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# Optional (non-)filing and effective taxation

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ABSTRACT

Many countries have automatic wage tax withholding systems with tax non-filing options for some taxpayers. We show that this has sizable and potentially unintended implications for effective taxation because taxes are often over-withheld. Low-income taxpayers pay more taxes than they have to because they frequently do not file. Using German administrative tax data, we document that the average non-filer overpays €119 in one year, equivalent to a 1.2 percentage point increase in the average tax rate. Non-filing acts as a form of "reverse evasion": It weakens the effective tax progressivity by increasing tax rates at the bottom of the income distribution.

#### 1. Introduction

Income inequality is one of the major concerns of today's societies and many countries rely on progressive income tax schedules to reduce it. Effective taxation, however, often diverges from statutory tax schedules. One mechanism that has received a lot of attention in both economic research and political debate is tax evasion at the top of the income distribution (e.g., Guyton et al., 2021; Sarin, 2023). Tax evasion by rich taxpayers reduces their effective tax rates and thus weakens the effective progressivity of a tax system (e.g., Alstadsæter et al., 2019). However, lower effective tax rates at the top of the distribution are only one mechanism that weakens tax progressivity.

In this paper, we focus on the other end of the distribution and quantify the impact of optional non-filing on effective taxation of low-income taxpayers. Under optional non-filing, certain taxpayers are not required to file an income tax return. More than thirty countries worldwide have a legal tax non-filing option for taxpayers, typically for employees where automatic wage tax withholding ensures that they do not owe additional income taxes (no under-withholding).<sup>1</sup> However, non-filers may face over-withholding, and pay more taxes than intended by the tax schedule. With a progressive tax schedule, over-withholding can occur due to fluctuations in income between payroll periods. In such cases, the projected annual income underlying the withholding in a given payroll period does not align with the realized annual income.

To the best of our knowledge, we are the first to empirically quantify the effective tax rates under non-filing and to emphasize its role for effective income tax progressivity. Analyzing tax (non-)filing in Germany, we show that optional non-filing can be a form of "reverse evasion": It increases effective tax rates at the bottom of the income distribution, because low-income taxpavers are most likely to refrain from optional filing while facing substantial tax over-withholdings. Although fundamentally different from evasion, non-filing also weakens the effective tax progressivity because low-income individuals pay more taxes than they have to.

Data on non-filers is often scarce, because, by definition, there is no tax return data for them. We overcome this by using administrative German income tax data that combines tax return data for filers with employer provided data for non-filers (Research Data Centre of the Federal Statistical Office and the statistical offices of the Länder (RDC), 2018, Research Data Centre of the Federal Statistical Office and the statistical offices of the Länder (RDC), 2020). Based on annual gross income and individual characteristics, we calculate the statutory tax liability for non-filers and compare it to their effective tax liability to quantify over-remittances at the individual level. German taxpayers are given the option not to file if automatic withholding guarantees no under-withholding, typically in cases where taxpayers have only wage income. This group of optional filers constitutes approximately half of the German taxpayer population. While non-filing can also refer to non-compliance with filing obligations as a form of tax evasion (e.g.

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<sup>&</sup>lt;sup>1</sup> For an overview of international non-filing regulations, see International Bureau of Fiscal Documentation (2016).

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Erard and Ho, 2001; Congressional Research Service, 2023), we focus on optional non-filers and exclude those who have to file.

Our empirical analysis provides three major insights on tax nonfiling and its distributional impact on the effective taxation of income. First, we show that non-filing is very common and particularly so at the lower end of the income distribution. Overall, 61% of optional filers do not file. At the bottom of the income distribution, the non-filing share is as high as 90%.

Second, we quantify absolute tax over-remittances that result from non-filing by comparing the effective tax withholding observed in the data to the statutory tax liability as defined in the tax schedule. Nonfilers over-remit taxes at all income levels and over-remittances are substantial with an annual value of at least  $\in$  951 million. On the individual level, the average non-filer over-remits  $\in$  119. We show that this mean value is not driven by a few extreme cases. One-third of the non-filers overpay taxes, representing 2.6 million taxpayers. In addition, we provide suggestive evidence that filing costs are unlikely to explain non-filing given the observed over-remittances.

