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journal homepage: www.elsevier.com/locate/jpubeTax evasion and tax avoidance [☆]Annette Alstadsæter ^a, Niels Johannesen ^{b,*}, Ségal Le Guern Herry ^c, Gabriel Zucman ^d^a Norwegian University of Life Sciences, Norway^b University of Copenhagen, CEPR and CEPR, Denmark^c Sciences Po Paris, France^d UC Berkeley and NBER, United States

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ABSTRACT

Exploiting rich administrative data and salient policy variation, we study the substitution between illegal tax evasion and legal tax avoidance. By increasing its enforcement effort, the Norwegian government pushed many wealthy individuals to disclose assets previously hidden abroad. We find that the taxes paid by these individuals rise 30% at the time of disclosure and that the rise is sustained over time. After stopping to evade, taxpayers do not start avoiding more. Our results suggest that cracking down on evasion by the wealthy can be an effective way to raise tax revenue, increase tax progressivity, and ultimately reduce inequality.

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1. Introduction

In recent years, governments in many rich countries have taken ambitious steps to crack down on tax evasion by the wealthy, notably by limiting the opportunities for evasion through undeclared offshore accounts (Johannesen and Zucman, 2014; Johannesen et al., 2020). Enhancing tax enforcement at the top of the wealth distribution may be desirable for at least three reasons. First, it has the potential to raise government revenue significantly as the wealthiest taxpayers account for a large fraction of total taxes. Second, it may help restore the progressivity of the tax system, which is currently being eroded by very high evasion rates at the top (Alstadsæter et al., 2019b). Third, it may mitigate the secular rise in inequality as top income and wealth shares continue to increase in many countries (Alvaredo et al., 2018).

Fighting the illegal tax evasion of the wealthy, however, only contributes to these policy goals to the extent that it effectively

raises their tax payments. This is not given even if enforcement is successful in the sense that it curbs tax evasion. As the wealthy are widely viewed to have ample opportunities for legal tax avoidance (Landier and Plantin, 2017), one may be concerned that they simply start avoiding more whenever enhanced enforcement compels them to evade less. This implies that the degree of substitution between evasion and avoidance at the top is a key parameter for guiding these enforcement policies. If substitution is low, cracking down on the evasion technologies used by the wealthy may be an attractive way to boost tax collection, increase the effective progressivity of the tax system, and reduce inequality. If substitution is high, the net benefits are likely to be small - or even negative if there are real resource costs of enforcement.

From a theoretical perspective, it is certainly possible that evasion and avoidance are substitutes because of the way their marginal costs and benefits interact (Slemrod and Yitzhaki, 2002). For instance, reducing evasion could render avoidance more attractive by moving taxpayers into an income bracket with a higher marginal tax rate or by lowering the marginal cost of time and other inputs shared between evasion and avoidance technologies. However, it is also theoretically possible that evasion and avoidance are not substitutes: Wealthy taxpayers may be in the top income bracket regardless of their evasion choices and evasion and avoidance could rely on entirely different inputs. This theoretical ambiguity calls for careful empirical analysis. While we are not aware of empirical papers speaking directly to this question, the puzzling finding that higher audit rates cause a decrease in tax pay-

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ments for high-income taxpayers (Slemrod et al., 2001) is suggestive of strong substitution between evasion and avoidance.

In this paper, we provide new empirical evidence on substitution between tax evasion and tax avoidance at the top of the wealth distribution by exploiting salient policy variation and detailed administrative data from Norway. The Norwegian tax administration operates a tax amnesty program, under which taxpayers who voluntarily disclose assets hidden abroad pay no penalties and suffer no criminal sanctions. The amnesty was rarely used until the Norwegian government launched a series of policy initiatives, most prominently the conclusion of information exchange agreements with a large number of tax havens, to reduce offshore tax evasion in 2008. This effort led around 1,500 taxpayers to disclose previously unreported foreign assets and income over the period 2008–2016. This represents a large sample of wealthy taxpayers who started to evade less at a well-defined point in time; the question we address in this paper is whether they also started to avoid more.

The Norwegian context is attractive to study the interplay between tax avoidance and tax evasion for several reasons. First, the enforcement policy represents an exogenous shock to tax evasion: it increased the risk of detection for offshore tax evaders and pushed many of them to use the amnesty. This alleviates concerns that the drop in tax evasion may be endogenous to changes in tax avoidance. Second, we can draw on administrative wealth data for the entire Norwegian population as well as a unique dataset with comprehensive transaction-level information on cross-border bank transfers. The richness of the data allows us to measure the behavioral adjustments accompanying participation in the amnesty: adoption of tax avoidance techniques and cross-border capital movements. The coverage of the data makes it possible to analyze also the very top of the wealth distribution: households with dozens of millions of dollars in net wealth whose evasion and avoidance are of particular interest to policy makers, but difficult to study with the smaller datasets obtained from, for instance, randomized tax audits.

In the main analysis, we estimate the behavioral adjustments of tax evaders at the time they disclose hidden assets under the amnesty in an event-study framework with a control group of other taxpayers. Our main results have the flavor of dynamic difference-in-difference estimates that express the change in behavior of disclosers over and above the change for other taxpayers with similar *ex ante* characteristics. We are particularly interested in the change in reported wealth, income, and taxes paid around the disclosures as well as changes in the use of a range of tax avoidance techniques. The results allow for a test of the substitutability between evasion and avoidance. With *perfect substitution*, each dollar decrease in evasion should be mirrored by a dollar increase in avoidance; hence, we should see no change in tax bases and tax liabilities, but a large increase in the use of avoidance techniques. With *no substitution*, by contrast, we should see substantial increases in tax bases and tax liabilities, but no change in the use of avoidance techniques.

The first set of results provides clear evidence against perfect substitution between evasion and avoidance. We find a sharp increase in reported net wealth (of around 60%) and income (of around 25%) at the time of disclosure as well as a corresponding increase in taxes paid (of around 30%). These behavioral changes are persistent: Disclosers report higher net wealth, income, and tax liabilities throughout the four-year period we follow them after they participate in the amnesty, with no clear decline over time. While this set of results does not rule some increase in avoidance around disclosure, it clearly rejects that the increase is large enough to offset the decrease in evasion, as implied by perfect substitution.

The next set of results suggests low or even zero substitution between evasion and avoidance. We consider a range of outcomes capturing avoidance techniques available to wealthy Norwegians: Legal ways to reduce effective taxation that exploit differences in tax rates across ownership structures, asset types and jurisdictions.¹ First, taxpayers can defer personal taxes on capital income by holding assets through separate legal entities. Second, they can reduce their wealth tax liability by investing in unlisted shares and real estate, which in Norway are taxed at only a fraction of market value. Third, they can avoid Norwegian taxes by moving their tax residence to a foreign country. Except for a small increase in newly founded holding companies prior to amnesty participation, we find no evidence that tax evaders increase tax avoidance when they disclose foreign assets and income. While we do not cover all possible avoidance margins and therefore cannot exclude that unobserved margins change at the time of disclosure, the low responsiveness on all the margins we do observe suggests that the overall increase in avoidance is small if not zero.

We corroborate the conclusions from the event-study analysis in a simple cross-sectional framework that compares tax payments in *levels* across taxpayers. While disclosers, before using the amnesty, paid much less taxes than other taxpayers with the same wealth and labor income (–20%), they paid the same, or slightly more, after using the amnesty (+5%). The latter result suggests that disclosers avoid less than other taxpayers after they have stopped evading, which is difficult to reconcile with high substitution between evasion and avoidance.

We explore three possible mechanisms underlying the apparently low substitution between tax evasion and tax avoidance. First, tax avoidance could be associated with fixed costs so that evaders with limited offshore wealth optimally choose not to adjust the avoidance margin upon disclosure. We re-estimate the model while allowing the results to vary with disclosure size, but find no clear signs of substitution to avoidance even for the subsample with the largest disclosures. Second, tax evaders could have exhausted all avoidance opportunities already before entering the amnesty – starting from such a corner solution, changes in the marginal costs and benefits of avoidance need not induce behavioral changes. We document that although the probability to adopt the various avoidance techniques rises strongly with wealth, there is scope for more avoidance even at the very top of the wealth distribution. Moreover, we find no substitution to avoidance even for the subsample who were pursuing avoidance least aggressively before disclosing. Third, tax avoidance opportunities could be concentrated among the very wealthiest. However, when we allow the estimates to vary with *ex ante* wealth, we find no substitution to avoidance even for the wealthiest disclosers. Overall, these results suggest that evasion and avoidance are largely independent decisions with limited substitution.

Finally, we ask to what extent the asset disclosures were accompanied by asset repatriation. This is important from the perspective of future tax compliance: Assets in Norwegian banks are subject to third-party reporting to the tax authorities and thus much more difficult to misreport than assets in foreign banks. It is also important for discussions about capital flight (Johannesen and Pirttilä, 2016): If tax evasion opportunities in offshore havens drive capital abroad, to what extent can increased enforcement then reverse the flow? The results document that amnesty participants gradually repatriated the majority of the offshore assets after disclosure. Using transaction data, we estimate that they

¹ This conceptualization of tax avoidance is similar to Stiglitz (1985) who discusses various forms of arbitrage, including postponement of taxes and investment in tax favored assets such as housing and pension accounts. It is somewhat broader than Slemrod and Yitzhaki (2002) who only consider strategies that reduce tax liabilities without altering the consumption basket.

transfer funds equivalent to around 60% of the disclosed assets to their domestic accounts over the disclosure over a five-year period. Using tax return data, we see an even starker picture with almost 75% of the estimated increase in taxable wealth and 90% of the estimated increase in taxable income belonging to domestic categories after five years. As Norwegian taxpayers are not required to take assets home to benefit from the tax amnesty, the strong repatriation responses suggest that holding assets is largely undesirable in the absence of evasion-related gains.

The results are robust to a range of modifications of the empirical framework. While the baseline model effectively compares the trajectories of disclosers and non-disclosers with similar ex ante characteristics in terms of wealth, income and age, our estimates do not change much when we reduce the number of controls (e.g. keeping only wealth), including more controls (e.g. adding controls for equity investments) or change how the ex ante controls are measured (e.g. exclude hidden assets from wealth measure). The results also remain similar when we re-weight the observations to make the discloser sample match the observable characteristics of an arguably *randomly selected* sample of offshore tax evaders whose secret accounts were exposed in the context of the *Swiss Leaks* (Alstadsæter et al., 2019b). The latter result suggests that selection into the amnesty is not an important concern, although we are unable to account for selection on unobservables.

Overall, our results suggest that cracking down on tax evasion by the wealthy can be a potent way to improve tax collection, increase the effective progressivity of the tax system, and ultimately reduce inequality. By increasing the detection risk associated with offshore tax evasion, the Norwegian authorities were able to significantly increase taxes paid by a large number of wealthy taxpayers.² The estimated increase in annual tax payments corresponds to around 2% of the disclosers' total net wealth (including increases in both wealth and income taxes), much more than the wealth tax at around 1% of reported net wealth. This suggests that stricter enforcement can potentially raise more revenue than even large increases in nominal rates when evasion is high. Given that the estimates are roughly uniform across the ex ante wealth distribution, including for the very wealthiest disclosers, the revenue gain is significant in dollar terms.

Our paper contributes to a broad literature on the effects of government policies aimed at reducing tax evasion (see Slemrod, 2018 for a survey). Recent initiatives studied in the literature include the introduction of electronic filing (Okunogbe and Pouliquen, 2018); new forms of third-party information reporting to improve the tax compliance of small firms (Slemrod et al., 2017; Naritomi, 2019); withholding taxes on credit card sales to limit evasion of sales taxes (Brockmeyer and Hernandez, 2018); and crackdowns on offshore tax evasion (Johannesen and Zucman, 2014; Johannesen, 2014). Moreover, our paper contributes to the large literature on tax avoidance behavior among high earners, such as corporate executives (Goolsbee, 2000), professional footballers (Kleven et al. (2013), and inventors (Akcigit et al., 2016). Finally, our analysis relates closely to a small set of papers studying disclosures of offshore wealth under tax amnesties without considering the interplay between evasion and avoidance (Johannesen et al., 2020; Londoño-Vélez and Ávila-Mahecha, 2021).³

The rest of the paper proceeds as follows. Section 2 describes the data. Section 3 develops the empirical strategy. Section 4 presents the results. Section 5 concludes.

