, most importantly by comprehensive beneficial ownership registries, would yield **a fairness dividend in the form of Europe's increased ability to effectively fight tax evasion and organised crime in general**.

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Appendix

Table 8: Average net wealth per percentile for the EU22 in euros.

Perc	Raw	Pareto	Perc	Raw	Pareto	Perc	Raw	Pareto
100	3,905,000	8,263,000	67	176,000	177,000	33	31,000	31,000
99	1,488,000	1,654,000	66	169,000	170,000	32	29,000	29,000
98	1,109,000	1,164,000	65	163,000	164,000	31	26,000	26,000
97	913,000	946,000	64	157,000	158,000	30	24,000	24,000
96	782,000	799,000	63	152,000	152,000	29	22,000	22,000
95	703,000	715,000	62	146,000	146,000	28	19,000	20,000
94	636,000	643,000	61	140,000	140,000	27	17,000	18,000
93	580,000	587,000	60	134,000	134,000	26	16,000	16,000
92	539,000	544,000	59	129,000	129,000	25	14,000	14,000
91	504,000	509,000	58	123,000	124,000	24	13,000	13,000
90	470,000	474,000	57	119,000	119,000	23	11,000	11,000
89	444,000	448,000	56	113,000	114,000	22	10,000	10,000
88	419,000	422,000	55	108,000	109,000	21	9,000	9,000
87	398,000	400,000	54	104,000	104,000	20	8,000	8,000
86	379,000	381,000	53	100,000	100,000	19	6,000	7,000
85	359,000	361,000	52	95,000	96,000	18	6,000	6,000
84	340,000	342,000	51	91,000	92,000	17	5,000	5,000
83	326,000	327,000	50	88,000	88,000	16	4,000	4,000
82	312,000	313,000	49	84,000	84,000	15	3,000	3,000
81	299,000	300,000	48	80,000	80,000	14	3,000	3,000
80	286,000	288,000	47	76,000	76,000	13	2,000	2,000
79	275,000	276,000	46	72,000	72,000	12	2,000	2,000
78	264,000	265,000	45	69,000	69,000	11	1,000	1,000
77	254,000	255,000	44	65,000	65,000	10	1,000	1,000
76	244,000	245,000	43	61,000	61,000	9	1,000	1,000
75	235,000	236,000	42	58,000	58,000	8	0	0
74	227,000	228,000	41	54,000	55,000	7	0	0
73	218,000	219,000	40	51,000	52,000	6	0	0
72	211,000	212,000	39	49,000	49,000	5	0	0
71	204,000	204,000	38	45,000	46,000	4	-2,000	-2,000
70	197,000	198,000	37	42,000	42,000	3	-5,000	-5,000
69	190,000	191,000	36	39,000	39,000	2	-15,000	-15,000
68	183,000	184,000	35	36,000	36,000	1	-103,000	-103,000
			34	34,000	34,000			

The total number of households in the EU22 is 168 million and thus each percentile (in column Perc) contains roughly 1.68 million households. The displayed values are estimates and thus to avoid the impression of overstated precision have been rounded to the nearest 1000-euro value. Source: Authors' calculations and HFCS.