Third, we compute the effective average tax rates (ATRs) for nonfilers and show that they effectively face a different tax schedule than filers. Comparing this effective tax schedule to the statutory tax schedule, we emphasize the role of non-filing for effective redistribution. On average, non-filers' effective ATRs are 1.2 percentage points higher than their statutory ATRs. Non-filing increases effective ATRs at all income levels, but especially at the lower end of the income distribution, where non-filing is most common. Similar to other progressive income tax schedules, the German tax schedule features a zero statutory ATR for lowest-income taxpayers with income below a basic allowance threshold. Although they should pay zero taxes, non-filers in this income range effectively face positive ATRs, averaging close to 2% in many income bins. As a result, the effective progressivity of the income taxation is weakened compared to the statutory tax schedule.

Optional non-filing does not only impact effective taxation in Germany. To illustrate this, we use aggregated Austrian tax data and document similar over-remittances under automatic withholding. In addition, we simulate effective taxation for low-income US non-filers and show that automatic withholding mechanisms lead to qualitatively similar divergences between effective and statutory ATRs.

Our results have clear policy implications: Allowing for non-filing impacts the effective taxation and policy makers should account for that when designing the income tax system. To correct for over-withholding, the straightforward policy is to automatically refund over-withholdings to optional filers, while allowing for the possibility to file an income tax return for taxpayers who want to itemize deductions. This realigns effective and statutory taxation and restores the level of effective tax progressivity as defined in the tax schedule without imposing any filing costs on non-filers. Automatic refunds not only decrease effective ATRs for low-income taxpayers, thus enhancing equity, but also decrease their effective marginal tax rates (MTRs). This is in contrast to many transfer policies that raise efficiency concerns because they increase MTRs at the bottom of the income distribution.<sup>2</sup>

Our work relates to an evolving literature on optional tax filing. We contribute to this literature by documenting the substantial role of optional non-filing for effective taxation, which has not been discussed before. Literature on non-filers often focuses on unclaimed refunds from social welfare or other payments that are administered via the income tax code (e.g., Guyton et al., 2017; Ramnath and Tong, 2017; Goldin et al., 2022). Here, we also add to a broader literature on incomplete take-up of social welfare programs (e.g., Currie, 2006; Bhargava and

Manoli, 2015; Finkelstein and Notowidigdo, 2019). We contribute to this literature by documenting that taxpayers leave money on the table in a context where two common explanations for incomplete take-up can be ruled out: there is no social stigma linked to tax filing, and filing costs are limited since the German tax system requires only minimal tax filing to correct for over-withholding. Another key difference compared to other settings is that policy makers can address the incomplete takeup of tax filing without necessitating changes in individual behavior. Tax authorities already have all relevant information at hand to refund over-withheld taxes for those who do not file.

In addition, research on optional filing shows that taxpayers forgo additional tax refunds to avoid compliance costs from filing (Benzarti, 2020) and are more likely to file when expected returns from filing increase, with positive effects on economic outcomes (Ramnath and Tong, 2017). In a concurrent paper, Goodman et al. (2023) analyze the accuracy with which the IRS could pre-populate tax returns for US taxpayers. They estimate significant tax over-remittances for optional US non-filers, supporting the international relevance of non-filing for effective taxation. Beyond providing point estimates for the average, we show that non-filing impacts effective progressivity by inflating effective ATRs differently over the income distribution.

We also contribute to a literature on effective taxation and tax progressivity. Recent studies document that rich taxpayers often face low effective ATRs (e.g., Saez and Zucman, 2019, 2020; Advani et al., 2023). They evade (e.g., Guyton et al., 2021; Alstadsæter et al., 2022) and avoid (e.g. Roller and Schmidheiny, 2016) taxes with tangible implications for inequality: When rich taxpayers pay less taxes, this weakens the effective redistribution (Roller and Schmidheiny, 2016; Alstadsæter et al., 2019). We contribute to this literature by highlighting the role of optional non-filing for effective taxation at the bottom of the income distribution. By increasing the effective ATR for low-income taxpayers, optional non-filing acts as reverse evasion and further dampens the effective tax progressivity.