² We only observe compliance responses that occur through the amnesty. Evidence from the U.S. suggests that there may have been additional gains through silent disclosures: repatriation of undeclared offshore assets outside of the amnesty (Johannesen et al., 2020).

³ An earlier literature analyzes U.S. state amnesties (e.g. Mikesell, 1986; Fisher et al., 1989; Crane and Nourzad, 1990).

2. Background and data

2.1. Tax and bank transfer data

For the purposes of our analysis, we combine data for the entire population of Norway from a number of different administrative sources.

We obtain de-identified data on taxable wealth, taxable income and tax liabilities from the Norwegian tax authorities. Since Norway levies a tax on net wealth, the wealth information is comprehensive and includes a detailed decomposition on asset classes such as deposits, housing, bonds, equities, and mutual fund shares. For most income and asset categories, tax authorities receive information from third parties, such as employers and banks. Other items, such as foreign and unlisted securities, are self-reported by the taxpayers. For key income and asset categories, our dataset includes information about both the amount originally claimed by the taxpayer and the amount on the most recent tax return after any corrections made by tax authorities.

In the data at our disposal, wealth is recorded at tax value. For items such as loans and deposits, the tax value is equivalent to the market value, but for other items the tax value is systematically below the market value (housing) or zero (tax-favored pension accounts). Investments in asset types with a low tax value is of independent interest to us because they represent an important tax avoidance strategy as explained below. However, when we seek to control for ex ante characteristics in our regressions, we prefer to measure wealth at market value. Following Alstadsæter et al., (2019a), we construct a measure of market wealth that is consistent with the household wealth recorded in national accounts and thus comparable to wealth for the United States computed by Saez and Zucman (2016).⁴ For disclosers, the measure of ex ante net wealth also includes the value of the hidden assets, based on the corrections to pre-disclosure tax returns made by the tax authorities for the purposes of computing back taxes.

We match income, wealth and tax data to comprehensive information about cross-border bank transfers collected by the Norwegian customs authorities. For each transfer involving a personal account in a Norwegian bank, we observe the transferred amount, the owner of the Norwegian account, and the country of the foreign bank account. Last, we add information from the corporate shareholder register to study the use of holding corporations to avoid taxes, and information from the population register to study migration.

2.2. The amnesty

To capture changes in offshore tax evasion empirically, we add information on the voluntary disclosure scheme (the "amnesty") to the dataset. In Norway, tax evaders can generally escape penalty taxes and criminal sanctions if they voluntarily provide information about unreported income and wealth sufficient for the tax administration to assess the correct amount of taxes owed up to ten years back in time. The two main conditions for using this amnesty is, firstly, that the declared income and wealth do not come from criminal activity and, secondly, that disclosure is fully voluntary and not prompted by ongoing investigations by the tax administration. Under these two conditions, no penalty taxes

⁴ We construct market values consistent with national accounts for each component of net wealth separately, as detailed in Alstadsæter et al., (2019a). For housing assets, we multiply the tax value of each unit with the ratio of the value of the housing stock in national accounts to the aggregate tax value summed over all housing in Norway. For tax-favored pension accounts, we assign a share of the aggregate value observed in national accounts to each individual based on age and salary level.

apply, but the taxpayer has to pay taxes due on the disclosed income and wealth up to ten years back. There is no requirement that offshore assets be repatriated to benefit from the amnesty. By contrast, taxpayers caught evading have to pay back taxes due plus an additional penalty tax that can reach 60% of the evaded taxes. Prison sentences up to six years are applicable in the most serious evasion cases. In international comparisons, the absence of penalty taxes makes Norway's disclosure scheme one of the most generous ones, providing strong incentives for taxpayers to disclose offshore assets and income (OECD, 2015).

As shown in Fig. 1, participation in the amnesty correlates strongly with the enforcement efforts of the tax authority.⁵ Only few taxpayers used the amnesty before 2008 when the authorities had virtually no way of detecting offshore tax evasion. The first wave of disclosures began when the Norwegian government stepped up its enforcement efforts by concluding a number of bilateral tax treaties with tax havens such as Jersey (October 2008), the Cayman Islands (April 2009), Luxembourg (July 2009), and Switzerland (August 2009). The treaties were signed in the context of a coordinated crackdown on tax havens by G20 countries (Johannesen and Zucman, 2014) and allowed tax authorities to request bank information from cooperating tax havens on a case-by-case basis. The second wave occurred after the signature in November 2013 of a multilateral convention providing for an automatic exchange of bank information between a large number of countries, including key tax havens (see Zucman, 2015, for a global analysis of these policy developments).

Between 2008 and 2016, around 1,500 individuals participated in the amnesty (excluding a small number of participants whose cases were dropped because no tax evasion was actually committed). This group of primarily wealthy individuals who acknowledged hiding assets abroad is large relative to the size of the Norwegian population. To fix ideas, there were 3.8 million adults in Norway in 2007 (the year before amnesty participation picked up), of which 38,000 in the top 1% of the wealth distribution. Our sample of 1,500 tax evaders is also large relative to the number of wealthy people typically sampled and found evading taxes in random audits or randomized controlled trials—two of the key sources used to study tax evasion (e.g., Slemrod et al., 2001; Slemrod, 2018). Total back taxes collected under the amnesty in the period 2007–2016 amounted to approximately \$250 million.⁶

We document a number of additional insights from the amnesty data in the Online Appendix. First, the distribution of disclosures is heavily skewed: while the median amnesty participant disclosed around \$0.5 million, the largest 10% of the disclosures each exceeded \$5 million and the largest 1% each exceeded \$50 million (Figure A1).⁷ Second, Switzerland accounts for the largest fraction of the disclosed assets, and its significance increases mono-

tonically through the wealth distribution, reaching 67% for the top 0.1% (Figure A2).⁸ Third, the composition of the offshore portfolio varies considerably across wealth groups: housing assets dominates for disclosers belonging to the bottom 50% of the wealth distribution whereas financial assets in the form of deposits and bonds dominate at higher wealth levels (Figure A3).⁹ Finally, the asset composition varies across locations: bonds and deposits are relatively more important in Switzerland, Luxembourg and Jersey while equity investments and housing assets are relatively more important in the U.S. and Spain respectively (Figure A4).

2.3. Avoidance techniques

Further, we use the micro-data to capture empirically several of the main ways in which Norwegian taxpayers avoid taxes.

First, a well-known tax planning technique in Norway involves investing in unlisted shares: since no market price is available for such securities, they enter the wealth tax base at the tax value of the underlying business assets, which typically implies a significant rebate.¹⁰ Similarly, the tax value of housing assets is only a relatively small fraction of the market value.¹¹ We use the tax value of unlisted shares and housing assets as an outcome in the analysis to capture these forms of tax avoidance.

Second, equity dividends and capital gains are taxable when distributed to individual shareholders, but tax free when distributed to corporate shareholders. This provides an incentive for individuals to own shares through a holding company, as it allows for deferral, in principle indefinitely, of taxes on the dividends received on the shares (Alstadsæter et al., 2019a). We create an indicator for founding a holding company based on the administrative corporate shareholder register and use it as an outcome in the analysis to capture avoidance through deferral of dividend taxes.¹²

Third, a number of countries offer low tax rates to wealthy residents, which makes it possible for wealthy Norwegians to avoid the high local taxes by moving their residence. Such responses would be in line with existing evidence that taxation shapes migration decisions at the top (Kleven et al., 2013a,b; Akcigit et al., 2016). Based on the administrative population register, we thus construct an indicator for moving away from Norway to capture avoidance through migration.

⁹ We measure disclosures within an asset class as the difference between the asset value on the final tax return (i.e. after corrections made by the tax authorities in the context of the amnesty) and the asset value initially claimed by the taxpayer (i.e. before these corrections). It is not possible to assign all disclosures to asset classes, as tax auditors in some cases correct the total taxable wealth on the tax return without correcting the relevant wealth components. This is not consequential for the tax assessment, as total taxable wealth is computed correctly, nor for our main analysis, but it implies that our attempt to break down disclosures by asset class remains incomplete.

¹⁰ Gobel and Hestdal (2015) estimate that the tax rebate to the most liquid unlisted equities is around 70% and exceeds 90% for a set of unlisted equities that were eventually listed. In principle, it is possible that the wealth tax rebate is partly capitalized into prices of unlisted shares. However, many investors are not wealth tax payers: individuals with net wealth below the threshold where the wealth tax tick in, pension funds, corporations and foreigners.

¹¹ On average, primary housing was taxed 20% of their assessed market value in 2007 with considerable variation across units (Statistics Norway, 2009). Starting in 2010, a new assessment system aimed to tax primary housing at a uniform 25% of their estimated market value and secondary housing at 40% while leisure houses remained under the favorable old assessment system. With the new assessment system, the tax rebate was thus slightly larger for primary than for secondary housing. However, it remained possible to reduce the effective exposure to the wealth tax considerably by investing in housing assets without changing the primary residence.

¹² We define a holding company as a corporation with only financial income. In principle, other limited liability companies can generate the same tax advantages as a holding company. As shown in Table 1, around 17% of disclosers owned closely-held corporations of any kind as compared to around 1.5% in the general population.

⁵ A theoretical literature shows that amnesties have more participants if combined with enhanced enforcement (Stella, 1991; Baer and Le Borgne, 2008). Another reason for the increased use of the amnesty from 2008–2009 may be the series of data leaks from tax havens, such as Swiss Leaks and Panama Papers, which may have increased the perceived risk of both criminal investigation and public exposure for offshore tax evaders (Johannesen and Stolper, 2017). Moreover, a scandal in 2007, widely covered in Norwegian media, where the Mayor of Oslo was accused of hiding money on Swiss bank accounts by his ex-son-in-law and ultimately had to resign may also have contributed to the surge in amnesty in participants in 2008–2009.

⁶ By comparison, the U.S. disclosure program collected around \$6.5 billion from around 45,000 disclosers over the period 2009–2012, including both back taxes and penalties (Johannesen et al., 2020). Measured per capita, the Norwegian program had around three times more participants and collected around three times more revenue than the U.S. program (albeit over a somewhat longer period).

⁷ Throughout the paper, values in NOK are converted into USD using the fixed exchange rate 5.86 NOK/USD, the average exchange rate in 2007.

⁸ The prominence of Switzerland in facilitating offshore evasion is consistent with earlier work based on macro data (Alstadsæter et al., 2018) and with more recent evidence from the disclosure program of the Netherlands (Leenders et al., 2020).