Table 9: Percentile cut-offs for the EU22 in euros

Perc	Raw	Pareto	Perc	Raw	Pareto	Perc	Raw	Pareto
100	1,874,000	2,153,000	67	172,000	173,000	33	30,000	30,000
99	1,245,000	1,322,000	66	167,000	167,000	32	27,000	28,000
98	1,002,000	1,039,000	65	160,000	161,000	31	25,000	25,000
97	836,000	861,000	64	155,000	155,000	30	23,000	23,000
96	741,000	754,000	63	149,000	150,000	29	20,000	21,000
95	665,000	675,000	62	142,000	143,000	28	19,000	19,000
94	607,000	614,000	61	137,000	137,000	27	16,000	16,000
93	556,000	562,000	60	131,000	132,000	26	15,000	15,000
92	522,000	526,000	59	126,000	126,000	25	13,000	13,000
91	485,000	490,000	58	121,000	121,000	24	12,000	12,000
90	457,000	460,000	57	116,000	116,000	23	11,000	11,000
89	430,000	434,000	56	111,000	111,000	22	9,000	9,000
88	407,000	409,000	55	106,000	107,000	21	8,000	8,000
87	388,000	390,000	54	102,000	102,000	20	7,000	7,000
86	369,000	371,000	53	98,000	98,000	19	6,000	6,000
85	349,000	351,000	52	93,000	94,000	18	5,000	5,000
84	333,000	334,000	51	90,000	90,000	17	4,000	4,000
83	318,000	319,000	50	86,000	86,000	16	4,000	4,000
82	305,000	307,000	49	82,000	83,000	15	3,000	3,000
81	293,000	294,000	48	78,000	78,000	14	2,000	2,000
80	281,000	282,000	47	74,000	74,000	13	2,000	2,000
79	269,000	271,000	46	71,000	71,000	12	2,000	2,000
78	259,000	259,000	45	67,000	67,000	11	1,000	1,000
77	249,000	250,000	44	63,000	63,000	10	1,000	1,000
76	239,000	240,000	43	60,000	60,000	9	0	0
75	231,000	232,000	42	56,000	56,000	8	0	0
74	223,000	223,000	41	53,000	53,000	7	0	0
73	215,000	215,000	40	50,000	50,000	6	0	0
72	207,000	208,000	39	47,000	47,000	5	-1,000	-1,000
71	200,000	201,000	38	44,000	44,000	4	-3,000	-3,000
70	194,000	194,000	37	41,000	41,000	3	-8,000	-8,000
69	186,000	187,000	36	38,000	38,000	2	-28,000	-28,000
68	180,000	181,000	35	35,000	35,000	1	-6,758,000	-6,758,000
			34	32,000	32,000			

Percentile cut-offs represent the beginning of the percentile. Percentile 1 thus represents the minimum of the data set and percentile 51 represents the median. The total number of households in the EU22 is 168 million and thus each percentile contains roughly 1.68 million households. The displayed values are estimates and thus to avoid the impression of overstated precision have been rounded to the nearest 1000-euro value. Source: Authors' calculations and HFCS.

Table 10: Total net wealth per percentile for the EU22 in billion euros.

Perc	Raw	Pareto	Perc	Raw	Pareto	Perc	Raw	Pareto
100	6,539	13,868	67	296	296	33	52	52
99	2,499	2,779	66	284	286	32	48	49
98	1,865	1,953	65	274	276	31	44	44
97	1,529	1,590	64	264	265	30	40	40
96	1,318	1,336	63	256	255	29	36	36
95	1,180	1,205	62	245	246	28	33	33
94	1,070	1,080	61	235	235	27	29	29
93	974	986	60	225	226	26	26	26
92	905	914	59	216	216	25	23	24
91	848	854	58	207	208	24	21	21
90	788	795	57	199	200	23	19	19
89	747	749	56	190	191	22	17	17
88	696	709	55	182	183	21	15	15
87	675	674	54	175	175	20	13	13
86	635	639	53	167	168	19	11	11
85	604	607	52	161	161	18	10	10
84	571	573	51	154	154	17	8	8
83	546	550	50	146	148	16	7	7
82	524	527	49	143	142	15	5	5
81	503	504	48	135	135	14	5	5
80	479	483	47	128	128	13	4	4
79	464	459	46	121	121	12	3	3
78	443	449	45	115	116	11	2	2
77	422	427	44	109	109	10	2	2
76	414	414	43	103	103	9	1	1
75	394	396	42	97	98	8	1	1
74	381	380	41	91	92	7	0	0
73	367	369	40	86	87	6	0	0
72	355	355	39	82	82	5	0	0
71	342	342	38	76	77	4	-3	-3
70	331	333	37	71	71	3	-8	-8
69	318	321	36	66	66	2	-25	-25
68	308	309	35	61	61	1	-175	-175
			34	56	57			

The total number of households in the EU22 is 168 million and thus each percentile (in column Perc) contains roughly 1.68 million households. Source: Authors' calculations and HFCS.

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