### 2. Institutional background

#### 2.1. Progressive income tax schedule

Progressive income tax schedules are characterized by higher average tax rates for higher taxable income. They are very common: In 2020, 34 out of 37 OECD countries have a progressive income tax schedule with Germany being one of them (OECD, 2021a). Like many other progressive tax systems, the German income tax schedule features a basic allowance: Annual taxable income up to  $\in$  8354 is tax free.<sup>3</sup> Above this basic allowance, marginal tax rates increase with income from initially 14% up to 45% for taxable income exceeding  $\in$  250,730.

### 2.2. Optional filing

Many countries have non-filing options for some taxpayers.<sup>4</sup> This includes the US, where non-filing can be optional for low-income employees with wage earnings below their basic allowance threshold. German taxpayers fall into two categories: compulsory filers, who have to file an income tax return, and optional filers, who are free to choose whether or not to file. Importantly, filing is optional for taxpayers for whom withholding is exact or too high (over-withholding). Throughout

 $<sup>^2</sup>$  We analyze the efficiency properties of the effective tax schedule under non-filing relative to comparable changes in the statutory tax schedule in Appendix H. Leaving aside equity concerns, we illustrate that non-filing is not an efficient way of reaching the observed effective tax schedule because it raises less tax revenue as compared to increasing statutory tax rates.

 $<sup>^{3}\,</sup>$  If not indicated otherwise, numbers from the German income tax code refer to 2014.

<sup>&</sup>lt;sup>4</sup> List of countries with non-filing options compiled from International Bureau of Fiscal Documentation (2016): Argentina, Austria, Belarus, Bulgaria, Chile, China, Costa Rica, Croatia, Czech Republic, Dominican Republic, Ecuador, El Salvador, Estonia, Guatemala, Iran, Israel, Japan, Korea (Rep.), Lithuania, Luxembourg, Macedonia, Madagascar, Moldova, New Zealand, Nicaragua, Peru, Philippines, Ukraine, Romania, Russia, Slovak Republic, Turkey, United States.

our analysis, we focus on optional-filing cases and abstract from illegal non-filing by excluding taxpayers who owe taxes and therefore engage in tax evasion by not filing. When optional filers decide to file an income tax return, we refer to them voluntary filers, whereas nonfilers abstain from filing an income tax return. Whenever taxpayers earn income from a source where automatic withholding does not take place (e.g., self-employment or business income), they are required to file an income tax return. Wage and capital income do not trigger compulsory filing, as taxes on these incomes are automatically withheld at source.<sup>5</sup>

Additional reasons which can lead to under-withholding and therefore trigger a filing duty include receiving wage replacement benefits like unemployment insurance payments that exceed  $\in$  410, having a second wage income subject to income taxes, or spouses electing to engage in a joint withholding scheme. Third party reporting allows as to identify these cases and drop compulsory files from our sample. We discuss the details of this in Section 3.

#### 2.3. Automatic withholding

Automatic income tax withholding - when employers withhold taxes for their employees' wages and directly transmit it to the tax authority - is "almost universal" (Brockmeyer and Hernandez, 2019, p. 1), key for taxing income at high tax rates (Kleven et al., 2016), effective in preventing evasion (Kleven et al., 2011), and correlated with economic development (Jensen, 2022). German employers typically withhold income taxes for their employees on a monthly basis. Employers extrapolate the annual gross income (multiplying the monthly gross wage income with twelve) and derive a corresponding taxable income. When doing so, they take into account one twelfth of the basic allowance of  $\in$  8354, one twelfth of the annual standard deductions (€1000 for work related expenses and €36 for special expenses), and the corresponding deductible social security contributions. Then, employers withhold income taxes according to the ATR that applies to the extrapolated taxable income. Similar withholding practices are common in other countries (we discuss the case of Austria and the US in Section 4.6).