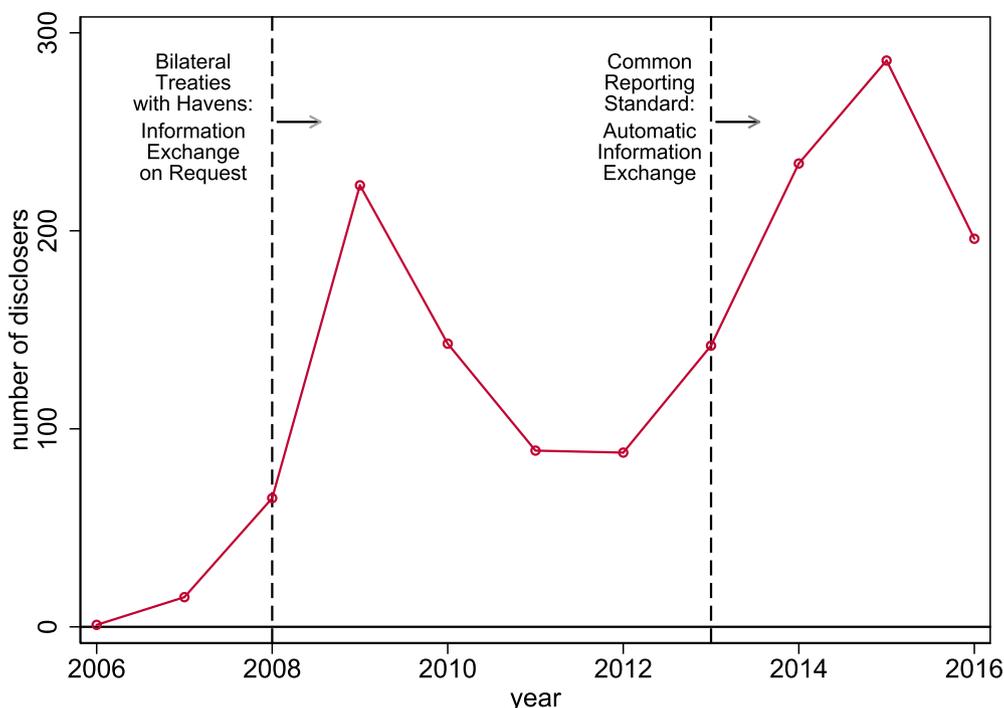


Fig. 1. Disclosures by year. The figure shows the number of participants in the Norwegian amnesty by year of first contact with the tax authorities. The dashed vertical lines indicate major tax enforcement initiatives during the sample period: a series of bilateral treaties with tax havens about information exchange on request starting in 2009 and the multilateral convention adopting the automatic information exchange in 2013.

Fourth, until 2009, there was a wealth tax rebate for taxpayers whose combined wealth and income tax liabilities exceeded 80% of their taxable income (Melby and Halvorsen, 2009).¹³ The rule created a significant tax avoidance opportunity for wealthy taxpayers who could reduce tax payments by structuring their assets in such a way that they generated little taxable income (e.g., by investing in securities that do not pay dividends). We capture this avoidance behavior empirically by constructing an indicator for benefiting from the 80% rule in 2007 (the last year where the rule was fully applicable).

Fifth, dividends paid out to individual shareholders were tax exempt until 2005, but then became taxable following a tax reform in 2006. The reform created an incentive for owners of closely held businesses to pay out dividends in 2005 (Alstadsæter and Fjærli, 2009). We construct an indicator for taking advantage of this tax avoidance opportunity.¹⁴

We note that while the former four tax avoidance outcomes are dynamic – we observe them in every year and we can track whether they change systematically around the time tax evaders enter the amnesty – the latter two are static – we observe them only once, in 2007 and 2006 respectively.

2.4. Summary statistics

Table 1 reports summary statistics for the population of amnesty participants in Column (1) and all other Norwegians in Column (2) for the year 2007. The individuals described in the table correspond exactly to the individuals in the estimating sample.

¹³ A similar system applies in other countries that have wealth taxes (see Jakobsen et al., 2020 for details on a similar rule in Denmark).

¹⁴ To be precise, the indicator takes the value one when dividends distributed out of a closely held firm in 2005 exceeds after-tax profits in the accounting year 2004 (which is the base for the 2005 dividend payout).

As shown in Panel A, disclosers are older and more likely to be male, married and foreign born than other taxpayers. As shown in Panel B, disclosers tend to be very wealthy: the average discloser reported more than \$3 million of taxable net wealth on their tax return in 2007, which is around 150 times more than the average non-discloser. The differences in reported income and tax liabilities are smaller, mainly because many disclosers are retired and earn no labor income. As shown in Panel C, disclosers owned a lot more housing wealth and unlisted shares than non-disclosers in 2007 and were much likely to found a holding company; by contrast, they were less likely to migrate. Moreover, disclosers were 10–20 times more likely to benefit from the 80% rule and to maximize dividends from closely held firms in preparation for the 2006 tax reform. As shown in Panel D, cross-border bank transfers were around \$13,000 from foreign accounts and \$16,000 to foreign accounts for disclosers in 2007 and 10–20 times smaller for non-disclosers. Tax havens accounted for around 25% of both incoming and outgoing bank transfers within the group of disclosers and a considerably smaller fraction for others.¹⁵

Disclosers are thus markedly different from the rest of the Norwegian population: they are much richer, and before using the amnesty they engaged much more in tax avoidance. In Column (3) of Table 1, we explore how much of the differences can be explained by demographic characteristics. Specifically, for each discloser, we identify all the non-disclosers with the exact same demographic characteristics (age, number of children, etc.) and take the average of their covariates. This procedure creates one synthetic non-discloser for each discloser with identical demographics, and we compute the average covariates for this synthetic sample. The differences between discloser and non-disclosers decrease somewhat when balancing the demographic characteristics, but remain large.

¹⁵ We define the set of tax havens in the same way as Johannesen and Zucman (2014).

Table 1

Descriptive Statistics. The table shows descriptive statistics as of 2007 for the 1,447 individuals who disclosed offshore assets under the Norwegian tax amnesty (Column 1); for the rest of the population (Column 2); and for a weighted subsample of non-disclosers with the same demographics as disclosers (Column 3). Panel A shows average values for demographic variables: age, number of children, marital status, gender and an indicator for being born outside of Norway. Panel B shows the taxable net wealth and income reported on the tax return and the resulting tax liabilities (in USD converted from NOK at the exchange rate 5.86); Panel C shows tax avoidance indicators: the tax value of housing assets and unlisted shares (in USD), an indicator for founding a holding company, an indicator for moving the residence out of Norway; and indicator for benefitting from using the 80% rule to obtain a wealth tax discount and an indicator for paying out all retained earnings of a closely held firm prior to the 2006 tax reform. Column D shows cross-border bank transfers (in USD): from all foreign countries, from tax havens, to all foreign countries and to tax havens where tax havens are countries not complying with the OECD principles of transparency and cross-border information exchange (Johannesen and Zucman, 2014).

	(1)	(2)	(3)
	Disclosers (Individuals disclosing assets under the amnesty)	Non-disclosers (Individuals not disclosing assets under the amnesty) All	Balanced
Number of individuals	1,447	3,714,572	-
Panel A: Demographics			
Age	58	46	58
Number of children	2.3	2.3	2.3
Married	60%	44%	60%
Male	66%	50%	66%
Foreign born	22%	11%	22%
Panel B: Wealth, income and tax liabilities			
Net wealth (USD reported tax value)	3,076,394	19,487	67,981
Net wealth (USD estimated market value)	5,680,021	202,980	327,795
Income (USD reported tax value)	184,988	56,414	65,929
Tax liabilities (USD reported tax value)	80,948	13,927	16,229
Panel C: Avoidance			
Housing wealth (USD tax value)	284,002	26,130	34,948
Unlisted shares (USD tax value)	2,162,212	16,245	25,315
Found holding company	0.69%	0.05%	0.05%
Emigrates	0.00%	0.02%	0.02%
Benefits from 80% rule	6.08%	0.24%	0.28%
Maximizes dividends from closely held firm (2005)	7.12%	0.70%	1.08%
Owner of a firm (100% of shares)	16.86%	1.51%	1.99%
Panel D: Bank transfers			
From foreign countries (USD)	13,039	605	1,175
- of which from tax havens (USD)	3,100	67	96
To foreign countries (USD)	15,908	1,232	1,851
- of which to tax havens (USD)	4,089	69	104

Finally, Fig. 2 illustrates how ex ante tax avoidance varies with the position in the wealth distribution and whether the differences in avoidance across disclosers and non-disclosers can be explained

¹⁶ Each figure is constructed by, first, taking averages within narrow wealth groups, each containing 0.01% of the population and, then, taking averages of those within the nine broader wealth groups shown in the figure. The figure in the top-left panel serves as a check that the other figures effectively compare disclosers and non-disclosers with equal net wealth.

by differences in wealth.¹⁶ For all of the avoidance outcomes, there is a pronounced wealth gradient – richer people avoid more – but controlling for wealth, avoidance is similar across disclosers and non-disclosers. Moreover, tax avoidance is far from systematic even at the very top of the wealth distribution, suggesting that disclosers were generally not, prior to making the disclosure, in a corner solution where all avoidance opportunities were exhausted. Rather, disclosers appear to be in an interior solution where a change to the marginal costs and benefits of avoidance, e.g. through a shock to evasion, could induce changes in the optimal choice of avoidance.

3. Empirical model

We study the behavioral adjustments of tax evaders around the time they disclose hidden income and assets under the amnesty in an event-study framework. The outcomes capture overall *tax compliance* (i.e. taxable wealth, taxable income and tax liabilities claimed by the tax payers), the use of various *tax avoidance* techniques (i.e. holding companies, unlisted shares, migration, housing assets) and *capital flows* (i.e. ingoing and outgoing cross-border bank transfers). Our estimating sample spans the period 2002–2013 and covers the entire adult population of Norway as of 2007, around 3.8 million adults, including the 1,447 amnesty participants.¹⁷ Indexing individuals by i and years by t , we estimate the following empirical model:¹⁸

$$\log(Y_{it}) = \alpha_i + \gamma_t \times X_i + \sum \beta_k D_{it}^k + u_{it}$$

where α_i denotes individual fixed effects, γ_t denotes calendar year dummies, X_i is a vector of dummies capturing individual characteristics (defined in 2007 before the first wave of disclosures) and D_{it}^k denotes event time dummies, indicating year k relative to the year of the disclosure of individual i . Standard errors are clustered at the individual level to allow for auto-correlation in the error term.

The event time dummies are the main variables of interest as they measure the change in the outcome for disclosers since the reference year, over and above the change observed for non-disclosers with similar ex ante characteristics in the same period. Since evaders disclosing offshore wealth in the beginning of year 0 can incorporate the disclosed wealth into the tax return for year -1 , we let year -2 , the last year for which the tax return has definitively been submitted at disclosure in year 0, be the reference year.

The interaction terms $\gamma_t \times X_i$ ensure that the dynamic adjustments of disclosers are measured relative to a counterfactual trajectory described by non-disclosers with similar ex ante characteristics. Accounting for the counterfactual trajectory is important given that many factors, entirely unrelated to amnesty participation, affected the economic outcomes of disclosers during the sample period, e.g. net wealth increased due to the boom in the

¹⁷ The panel is not fully balanced as individuals enter the sample when they turn 18 years old or move to Norway, and exit the sample when they die or move away from Norway. We have information about amnesty participation until 2016 and individuals who participated after 2013 generally remain in the sample, but only contribute to identification of the pre-trend. However, as we cannot compute the size of the disclosure for individuals disclosing after 2013, such individuals fall out of the sample when the estimates are conditioned on the size of the disclosure (Fig. 6).

¹⁸ Including non-disclosers in the analysis allows us to employ both individual fixed effects and a full set of time dummies, which is not possible in empirical designs that identify event-time dummies exclusively from differences in the timing of the event (Borusyak and Jaravel, 2017).

¹⁹ There is likely to be some undisclosed offshore evasion among taxpayers in the control group. This suggests that we are partly identifying off a comparison between, for instance, the reported net wealth of disclosers and the reported net wealth of evading non-disclosers with similar observed ex ante characteristics. This comparison is still likely to address the potential confounders discussed above and pre-trends remain a good diagnostic of confounding shocks.