#### 2.4. Over-withholding

Over-withholding occurs when effective annual withholdings exceed the statutory tax liability that the tax schedule defines for a taxpayer's annual income. It occurs because the tax schedule is a function of annual income, but withholding takes place for each payroll period, i.e., monthly. If monthly gross wage income fluctuates, this can lead to over-withholding via two main mechanism.

First, employers consider 1/12 of the annual standard deductions for automatic withholding every month. If a taxpayer is employed for x < 12 months, only x/12 of the annual standard deductions are considered for automatic withholding, although all employees are eligible for the full  $\in$  1036. Likewise, only a fraction of the basic allowance ( $\in$  8354) is considered. Second, the extrapolated and the realized annual income do not coincide if wages are not constant over twelve months. This drives a wedge between statutory and effective ATRs. The tax schedule is progressive and tax liability is a convex function of taxable income. For fluctuating monthly income, the average of the applied ATRs from the extrapolated annual income is always higher than the ATR that applies to the true annual income. As a result, over-withholding is common, while under-withholding is not possible for optional filers.

For illustration, consider this simple example: A taxpayer is employed for 3 months with a monthly gross wage income of  $\notin$  2000 and 0 income else (e.g., a graduate starting their first job in October).

For each month employed, the employer extrapolates an annual gross income of  $12 \times \in 2000 = \in 24,000$  and withholds taxes at the corresponding ATR (approximately 10%). The true annual gross income is  $\in 6000$ , which implies a statutory ATR of zero. As a result, the employer withholds  $3 \times 0.1 \times \in 2000 = \in 600$  while the statutory tax liability is  $\in 0$ . In general, over-withholding occurs when taxes are withheld for employees who do not have constant monthly wages throughout a year.<sup>6</sup>

### 2.5. Minimal tax filing

To get a refund for over-withheld taxes, only minimal filing is needed. The two-page form (Figure A.6b and A.6c) requires personal information such as name and bank account, as well as copy-pasting six values from the wage tax certificate that all employees receive automatically (comparable to form W-2 for US employees, Figure A.6a). The form does not require any calculations or additional information beyond what is immediately available from the wage tax certificate. making it less demanding than filling out a 1040 form in the US, for instance. This minimal filing corrects for over-withholding by taking into account the full standard deductions and basic allowance, and applying the correct statutory ATR for the resulting taxable income. Throughout the paper, over-remittances refer to this minimal filing scenario and we abstract from further possibilities to reduce the tax liability, i.e. by itemizing deductions. We provide an upper bound estimate for additional refunds that non-filers could realize when filing and itemizing deductions in Appendix F.

#### 3. Data set and samples

### 3.1. Data set

We use cross-sectional, administrative income tax data on German taxpayers, provided by the Research Data Centre of the Federal Statistical Office and the statistical offices of the Länder (RDC Research Data Centre of the Federal Statistical Office and the statistical offices of the Länder (RDC) (2020, 2018)) — the Lohn- und Einkommensteuerstatistik (LESt). The LESt is a 10% stratified random sample of taxpayers in Germany. It covers a broad range of variables related to individual income taxation, including different sources of income, deductions, wage-replacement benefits, demographic information, and taxes paid.

#### 3.2. Data on non-filers

For non-filers, the data mainly stems from employer-provided endof-year wage tax certificates, comparable to form W-2 in the US. This includes the annual gross wage income and withheld income taxes, as well as basic demographic characteristics, such as gender, age and state of residence. Based on this information, we can simulate the statutory tax rates for most non-filers and compare it to their effective taxation, the withheld income taxes. Data on non-filers is available for the two most recent LESt years, 2014 and 2010. We use the 2014 LESt for our main analysis. As a robustness check, we replicate our findings for 2010 in Appendix D. Aggregated data on tax filing status, available for a longer time range, shows that both 2010 and 2014 are typical years in terms of tax filing (see Figure A.7)). For filers, the LESt also includes data from their tax filing forms and final tax assessment.<sup>7</sup>

<sup>&</sup>lt;sup>5</sup> Different from all other income, capital income is subject to a flat tax rate of 25%. See <u>Bartels and Jederny</u> (2015) for a discussion of the German dual taxation system.

<sup>&</sup>lt;sup>6</sup> Employers can adjust for over-withholding from monthly wage fluctuations if they employ the taxpayer for the full year. For employers with less than ten employees, this is optional. Unfortunately, according to the Federal Ministry of Finance, there is no data on the number or share of conducted end-of-year adjustments.

 $<sup>^7</sup>$  A taxpayer is recorded as a filer if their tax assessment is concluded within 2 years and 9 months after the tax year, i.e. September 30, 2016 for the tax

#### 3.3. Identifying optional (non-)filers

Our analysis focuses on optional (non-) filers, i.e., taxpayers who are not required to file an income tax return. Filing is optional when income taxes are withheld at source and under-withholding is ruled out. This is typically the case if taxpayers have only wage income and potentially capital income, receive no wage replacement benefits, do not have several jobs at a time, and do not opt for joint withholding with their spouse (see Section 2 for details). We can identify these taxpayers because the LESt data covers relevant information to determine whether filing is optional or compulsory.

The LESt data reports all income sources that trigger compulsory filing, such as self-employed income. Information on capital income is limited in the LESt data, but this is no concern for the identification of optional non-filers, because capital income does not trigger compulsory filing.<sup>8</sup> A false classification of taxpayers with additional income sources as optional filers is only possible if they evade taxes by not reporting this additional income at the extensive margin, e.g., hiding all self-employed income. Although administrative data does not allow to rule out that these cases exist, we argue that such extensive margin tax evasion is unlikely to drive our results (see Appendix B for details). Information on wage-replacement benefits are shared between social insurance institutions and tax offices and reported in the LESt data. Spouses with joint withholding and taxpayers with multiple jobs can be identified based on their withholding scheme (*Steuerklasse*).

#### 3.4. Sample 1

For our analyses, we use different samples of filers and non-filers drawn from the LESt data. To study the prevalence of optional tax non-filing in Section 4.1, we first restrict our sample to optional filers and exclude all compulsory filers (Sample 1). This sample contains 258,139 non-filers. When applying statistical weights, they represent 9 million German taxpayers, which is equivalent to 23 percent of the total taxpayer population. We provide descriptive statistics and additional details on the sample restrictions in Appendix B.

#### 3.5. Sample 2

To be able to simulate the statutory taxation, we further restrict our sample in Sections 4.3 and 4.4 to optional filers between 16 and 63 years of age (working-age population) for whom we can impute their taxable income based on the employer-provided information (Sample 2). This excludes civil servants and employees with wage income of more than  $\in$  48,600 (about the 90th percentile of the of optional filers' income distribution). For these taxpayers, tax-deductible social insurance contributions cannot be inferred based on their gross wage income, because they do not face compulsory enrollment. We also exclude taxpayers for whom the withheld taxes are not in line with tax-determining individual characteristics reported in the LESt data.<sup>9</sup>



Fig. 1. Prevalence of Non-Filing by Gross Income

<u>Notes</u>: Share of non-filers among optional filers over annual gross wage income. Dashed gray line: Average share of non-filers (61.15%) across all income levels. Statistics refer to taxable units, which may be either an individual or married spouses in case of joint filing. For jointly filing spouses, we consider the average gross income.

Sample 2 contains 205,678 non-filers for whom we can compute potential over-withholdings. The weighted sample represents 8 million non-filers, who account for 20 percent of the full taxpayer population.

#### 4. Results on non-filing, over-remittances, and effective ATRs

#### 4.1. Prevalence of non-filing

Non-filing is common and there is a clear correlation between non-filing and annual income. Among optional filers, who can choose whether or not to file, 61% do not file. These non-filers have an average annual gross wage income of about €18,000, compared to €35,000 for voluntary filers (Table B.3). Fig. 1 shows that the non-filing share decreases from 90% for gross wage income of around €10,000 to around 30% for €50,000 and higher.<sup>10</sup> While the non-filing share varies significantly over the income distribution, we document that it is remarkably persistent across age groups, gender, family status, and region (see column 2 of Table A.2).