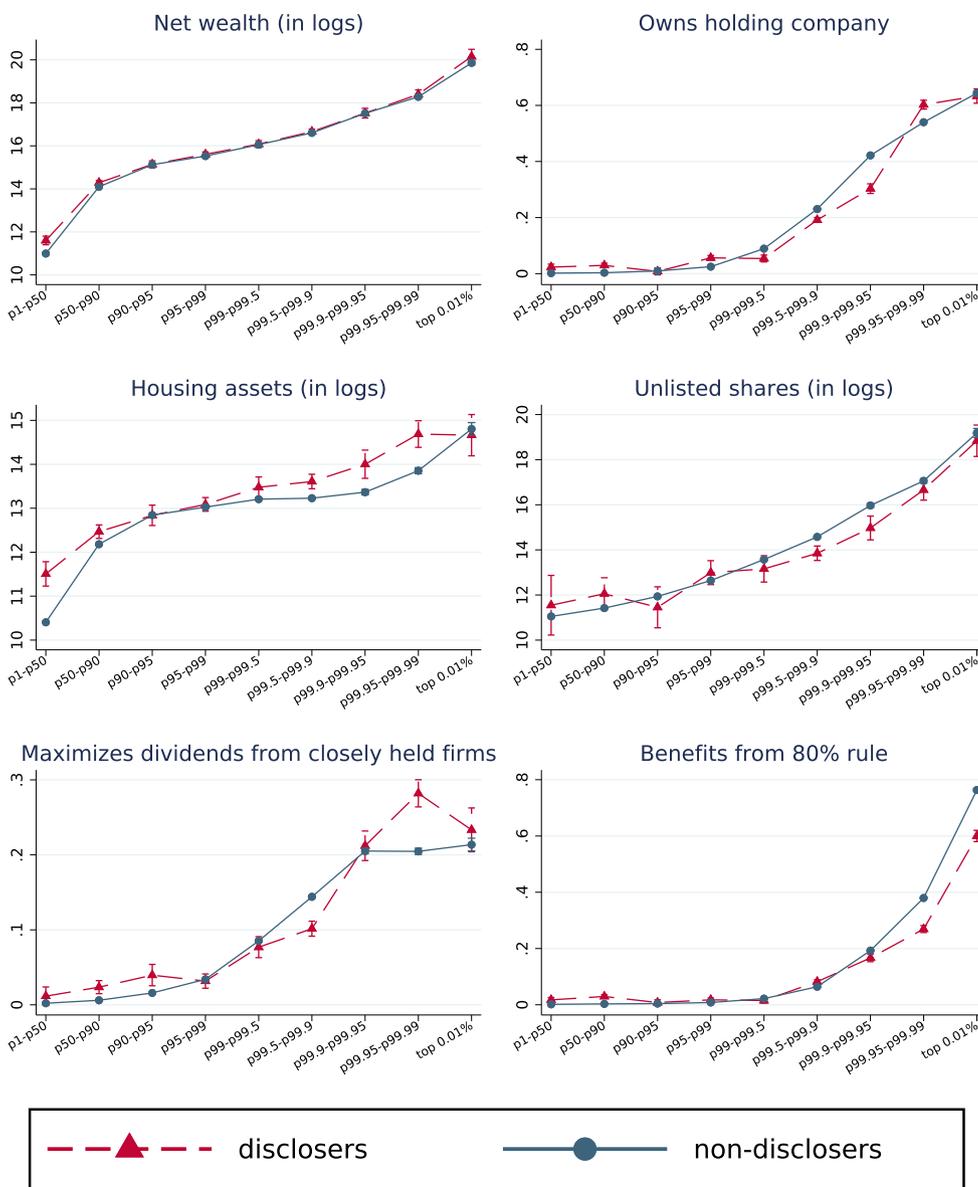


Fig. 2. Tax avoidance by wealth group. The figure shows, by location in the net wealth distribution, the average of the following outcomes: net wealth at market value (upper left), an indicator for owning a holding company (upper right), the tax value of housing assets (middle left), the tax value of unlisted shares (middle right), an indicator for paying out all retained earnings from a closely held firm just before tax reform in 2006 (bottom left) and an indicator for using the 80% rule to obtain a wealth tax discount (bottom right). To account for differences across disclosers and non-disclosers in the distribution of wealth within the nine wealth groups, the figures are constructed by, first, taking averages within much narrower wealth groups, each containing 0.01% of the population and then averages of those within the nine broader wealth groups shown in the figure.

housing market, labor income fluctuated due to life-cycle factors and tax liabilities changed mechanically due to tax reforms. All of these effects are likely to be heterogeneous and our model therefore allows the counterfactual trajectory to vary by ex ante characteristics (captured by X_i).¹⁹

In the baseline specification, the ex ante characteristics are captured with 10 dummies for net wealth, 10 dummies for income and 6 dummies for age (a total of 26 dummies). To construct the dummies for net wealth, we divide the sample of disclosers into ten equally sized groups based on their net wealth in 2007 (including

¹⁹ There is likely to be some undisclosed offshore evasion among taxpayers in the control group. This suggests that we are partly identifying off a comparison between, for instance, the reported net wealth of disclosers and the reported net wealth of evading non-disclosers with similar observed ex ante characteristics. This comparison is still likely to address the potential confounders discussed above and pre-trends remain a good diagnostic of confounding shocks.

assets disclosed in later years), assign non-disclosers to these wealth groups, and create dummies corresponding to the groups. We construct the dummies for income following an analogous procedure while the dummies for age express uniform intervals (e.g. 20–29, 30–39, ..., and 70+).

In robustness tests, we modify the vector of ex ante characteristics in a number of ways. First, we consider versions of the model that control both more and less exhaustively for ex ante characteristics. For instance, we add controls for ex ante equity investments to allow for systematic differences in the portfolio composition across disclosers and non-disclosers with the same net wealth, income and age. Second, we re-define the characteristics so they are measured in 2005 rather than in 2007. This addresses the concern that a very small group of taxpayers made disclosures already in 2006–2007, but adds noise by increasing the time between measurement of the characteristics and observation of the relevant

outcomes. Third, we re-define ex ante variables to exclude disclosures made under the amnesty. In the baseline model, we include disclosures in the wealth and income controls; however, it is not clear which of the two models delivers the most accurate counterfactual for disclosers.

Occasionally, we employ a more compact version of the baseline model where the omitted event time categories are -4 , -3 and -2 and the categories 0 , 1 and 2 are replaced by a simple *post* dummy. In this model, *post* is the key variable of interest. It expresses the change in the outcome from the years before the disclosure to the years after relative to the change over the same period for non-disclosers who are similar in terms of wealth, income and age.²⁰

Across all specifications, the key identifying assumption is that disclosers would have followed the same trajectory as non-disclosers with the same ex ante characteristics if they had not made a disclosure under the amnesty. A key concern is *reverse causality*: Taxpayers may have chosen to participate in the amnesty because of changes in the economic outcomes of interest. For instance, the decision to legally repatriate hidden assets may be induced by losses on the stock market or by investment opportunities in a start-up company, in which case we would underestimate the increase in compliance (measured by net wealth) and overestimate the increase in avoidance (measured by unlisted shares). The fact that the waves of disclosures followed salient enforcement efforts attenuates this concern: It seems plausible that the vast majority of disclosers chose to use the amnesty in response to the increased risk of detection for offshore tax evaders rather than because of idiosyncratic shocks to their balance sheets. Moreover, our empirical design allows us to detect some forms of reverse causality by comparing trends in the outcomes across disclosers and non-disclosers in the years *prior to* disclosure: To the extent that confounding shocks occur in an earlier year than the disclosure, they will appear as a differential trend for the disclosers in the pre-disclosure period. Finally, we also consider a major income component, wage income, which is *not* mechanically related to disclosures and therefore offers another diagnostic: If wage dynamics differs systematically across disclosers and non-disclosers, it raises concerns about endogeneity and suggests that differential dynamics in total income and tax payments cannot be attributed entirely to disclosures.

Another issue that is important for the interpretation of the estimates is *selection* into the amnesty: While our estimates capture substitution between evasion and avoidance in the subsample of offshore evaders who choose to disclose under the amnesty, the estimates are, in principle, local to this subsample and may not necessarily extend to the full sample of offshore evaders.²¹ It follows that we may overestimate substitution if there is selection into the amnesty on characteristics correlating with high substitutability and *vice versa*. In robustness tests, we go some way toward addressing this issue using information about individuals whose undeclared offshore wealth was detected through a data leak and who therefore arguably constitute a *randomly selected* sample of offshore tax evaders (Alstadsæter et al., 2019b).²² We exploit this data source by re-estimating the baseline model while re-weighting the observa-

tions in the sample of disclosers so that they match the leaked sample in terms of the wealth distribution.²³ This method corrects for selection on wealth, which is important if wealthy individuals have more scope for substitution to avoidance; however, it does not correct for selection on other observables nor unobservables.

4. Results

4.1. Tax compliance

The first set of results describes the dynamics of overall tax compliance around the time taxpayers make disclosures under the amnesty. We consider three main outcomes: taxable net wealth, taxable income, and total tax liabilities. In all three cases, we capture compliance by using the values claimed by the taxpayers on the tax return before any corrections are made by the tax authorities. The estimated coefficients on the event time dummies and 95% confidence bounds are plotted in Fig. 3.

As shown in Fig. 3A, disclosures under the amnesty are associated with large and persistent increases in reported net wealth. Specifically, the net wealth of disclosers follows the same trajectory as that of non-disclosers in the years -5 to -2 and then increases sharply by 0.5 log-points (around 65%) relative to non-disclosers between years -2 and 0 . The effect of the amnesty shows up as soon as year -1 because tax evaders using the amnesty in the beginning of year 0 can report the disclosed assets on the tax return for year -1 . The differential shift in the net wealth of disclosers persists through the remainder of the event window.

It is instructive to compare the magnitude of the increase in net wealth around disclosure to recent evidence that Scandinavians who evaded taxes through accounts at HSBC Switzerland held on average 40% of their true net wealth on the undeclared Swiss accounts (Alstadsæter et al., 2019b). The estimated wealth increase of 65% implies an offshore wealth share of almost exactly 40% under the assumption that amnesty participants disclosed all of their offshore assets ($65\%/165 \approx 40\%$). This suggests that offshore tax evasion not only decreases, but literally ends at the time of participation in the amnesty.

As shown in Fig. 3B, the results for reported income are similar to those for reported wealth. From year -5 to -2 , the incomes of disclosers and non-disclosers evolve in parallel; there is then a differential increase of almost 20% from year -2 to 0 for disclosers. It is not surprising that income increases less than wealth in relative terms since many disclosers have labor or pension income that is unaffected by the disclosure.

As shown in Fig. 3C, tax liabilities follow the same qualitative pattern as wealth and income with a differential jump of almost 30% from year -2 to 0 . The magnitude of the jump corresponds to what one would mechanically expect given the differential increase of 20% in taxable income and 65% in taxable wealth, and the marginal tax rates that apply to income and wealth.

To get a sense of the implications for effective taxation of wealth, we re-estimate the model using as an outcome the tax liabilities claimed by the taxpayer scaled by net wealth (measured at market value and including subsequent disclosures).²⁴ As shown in Fig. 3D, this ratio follows the same trend for disclosers and non-disclosers between year -5 and -2 and then shifts up differentially for disclosers by around two percentage points between year -2 and 0 . Importantly, the increase reflects changes in wealth taxes as well as in capital income taxes.

²⁰ However, when the outcome is the opening of a holding company, we estimate the full model and report the coefficient on year -1 in event time. We take this slightly different approach because the opening of a holding company is a flow variable and because the fully dynamic results discussed in Section 4.2 clearly indicate a sharp response in year -1 and no response in other years.

²¹ This is reminiscent of IV estimates being local to the group of compliers (Angrist et al., 1996).

²² We use customer data leaked from the Swiss bank HSBC Switzerland in 2006 in the so-called *Swiss Leaks* and later matched to tax data by the Norwegian tax authorities and used to crack down on undeclared accounts. We refer to earlier work for a detailed account of this data source (Alstadsæter et al., 2019).

²³ We compare the wealth distribution of amnesty participants and HSBC customers in Table A1 in the Appendix.

²⁴ To limit the impact of extreme values, we winsorize this outcome at the 95% level.