### 4.2. Prevalence of over-withholding

After documenting non-filing for large parts of the taxpayer population, we now study the prevalence of over-withholding among those who do not file, to rule out that the average is driven by a small number of non-filers with extreme values of over-remittances. Under overwithholding,  $T_i^E > T^S(y_i)$ , where  $T_i^E$  denotes income taxes effectively withheld for taxpayer *i* and  $T^{S}(y_{i})$  denotes the statutory taxes that the tax schedule defines for their taxable income  $y_i$ . We observe  $T_i^E$ for non-filers in the LESt data and follow the tax code to compute  $y_i$  and  $T^S(y_i)$ . Starting from the annual gross income, we simulate the statutory income taxation taking into account standard deductions, social insurance contributions, and special allowances if applicable. We restrict the sample to non-filers for whom the taxable income can be inferred from their gross income (sample 2). We discuss the sample selection in Appendix B and explain the income tax schedule simulation in Appendix C. We then compute tax over-remittances as  $T_i^E - T^S(y_i)$ and study their prevalence for non-filers.

First, we document that tax over-withholding is common and affects about one third of the non-filing taxpayers. This share is stable across

year 2014. Optional filers have up to four years to file, which is a potential confounder to our results if such late filing is particularly common among low income optional filers with over-remittances. There is no data on the frequency of late filing behavior, but anecdotal evidence from practitioners suggests that the number of late filers is negligible.

<sup>&</sup>lt;sup>8</sup> Capital income is taxed with a flat rate of 25% and taxes are automatically withheld at source. Taxpayers are typically not required to report capital income for their income taxation because of this automatic withholding.

<sup>&</sup>lt;sup>9</sup> This excludes taxpayers for whom withheld taxes are "too high" as compared to the statutory tax liability computed based on their individual characteristics. While there cannot be under-withholding for optional filers (see Section 2), these deviations may occur because individual characteristics that determine the tax liability can change throughout the year, but the data contains only end-of-year information. We discuss this in more detail in Appendix B and show that over-remittances are still substantial when including those cases.

<sup>&</sup>lt;sup>10</sup> We analyze non-filing over gross income instead of taxable income, since the latter is endogenous to tax filing.



#### Fig. 2. Effective Taxation of Non-Filers

<u>Notes:</u> This figure shows the non-filing share (dark blue line, same as in Fig. 1), decomposed in threes subgroups of non-filers, based on their over-remittances (stacked bars). For a given 1,000-€-bin of annual gross wage income, the figure plots the share of non-filers, who over-remit no income taxes (light blue bars), up to €100 (medium blue bars), and more than €100 (dark blue bars). None: No over-withholding because taxes are withheld correctly. This €0 threshold is allowing for a 5-€-tolerance, i.e. including all non-filers with an estimated over-remittance of 0 +/- 5 €. Reading example: 88% of optional filers with an annual gross wage income of €10,000 are non-filers. 54% face no over-remittance, 7% over-remit up to €100 and 26% over-remit more than €100. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

different demographic groups (see column 5 of Table A.2). In absolute terms, applying statistical weights provided by the RDC (2020), nonfilers with over-withholdings represent 2.6 million German taxpayers.<sup>11</sup> For the other two thirds of the non-filer population, withholding is exact. They may be eligible for a tax refund if they have tax deductible expenses that exceed the standard deductions and can be itemized. This information is not observable for non-filers, but we provide an upper bound estimate based on filers' deductions (see Appendix F).

Second, we show that over-remittances are not only common among non-filers, they are also often non-negligible in size. For the 2.6 million non-filers with over-remittances, the average tax over-remittance amounts to  $\in$  361 with a median of  $\in$  183 (see Table A.1 for more percentile estimates).

Third, we document that low-income taxpayers are not only most likely to be non-filers, they are also most likely to overpay non-negligible amounts. To show this, we decompose the group of non-filers in 3 subgroups: non-filers with no over-remittances, with small over-remittances of up to  $\in 100$ , and with larger over-remittances of more than  $\in 100$ . Fig. 2 plots the decomposed non-filing share over the income distribution. Over-remittances of more than  $\in 100$  are most common for low levels of annual gross income.