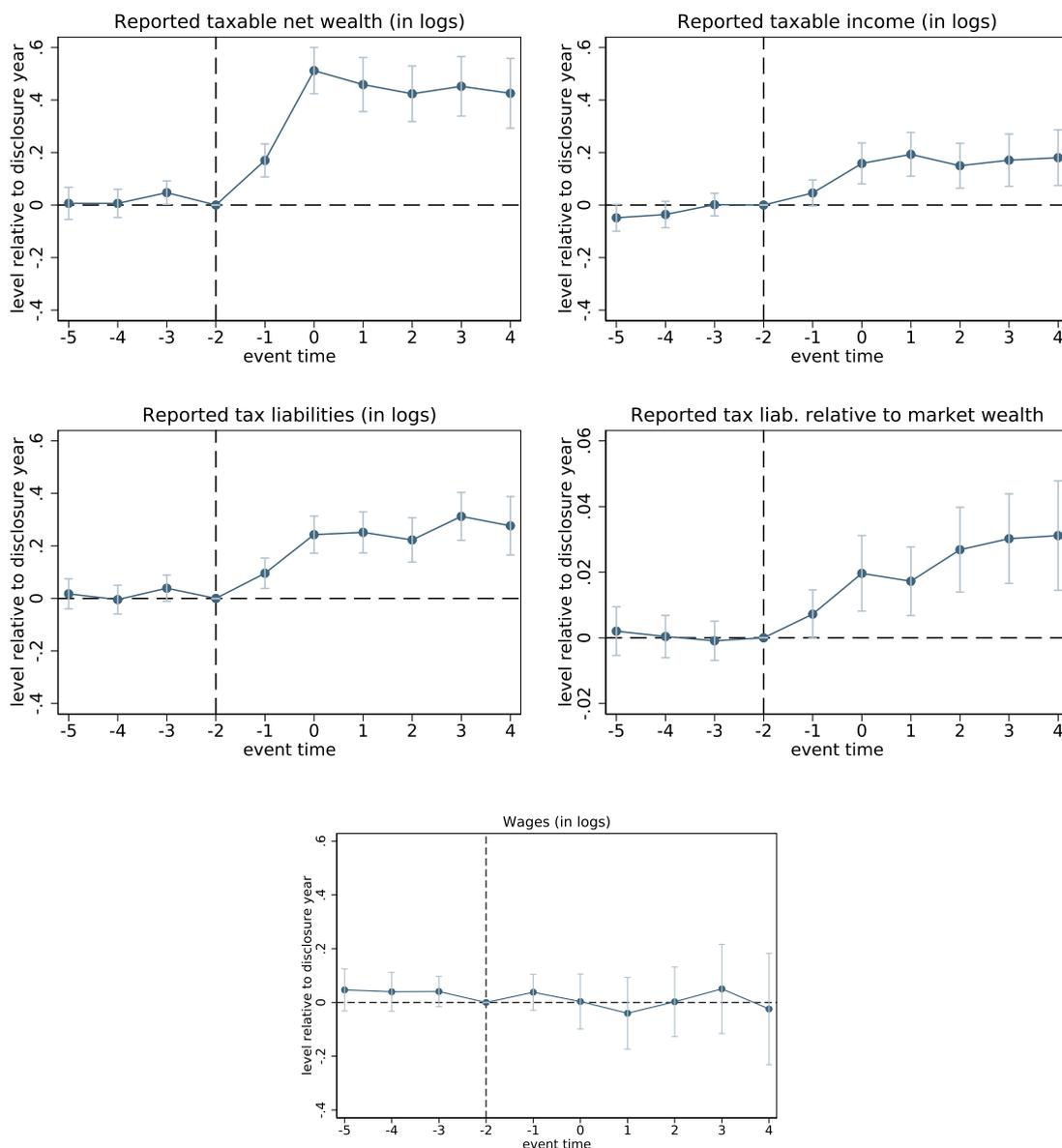


Fig. 3. Tax compliance. The figure shows point estimates for event time dummies (with 95% confidence bands) obtained from a model with individual fixed effects, calendar time dummies interacted with indicators for wealth, income and age and a full set of event time dummies (disclosure is year 0 and year -2 is the omitted category). The outcomes are net wealth (in logs), income (in logs), tax liabilities (in logs) and tax liabilities (scaled by the market value of net wealth including disclosures) as claimed by the taxpayer. The confidence bands are based on standard errors clustered at the individual level.

While the pre-trends in reported net wealth, income and taxes are consistent with the identifying assumption, we conduct a further test for endogeneity by estimating the baseline model for wage income. As shown in Fig. 3E, wage income evolves in parallel for disclosers and non-disclosers throughout the entire event window. This is consistent with our interpretation that the increase in taxable income and tax liabilities around amnesty participation is explained by the disclosures and not by confounding shocks to wages.

In brief, the results presented in this section consistently show that amnesty participation is associated with a significant and sustained increase in overall tax compliance: the taxable wealth and income reported by taxpayers increase as do the resulting tax liabilities. This is clearly inconsistent with tax evasion and tax avoidance being perfect substitutes. Under this hypothesis, we should see no change in overall tax compliance around disclosure, as each dollar decrease in evasion should be offset by a dollar increase in avoidance thus leaving all tax bases unchanged. By contrast, the

result is consistent with imperfect or no substitution between tax evasion and tax avoidance. Under this hypothesis, ending off-shore evasion is accompanied by a modest or no increase in avoidance and, thus, a sizeable increase in tax bases.

4.2. Tax avoidance

The next set of results describes the use of four well-defined tax avoidance techniques around the time taxpayers make disclosures under the amnesty. The avoidance techniques are: emigration out of Norway, the founding of a holding company and investments in two distinct tax-favored asset classes. The results are illustrated in Fig. 4.

As shown in Fig. 4A, emigration rates decline slightly among non-disclosers relative to disclosers in the years after disclosure, a small decrease in this dimension of tax avoidance. However, the estimated coefficients are very small (at most 0.01%) and statistically insignificant. As shown in Fig. 4B, there is a clear and statis-

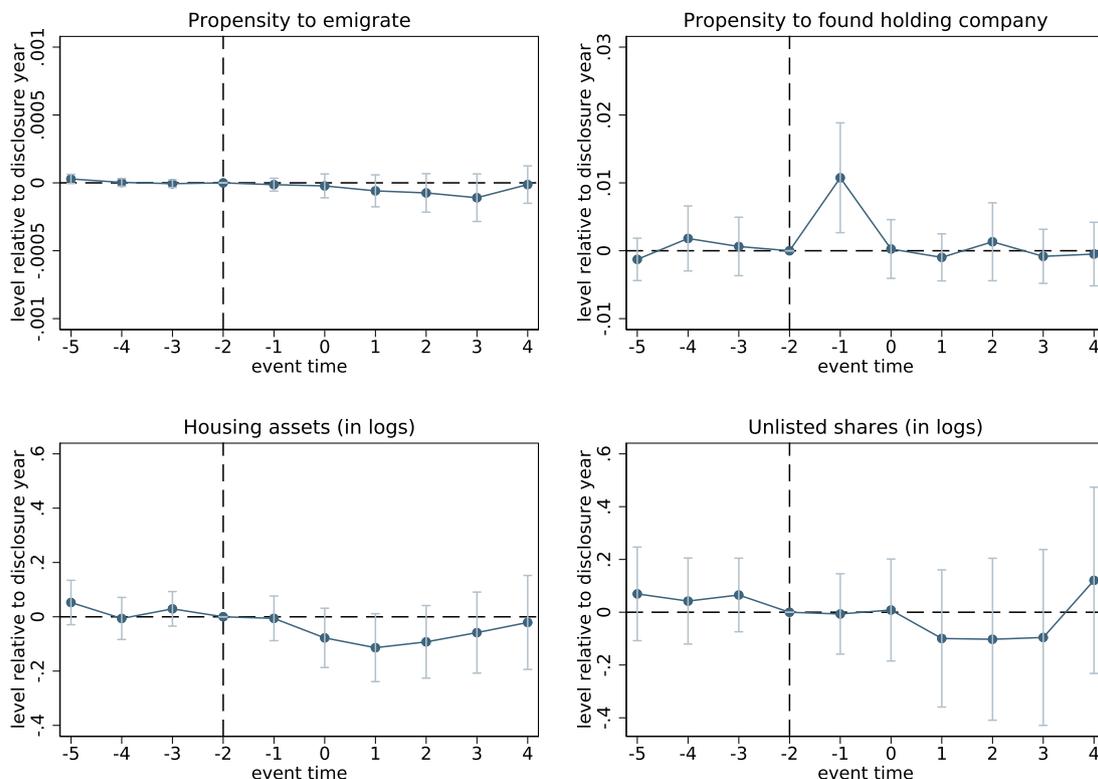


Fig. 4. Tax avoidance. The figure shows point estimates for event time dummies (with 95% confidence bands) obtained from a model with individual fixed effects, calendar time dummies interacted with indicators for wealth, income and age (in 2007) and a full set of event time dummies (disclosure is year 0 and year -2 is the omitted category). The outcomes are an indicator for emigration, an indicator for founding a holding company; the taxable value of housing assets (in logs) and the taxable value of unlisted shares (in logs). The confidence bands are based on standard errors clustered at the individual level.

tically significant increase in incorporations of Norwegian holding companies by disclosers in year -1. Some amnesty participants do seem to prepare for a tax-efficient repatriation of assets; however, the size of the estimated coefficient (around 1%) suggests that this is a very small minority.²⁵ As shown in Figs. 4C and 4D, there is a slight differential decrease in investments in housing and unlisted shares around disclosure, but the estimates are statistically insignificant.²⁶

These results indicate that amnesty participation is associated with small or no increases in the use of the four tax avoidance

²⁵ As shown in Table 1, more than 80% of the disclosers did not have a closely held corporation of any kind and thus needed to found a new corporation to be able to defer taxes on capital income in this way.

²⁶ The two remaining avoidance techniques described above cannot be studied in the present framework, because they were not available in the years that tax evaders used the amnesty. The tax saving from having closely held firms pay out dividends existed only in 2005, and the possibility to obtain a wealth tax rebate when total taxes owed exceeded 80% of income ended in 2009.

²⁷ To be precise, we estimate the following equation:

$$\log(\text{Tax}_{it}) = \gamma_t \times \text{netwealth}_{it} + \phi_t \times \text{income}_{it} + X_{it} + \sum \beta_k D_{it}^k + \epsilon_{it}$$

where Tax_{it} denotes the tax liabilities claimed by individual i in year t ; γ_t and ϕ_t are calendar time dummies; netwealth_{it} represents 199 indicators for net wealth (one for each percentile of the distribution and one for each percentile of the top one percent); income_{it} represents 199 indicators for non-wealth income (one for each percentile of the distribution and one for each percentile of the top one percent); X_{it} is a vector of demographic controls (age, gender, marital status, county and number of children); and D_{it}^k indicates year k relative to the year of the disclosure of individual i . The controls capture the non-linear and time-variant mapping of wealth and income into tax liabilities conditional on taxpayer choices about evasion and avoidance.

techniques. While we cannot exclude responses on avoidance margins that we are unable to measure, the results are suggestive that substitution between evasion and avoidance is low or zero. This is remarkable given that the sample of disclosers consists mostly of very wealthy individuals. Finally, we address the avoidance responses in a different empirical framework that compares levels of tax liabilities across disclosers and non-disclosers with the same market wealth and the same income from non-wealth sources. Specifically, we regress the tax liabilities (in logs) claimed by individual i in year t on a large set of non-parametric controls for the market value of net wealth and income from non-wealth sources, rich demographic controls and a vector of event-time dummies.²⁷ The event-time dummies measure whether disclosers are able to achieve lower tax liabilities than non-disclosers with the same wealth and the same income from non-wealth sources, either by illegally hiding assets offshore (evasion) or by legally structuring their wealth in a tax efficient way (avoidance). As shown in Fig. 5, disclosers claim significantly less taxes (-20%) than equally wealthy non-disclosers before disclosure. This is consistent with substantial evasion through offshore accounts prior to amnesty participation. When they enter the amnesty, their tax liabilities increase sharply and they claim slightly more taxes (+5%) than equally wealthy non-disclosers after disclosure. This is suggestive that the level of avoidance remains modest after disclosure, lower than for similar non-disclosers, which is difficult to reconcile with strong substitution from evasion to avoidance.