### 4.3. Tax over-remittance through non-filing

After documenting that over-withholding is common, we now analyze the amount and distribution of tax over-remittances in more detail. Fig. 3 plots the average tax over-remittance for non-filers over the income distribution. We show that non-filers pay too much income taxes at all income levels. Averaging over all non-filers, including those with no over-withholding, the mean over-remittance is  $\in$  119 (solid red line in Fig. 3(a)). In relative terms, this corresponds to 1.2% of the

(a) Absolute Over-Remittances







Fig. 3. Tax Over-Remittances of Non-Filers

<u>Notes</u>: This figure shows the average tax over-remittances for non-filers over annual gross wage income (1,000-€-bins). Panel (a) plots absolute over-remittances in €, panel (b) plots the over-remittances in relative terms, as a share of annual gross income, respectively. The solid red lines refer to all non-filers, the dashed red lines to the subpopulation of non-filers with tax over-withholding, excluding those for whom statutory and effective taxation are aligned. We define tax over-remittances as the amount of income taxes that non-filers pay in excess to the statutory income taxes defined in the tax schedule. A value of 0 indicates no over-remittances, i.e. effective and statutory taxation coincide. Strictly positive values indicate that, on average, non-filers over-remit taxes at all income levels. Fig. 4 plots the resulting effective ATR. Reading example: Non-filers in the €10,000 income bin pay €166 more in taxes than intended by the income tax schedule. Conditional on over-withholding, non-filers in this income bin over-remit €435. In relative terms, this is equivalent to 1.7% and 4.7% of their annual gross wage income. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

annual income for the average non-filer. Fig. 3(b) shows that relative over-remittances are highest at the bottom of the income distribution, where the average over-remittance is close to 2% in many income bins.

For many non-filers, the withholding is exact (see Fig. 2). When excluding those and conditioning on over-withholding, i.e., taxpayers who leave money on the table by not filing, the average tax over-remittance is  $\in$  361 (dashed red line in Fig. 3(a)). In terms of economic magnitude, this corresponds to approximately one month of social welfare (2014 baseline level for singles:  $\in$  391).

In total, non-filers over-remit at least  $\in$  951 million in 2014 and lowest income taxpayers bear significant parts of this. One third of all over-remittances originates from non-filers with annual gross income

<sup>&</sup>lt;sup>11</sup> The cross-sectional data does not inform about how frequently individuals over-remit taxes under non-filing, but we can use the repeated cross-section to provide suggestive evidence that it is not a once-in-a-lifetime phenomenon (see Hauck and Wallossek 2021 for a discussion).



#### Fig. 4. Effective vs Statutory ATR for Non-Filers

<u>Notes</u>: This figure shows the statutory (black line) and effective (red lines) average tax rate (ATR) of non-filers over annual gross wage income (1000-€-bins). The solid red line refers to all non-filers, the dashed red line to the subpopulation of non-filers with tax over-withholding. The black line shows the statutory ATR as defined by the income tax schedule. The deviation between effective and statutory ATR is the additional ATR that non-filers face (see Fig. 3(b)). This is the relative value of the absolute overremittances shown in Fig. 3, with the tax schedule here being the equivalent to the 0 intercept in Fig. 3. Reading example: Non-filers in the €10,000 income bin face an effective ATR of about 1.7% as compared to a statutory ATR of 0%. Conditional on over-withholding, the average effective ATR is 4.6% in this income bin. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

below the basic allowance threshold. They would receive a full tax refund for all income taxes withheld when filing a tax return.

Our results are only a lower bound for the forgone refund potential of non-filers. The quantified over-remittances are the refunds that follow minimal filing with standard deductions, but itemizing deductions can further increase refunds. We provide an upper bound for the refund potential when considering additional deductions in Appendix F. Furthermore, the data does not allow for quantifying over-withholding of additional surtaxes and potential joint-filing benefits for married non-filers.