4.3. Robustness

In the first series of robustness tests, we explore how sensitive the results are to the specific set of ex ante characteristics that is included in the model. We present the results from the compact

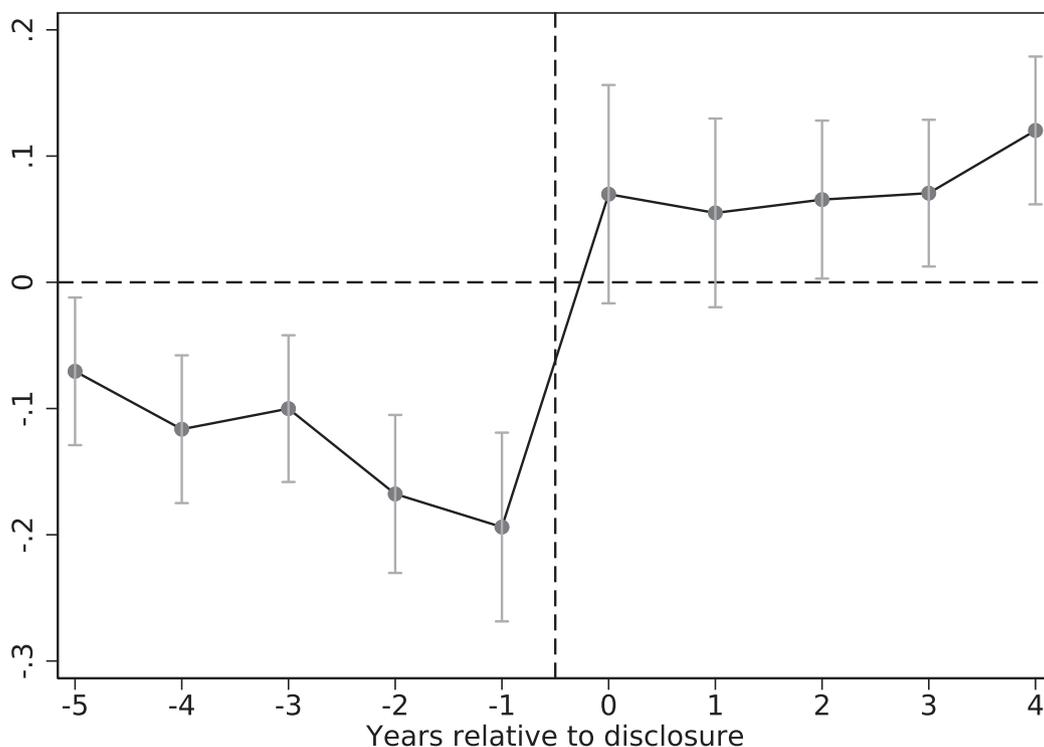


Fig. 5. The tax compliance gap. The figure shows the gap in tax payments between disclosers and non-disclosers with similar net wealth and non-wealth income. The gap is estimated in a regression of claimed tax liabilities (in logs) on a large set of non-parametric controls for the market value of net wealth and income from non-wealth sources, rich demographic controls and a vector of event-time dummies. The figure shows the point estimates for the event-time dummies (with 95% confidence bands). The confidence bands are based on standard errors clustered at the individual level.

model in Table 2 whereas the fully dynamic results are reported in Figure A5-A6 in the Online Appendix. We start from the most parsimonious model where the calendar time dummies enter alone without any interactions (Column 1) and sequentially add interactions with ex ante wealth (Column 2), income (Column 3) and age (Column 4). We further add interactions with ex ante equity investments to allow for systematic differences in the portfolio composition (Column 5); address a small number of early disclosures by defining controls already in 2005 (Column 6); correct for selection on wealth by re-weighting the observations so that the effective wealth distribution among disclosers corresponds to the one observed in the HSBC leak (Column 7); and apply an alternative definition of ex ante net wealth that does not include subsequent disclosures (Column 8). Some of the estimated coefficients are quite different from the baseline when the model includes no controls (e.g. the estimate for reported income changes signs). Otherwise, the qualitative patterns are highly stable as we vary the features of the model. Across all specifications, there is a sizeable and statistically significant increase in reported net wealth, income and tax liabilities at the time of disclosure while the only statistically significant increase in tax avoidance is the foundation of new holding companies immediately before disclosure.²⁸

Next, as some of our outcomes are in logs, observations with zeroes are discarded in the main regressions.²⁹ This means that our baseline results capture behavioral adjustments on the intensive margin, but not on the extensive margin. We address this challenge by re-estimating the baseline model while using as an outcome a dummy indicating a strictly positive value of the variable of interest.

²⁸ In some specifications, the estimated change in unlisted shares and housing assets is significantly negative, which is the opposite of what should be expected if disclosers were substituting from evasion to avoidance.

²⁹ Negative values of net wealth are also discarded.

The results, reported in Figure A7 in the Online Appendix, indicate a strong and statistically significant adjustment of tax liabilities on the extensive margin: a differential increase of around 5 percentage points in the probability of claiming a positive tax liability around the time of disclosures. We also find small and statistically insignificant increases in net wealth and housing assets on the extensive margin.

Finally, the earlier results indicated that a small number of disclosers founded a holding company in anticipation of the disclosure. This raises the question if disclosers used existing holding companies as vehicles of tax avoidance, e.g. increasing investments in unlisted shares and housing assets held through the companies, which may explain why we see none of these behavioral adjustments at the individual level. While we do not observe the balance sheets of holding companies and therefore cannot test this hypothesis directly, we split the sample of disclosers into two groups – those who owned a holding company in year $t - 2$ and those who did not – and estimate the baseline model separately for the two groups. The results, reported in Figure A8 in the Online Appendix, show that the increase in tax liabilities around disclosure is similar for the two groups, suggesting that disclosers are not able to use existing holding companies to significantly reduce the tax cost of disclosure.

4.4. Mechanisms

The apparent absence of substitution between avoidance and evasion is somewhat surprising. In this subsection, we explore a number of possible mechanisms.

Fixed costs of avoidance

We first consider whether the lack of substitution toward avoidance can be explained by high fixed costs of adjusting the

Table 2

Robustness. The table shows the results from a range of robustness tests conducted by varying the compact model. Column (1) shows the results from the most parsimonious specification that only includes individual FE and year FE and no further controls. Column (2) adds interactions between year FE and ten indicators of net wealth; Column (3) further adds interactions between year FE and ten indicators of income; Column (4) further adds interactions between year FE and six indicators of age and is thus equivalent to the baseline model; Column (5) further adds interactions between year FE and six indicators of equity investments; Column (6) measures the controls for net wealth, income and age controls in 2005 rather than in 2007 as in the baseline; Column (7) re-weights the observations so that the wealth distribution matches the one observed in the leaked sample of customers at HSBC; Column (8) only measures the controls for net wealth and income with the values claimed by the tax payer, rather than with values including subsequent disclosures as in the baseline. The estimates generally indicate the change from years -4 , -3 and -2 to the years 0, 1 and 2 (relative to the control group) except when the outcome is founding a holding company where estimates are the change from year -2 to year -1 (relative to the control group).

	(1) Only year controls	(2) Add wealth controls	(3) Add income controls	(4) Add age controls (Baseline)	(5) Add equity controls	(6) Use 2005 as baseline	(7) Reweight with HSBC data	(8) Use pre-disclosure wealth as control
Compliance								
Net wealth	0.277 (0.044)	0.417 (0.043)	0.401 (0.043)	0.425 (0.043)	0.510 (0.043)	0.441 (0.047)	0.437 (0.043)	0.359 (0.041)
Taxable income	-0.134 (0.036)	0.142 (0.036)	0.152 (0.035)	0.180 (0.034)	0.181 (0.033)	0.123 (0.032)	0.185 (0.035)	0.152 (0.034)
Tax liabilities	0.069 (0.032)	0.163 (0.032)	0.168 (0.032)	0.212 (0.032)	0.226 (0.032)	0.196 (0.035)	0.221 (0.032)	0.233 (0.032)
Avoidance								
Emigration	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	-0.0001 (0.000)	0.0000 (0.000)	0.0000 (0.000)	-0.0001 (0.000)	0.0000 (0.000)
Holding company	0.010 (0.004)	0.011 (0.004)	0.011 (0.004)	0.011 (0.004)	0.011 (0.004)	0.011 (0.004)	0.008 (0.003)	0.011 (0.004)
Housing assets	-0.234 (0.056)	-0.098 (0.056)	-0.121 (0.056)	-0.115 (0.056)	-0.085 (0.057)	-0.035 (0.062)	-0.105 (0.056)	-0.184 (0.058)
Unlisted shares	-0.226 (0.113)	-0.171 (0.113)	-0.200 (0.113)	-0.132 (0.112)	-0.027 (0.112)	-0.193 (0.111)	-0.133 (0.112)	-0.156 (0.113)
Repatriation								
Money transfers in	0.091 (0.014)	0.093 (0.014)	0.093 (0.014)	0.093 (0.014)	0.092 (0.013)	0.098 (0.017)	0.093 (0.014)	0.093 (0.014)
Money transfers out	-0.017 (0.008)	-0.011 (0.008)	-0.010 (0.008)	-0.010 (0.008)	-0.011 (0.008)	-0.017 (0.013)	-0.010 (0.009)	-0.011 (0.008)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year x Wealth FE	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year x Income FE	-	-	Yes	Yes	Yes	Yes	Yes	Yes
Year x Age FE	-	-	-	Yes	Yes	Yes	Yes	Yes
Year x Equity FE	-	-	-	-	Yes	-	-	-
2005 baseline	-	-	-	-	-	Yes	-	-
HSBC weights	-	-	-	-	-	-	Yes	-
Predisclosed wealth	-	-	-	-	-	-	-	Yes

avoidance margin. For instance, an important way to avoid capital taxes is to invest in housing assets; however, houses are lumpy investment objects and transactions are associated with considerable costs. Similarly, setting up a holding company is a discrete decision that involves operating costs and creates frictions for owners to access their assets. At the extreme, moving to a foreign country is a choice with important consequences for economic and private life. For individuals who reduce evasion by disclosing a relatively small offshore account, we should not expect a detectable increase on these avoidance margins.

To shed light on the role of fixed costs, we rank the population of disclosers by the size of their disclosures, divide them into five groups corresponding to the quintiles of the distribution, and estimate the compact model while allowing the estimates to vary across group. If high fixed costs of avoidance explain the lack of substitution toward avoidance in the full sample, we should expect much more substitution when focusing on a subsample with particularly large disclosures for whom the potential gains from avoidance are significant.

The results, illustrated in Fig. 6, do not support an important role for fixed avoidance costs. In line with intuition, changes in overall tax compliance are (roughly) monotonic in the size of the disclosures. However, there is no clear gradient in adjustments on the avoidance margins. While the propensity to found a holding company appears to be slightly increasing in the size of the disclosure, it remains a very rare outcome for all groups. Moreover, individuals with the largest disclosures appear to reduce investment in both housing and unlisted shares.³⁰

Avoidance opportunities only at the top

Next, we investigate whether the lack of adjustment on the avoidance margin may owe itself to the fact that the most attractive tax avoidance opportunities are only available to the very wealthiest taxpayers.

³⁰ Note that the sample is slightly different than in the other regressions: As we cannot compute the size of the disclosure for individuals disclosing after 2013, such individuals fall out of the sample when the estimates are conditioned on the size of the disclosure.

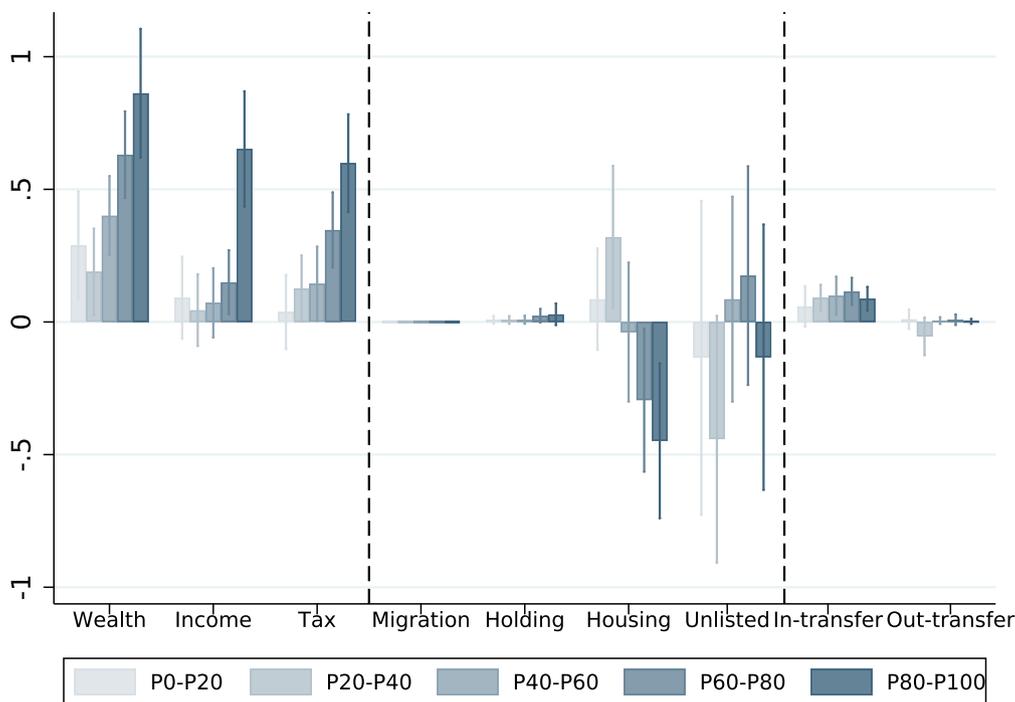


Fig. 6. Heterogeneity by disclosure size. The figure shows point estimates from the compact model by the size of disclosures. To form the groups, we rank disclosers by their disclosure and divide them into five groups corresponding to the quintiles of the distribution. Darker shades of blue indicate groups with larger disclosures. There are nine outcomes: *Wealth* is reported taxable wealth (in logs); *Income* is reported taxable income (in logs); *Tax* is the tax liabilities (in logs); *Migration* is an indicator for moving the main residence to a foreign country; *Holding* is an indicator for setting up a holding company; *Housing* is the tax value of housing assets (in logs); *Unlisted* is the tax value of unlisted shares (in logs); *In-transfer* is incoming transfers from foreign bank accounts (scaled by net wealth in 2007); *Out-transfer* is outgoing transfers to foreign bank accounts (scaled by net wealth in 2007). Note that while the bars generally indicate the change from years -4 , -3 and -2 to the years 0 , 1 and 2 (in event time) relative to the control group and conditional on controls, the bars indicate the change from year -2 to year -1 for the holding company outcome because the fully dynamic results indicate that the entire response takes place in period -1 .

To study this mechanism, we rank the population of disclosers by their net wealth in 2007 (measured at market value and including subsequent disclosures), divide them into five groups corresponding to the quintiles of the distribution, and apply the compact model to each group separately. If tax avoidance opportunities are increasing strongly in wealth, even within our sample of relatively wealthy disclosers, we should expect to see a clear wealth gradient in the avoidance responses and particularly large adjustments in the wealthiest subsample.

The results, illustrated in Fig. 7, do not provide evidence in favor of this hypothesis. There is no clear gradient in the compliance estimates. For instance, the increase in tax payments is relatively uniform across wealth groups except for the least wealthy group where the increase is smaller; possibly because this group earns low returns (Fagereng et al., 2020) and are below the threshold for being liable to wealth taxes. Further, there is little signs of increases in avoidance for any of the wealth groups. The wealthiest are slightly more likely to open a holding company, but at the same time reduce holdings of both housing assets and unlisted shares.

Only tax aggressive individuals avoid

Finally, it is possible that only a small fraction of particularly tax aggressive disclosers are able and willing to engage in tax avoidance.

To investigate this possibility, we use as an ex ante measure of tax aggressiveness the ratio of net wealth at tax value to net wealth at market value. This measure captures both *evasion*, because offshore assets disclosed under the amnesty enter the denominator but not the numerator, and *avoidance*, because tax favored assets generally enter the denominator at market value but the numerator at a lower tax value. We rank the population of disclosers by this measure of tax aggressiveness in 2007, divide them into five

groups corresponding to the quintiles of the distribution, and apply the compact model to each group separately.

The results, presented in Fig. 8, provide some evidence of substitution toward avoidance for the most tax aggressive subsample (darkest shade of blue). While this group increased reported net wealth roughly as much as other groups, they barely reported more income. Moreover, they exhibited a sizeable, albeit statistically insignificant, increase in unlisted shares as well as an increase in housing assets. This is all suggestive that substitution from evasion to avoidance did occur within a small group of highly tax aggressive individuals. However, the evidence is weak because the sample is small and tax aggressiveness is observed with considerable noise.

4.5. Repatriation

In the final part of the analysis, we study whether disclosures of offshore assets were accompanied by repatriation. While this is not immediately relevant for the main question about substitution between evasion and avoidance, it has important implications for future tax compliance: Assets in Norwegian banks are subject to third-party reporting to the tax authorities and thus much more difficult to misreport than assets in foreign banks.

Bank transfers

The first outcome is the value of bank transfers from foreign accounts, a direct measure of asset repatriation. To relate the results to the analysis of wealth dynamics, we scale bank transfers by ex ante net wealth (measured in 2007 at market value and including any assets subsequently disclosed). This implies that the main estimates capture the share of total net wealth trans-

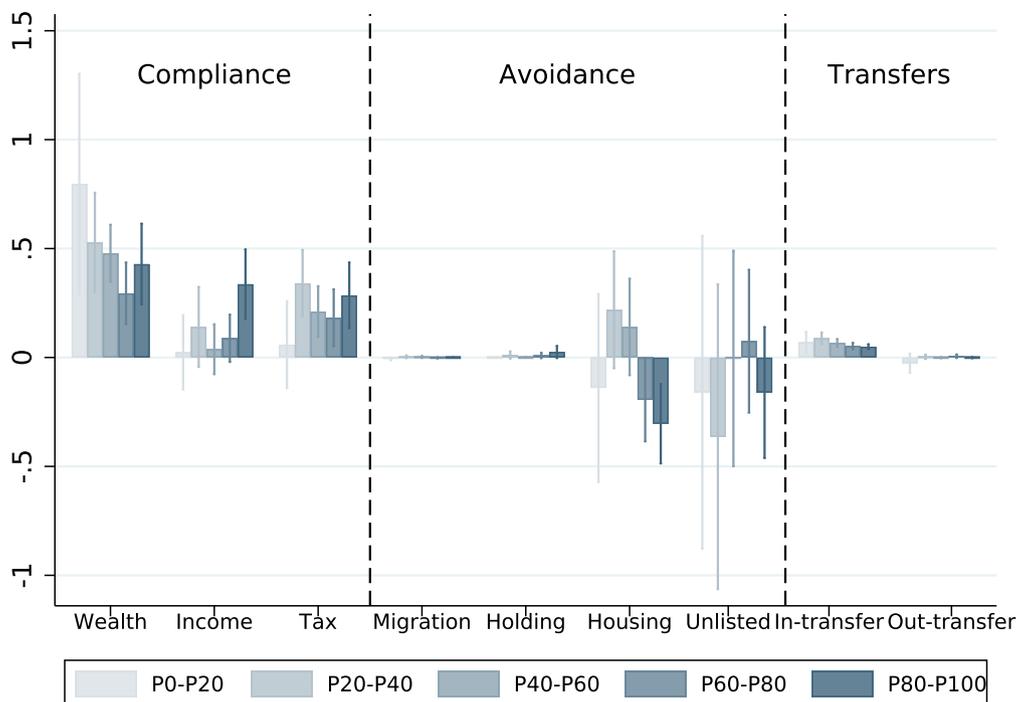


Fig. 7. Heterogeneity by net wealth. The figure shows point estimates from the compact baseline for five wealth groups. To form the groups, we rank disclosers by their net wealth in 2007 and divide them into five groups corresponding to the quintiles of the distribution. Darker shades of blue indicate wealthier groups. There are nine outcomes: *Wealth* is reported taxable wealth (in logs); *Income* is reported taxable income (in logs); *Tax* is the tax liabilities (in logs); *Migration* is an indicator for moving the main residence to a foreign country; *Holding* is an indicator for setting up a holding company; *Housing* is the tax value of housing assets (in logs); *Unlisted* is the tax value of unlisted shares (in logs); *In-transfer* is incoming transfers from foreign bank accounts (scaled by net wealth in 2007); *Out-transfer* is outgoing transfers to foreign bank accounts (scaled by net wealth in 2007). Note that while the bars generally indicate the change from years -4 , -3 and -2 to the years 0 , 1 and 2 (in event time) relative to the control group and conditional on controls, the bars indicate the change from year -2 to year -1 for the holding company outcome because the fully dynamic results indicate that the entire response takes place in period -1 .

ferred from foreign accounts in a given year over and above transfers made by non-disclosers with similar characteristics.

As shown in Fig. 9A, disclosers exhibit the same trend in incoming bank transfers as the control group of non-disclosers from year -5 to -1 . Then in both years 0 and 1 , transfers exceed the level in the reference year -2 by the equivalent of 8% of 2007-wealth (above and beyond the trend in the control group of non-disclosers). Transfers remain higher than the reference year through to year 4 and the cumulated coefficients imply that around 25% of 2007-wealth is repatriated between year 0 and 4.³¹

Recall that disclosed assets amount to around 40% of total wealth (reported plus previously hidden) for the average discloser. Our results thus imply that more than 60% (i.e. 25%/ 40%) of the disclosed assets are repatriated through bank transfers during the four years following amnesty participation. The remaining 40% either stay abroad (but start being reported to the tax authorities instead of being hidden as previously), are consumed, or are repatriated to Norway through other means than bank transfers.

We also study the value of bank transfers to foreign accounts, but find no clear signs that amnesty participation is associated with changes in outgoing transfers. As shown in Fig. 9B, transfers to foreign banks do not increase significantly from the period before disclosure to the period after relative to the control group of non-disclosers. This speaks to a widespread concern that the effectiveness of tax amnesties is eroded by moral hazard: Some tax evaders may use them, and then a few years down the road start evading even more than previously, if they feel they will always be able to come clean if need be. Monitoring bank transfers

³¹ We conduct the same robustness tests for bank transfers as for the other main outcomes and report the results in Table 2 and Figures A5-A6 in the Online Appendix.

for four years after amnesty participation, we find no evidence of this type of dynamics.

Tax returns

We also study repatriations with a complementary data source: the decomposition of income and net wealth on domestic and foreign sources on the tax return. This allows us to estimate dynamically how much of the total increase in reported income and reported net wealth following participation in the amnesty derives from domestic assets (disclosed and repatriated) and foreign assets (disclosed but not repatriated). To obtain a proper decomposition, we scale all income variables (total, domestic and foreign) with total reported income and scale all net wealth variables (total, domestic and foreign) with total reported net wealth.³²

As shown in Fig. 10A, the total increase in reported income (blue line) is initially shared almost equally between domestic income (green line) and foreign income (red line). However, four years after participation in the amnesty, almost the entire increase in reported increase comes from domestic sources whereas the contribution from foreign sources has largely vanished. This result is suggestive of almost complete repatriation of income-generating assets in the medium run.³³

³² Reported domestic income and reported domestic net wealth are not observable in our dataset, but can be inferred from the foreign variables and the totals. To limit the impact of extreme values, a more important challenge when we work with ratios, we winsorize all outcomes at the 95% level. Because of the slightly different empirical approach – scaling with the 2007-value rather than relying on a logarithmic transformation – the results for total income and total net wealth in Fig. 10 are not fully consistent with the baseline results in Fig. 3

³³ Consistent with this interpretation, we find that the propensity to report any foreign capital income increases sharply by around 25 percentage points around amnesty participation and then falls almost back to the pre-disclosure level (Figure A9 in the Online Appendix).

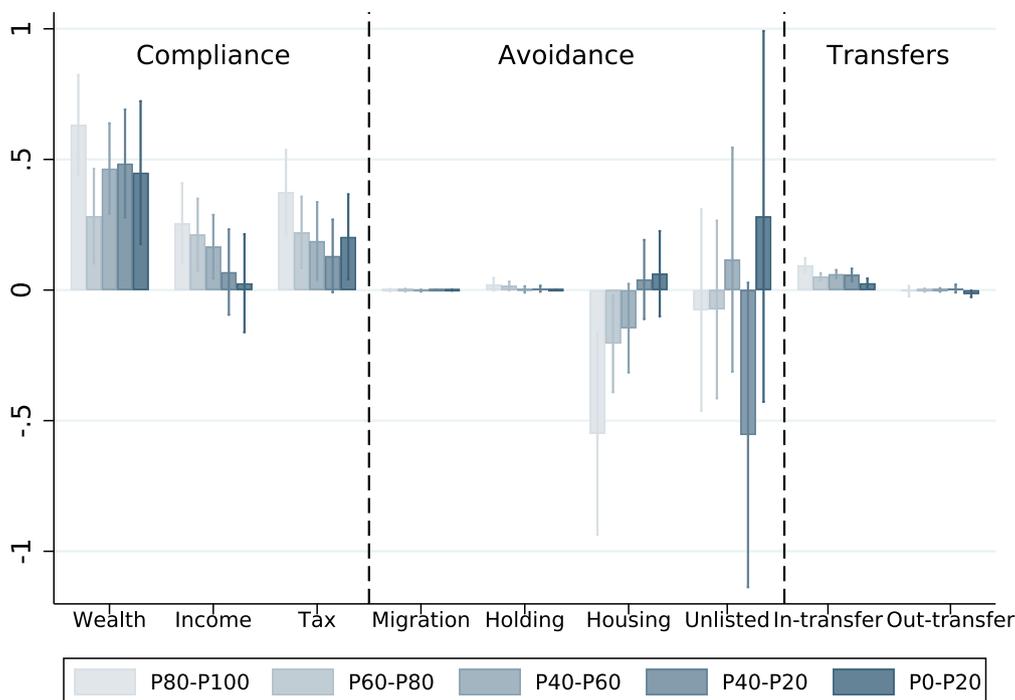


Fig. 8. Heterogeneity by tax aggressiveness. The figure shows point estimates from the compact baseline model for five groups of tax aggressiveness. To form the groups, we rank disclosers by the ratio of taxable wealth to market wealth in 2007 and divide them into five groups corresponding to the quintiles of the distribution. Darker shades of blue indicate more tax aggressive groups (i.e. lower ratio of taxable wealth to market wealth). There are nine outcomes: *Wealth* is reported taxable wealth (in logs); *Income* is reported taxable income (in logs); *Tax* is the tax liabilities (in logs); *Migration* is an indicator for moving the main residence to a foreign country; *Holding* is an indicator for setting up a holding company; *Housing* is the tax value of housing assets (in logs); *Unlisted* is the tax value of unlisted shares (in logs); *In-transfer* is incoming transfers from foreign bank accounts (scaled by net wealth in 2007); *Out-transfer* is outgoing transfers to foreign bank accounts (scaled by net wealth in 2007). Note that while the bars generally indicate the change from years -4 , -3 and -2 to the years 0 , 1 and 2 (in event time) relative to the control group and conditional on controls, the bars indicate the change from year -2 to year -1 for the holding company outcome because the fully dynamic results indicate that the entire response takes place in period -1 .

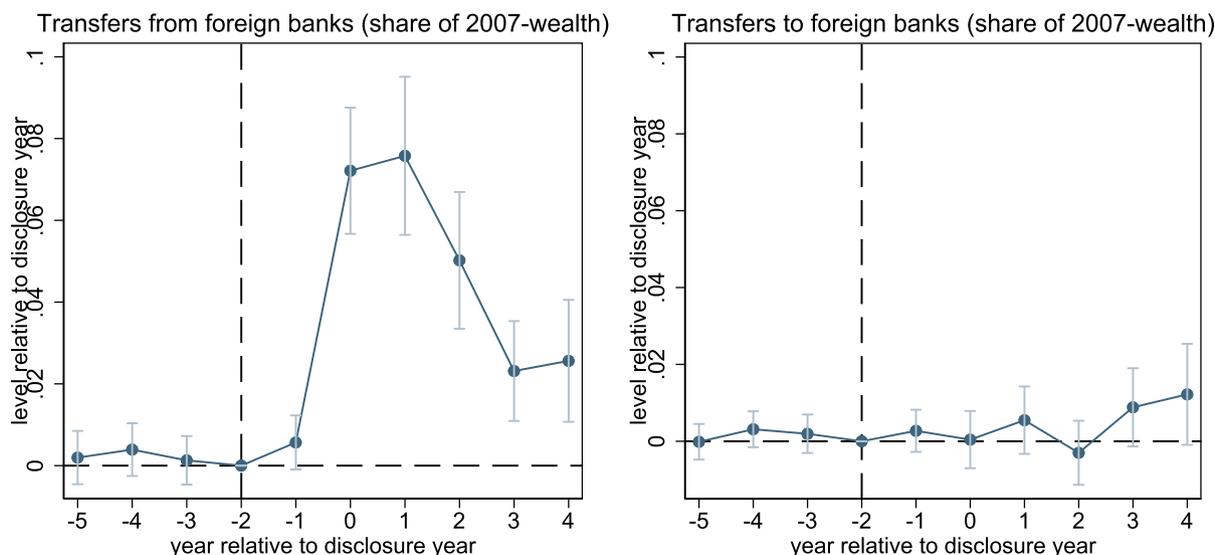


Fig. 9. Capital flows. The figure shows point estimates for event time dummies (with 95% confidence bands) obtained from a model with individual fixed effects, calendar time dummies interacted with indicators for wealth, income and age (in 2007) and a full set of event time dummies (disclosure is year 0 and year -2 is the omitted category). The outcomes are bank transfers *from* foreign accounts and bank transfers *to* foreign accounts, both scaled by market wealth in 2007. The confidence bands are based on standard errors clustered at the individual level.

As shown in Fig. 10B, we observe a similar but not identical pattern for net wealth: The increase in reported net wealth is initially driven mostly by foreign assets and while the domestic assets

gradually become more important, a significant contribution from foreign assets remains even at the end of the event window. The slight difference between income and net wealth suggests that dis-

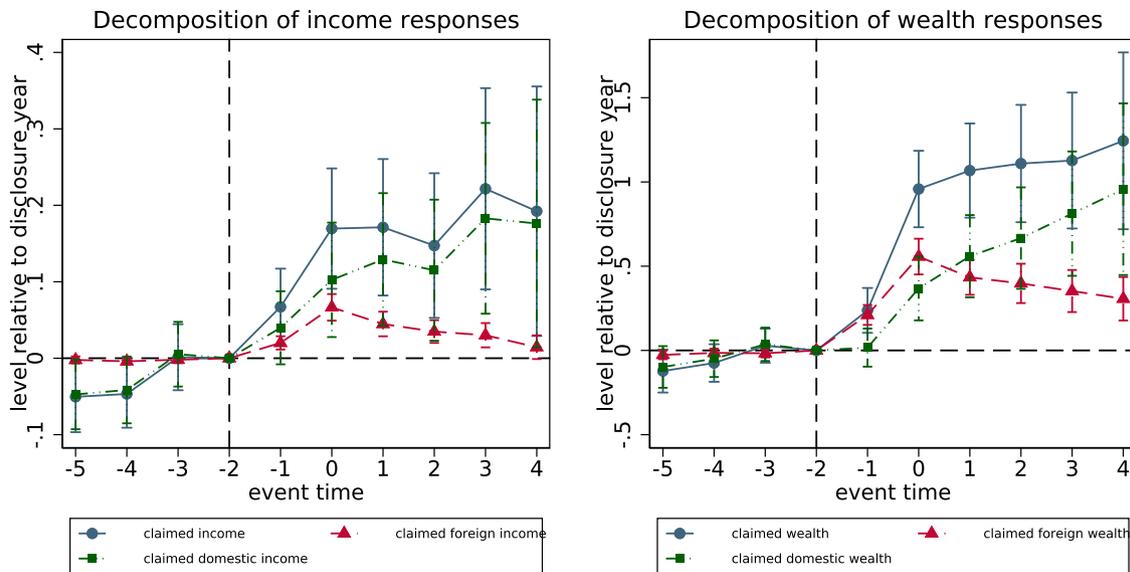


Fig. 10. Foreign and domestic income and assets. The figure shows point estimates for event time dummies (with 95% confidence bands) obtained from a model with individual fixed effects, calendar time dummies interacted with indicators for wealth, income and age (in 2007) and a full set of event time dummies (disclosure is year 0 and year -2 is the omitted category). The outcomes are reported income decomposed into a foreign and a domestic part (all scaled by reported income in 2007) and reported net wealth decomposed into a foreign and a domestic part (all scaled by reported net wealth in 2007). The confidence bands are based on standard errors clustered at the individual level.

closers are more likely to keep assets with a low taxable return in foreign accounts.³⁴

5. Conclusion

The main lesson emerging from the paper is that fighting tax evasion can be an effective way to collect more tax revenue from the wealthy, increase the progressivity of the tax system—and ultimately reduce inequality.

This result was far from obvious. In a field experiment in Minnesota where randomly selected taxpayers were informed that the returns they were about to file would be “closely examined”, Slemrod et al. (2001) find that high-income treated taxpayers paid less tax relative to the control group—suggesting substitution away from evasion toward legal avoidance. In our setting where we can observe a large sample of very wealthy tax evaders with ample access to tax avoidance opportunities, several high-quality measures of avoidance, and follow taxpayers over time, we can rule out that such substitution is significant.

Our research design and data deliver clear, compelling, and consistent results. By boosting its enforcement effort, the Norwegian government induced a large sample of wealthy individuals to disclose previously hidden assets. The taxes paid by these amnesty participants jump by a striking 30% at the time they use the amnesty. The increase in wealth, income and taxes is sustained over time. The decrease in evasion is not accompanied by an increase in the key forms of tax avoidance documented in the Norwegian context, such as emigration and investment in tax-favored asset classes. And these results cannot be explained by a lack of avoidance opportunities among amnesty participants.

Our results inform the global policy debate about the potential benefits of fighting offshore tax evasion. By combining enforcement measures that raised the probability of detecting undeclared foreign accounts with an amnesty that made it relatively attractive

for evaders to come into compliance, the Norwegian government was able to significantly increase revenue collection from mostly wealthy offshore evaders. Our findings suggest that this combination of policies has an important role to play for the sustainability of progressive taxation in a globalized world.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.jpubeco.2021.104587>.

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³⁴ Consistent with this interpretation, we find that, within the class of foreign assets, the largest contribution to the total increase in reported net wealth comes from deposits, which generally have a lower return than other financial assets (Figure A10 in the Online Appendix).

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