#### 4.4. Effective ATR under non-filing

The over-remittances of non-filers drive a sizable wedge between their effective ATR ( $ATR^E$ ) and their statutory ATR as defined in the tax schedule ( $ATR^S$ ). Effectively, there are two tax schedules in place, one for filers and one for non-filers. Fig. 4 shows that the latter features higher ATRs: Non-filers face  $ATR^E > ATR^S$  at all income levels, with an average deviation of 1.2 percentage points.

The deviation is highest for lowest income non-filers, which weakens the effective redistribution and income tax progressivity. For low income levels up to the basic allowance threshold, the tax schedule intends  $ATR^S = 0$ . Despite not being liable to pay any income tax, the average non-filer in this income range faces an  $ATR^E$  of about 1.5% (solid red line). This average includes non-filers with exact withholding, i.e.,  $ATR^E = ATR^S = 0$ . They typically have no incentives for filing, even if they had tax deductible expenses, since there is nothing to refund. If we exclude them and restrict the sample to non-filers with over-withholding, the average  $ATR^E$  is 4.7% for non-filers with  $ATR^S = 0$  (dashed red line).

From an equity perspective, non-filing acts as reverse evasion with a qualitatively similar impact on effective taxation: higher effective ATRs for low-income non-filers and lower effective ATRs for rich evaders both weaken the effective tax progressivity.

#### 4.5. The role of filing costs

While the income tax return data does not allow for a clear identification of the mechanisms behind the observed non-filing behavior, we can exploit heterogeneity in forgone refunds to provide suggestive evidence for the limited role of filing costs. Fig. 5 plots the share of nonfilers for the distribution of over-withholdings. Two patterns emerge. First, non-filing is indeed less common for higher over-withholdings. Second, albeit this negative correlation, non-filing is strikingly persistent across all levels of over-withholdings: whether taxpayers overremit  $\in 200$  or  $\in 2,000$ , about 50%–70% do not claim their refunds (Fig. 5(a)). The pattern is similar when expressing the (forgone) refunds relative to income, as additional ATR under non-filing (Fig. 5(b)). We take this limited responsiveness as suggestive evidence that filing costs are not the main driver for the observed non-filing. Intuitively, it seems unlikely that filing a two page form (see Figure A.6 for the form) comes at costs of hundreds of Euros or more.

#### 4.6. Over-withholding for non-filers in other countries

We build our analysis on German administrative data that allows for quantifying individual tax over-remittances for non-filers. However, the implications of tax non-filing for effective taxation are not limited to Germany. To illustrate this, we discuss effective taxation under automatic withholding with optional non-filing for two countries: Austria and the United States. We show that in both countries, taxpayers for whom tax filing is optional can be subject to over-withholding. We discuss the underlying computations in more detail in Appendix E.

Austria. The Austrian income tax system is similar to the German setting, with optional filing under automatic withholding for taxpayers with wage income only. Similar to the German withholding system, there can be over-withholding, but no under-withholding for optional filers. Using aggregated administrative Austrian income tax data, we show that low-income employees with  $ATR^S = 0$  face overwithholdings that are qualitatively similar to over-withholdings in Germany (we provide details in Appendix E).

In 2017 Austria implemented automatic refunds for non-filers (see Austrian Federal Ministry of Finance 2022 for details). Since this reform, over-withholdings accrue only temporary and are fully refunded after the end of a tax year — realigning  $ATR^E$  and  $ATR^S$ . The average automatic refund to non-filers in 2017 is  $\in$  238 (Austrian Federal Ministry of Finance, 2018).

United States. The US withholding system differs from the German and Austrian setting. Under automatic wage tax withholding, US taxpayers have substantial discretion over their withholdings. As a result, US taxpayers are typically required to file an income tax return, since there can be both over- and under-withholding, depending on the chosen withholding (see, e.g., Jones, 2012). However, tax filing is optional for some US taxpayers: Low-income employees with annual gross income below the applicable standard deduction are typically not required to file. With  $ATR^S = 0$ , they cannot face under-withholding, while over-withholding can occur when employment is not constant throughout the year — similar to the German setting. Goodman et al. (2023) estimate that there is a total of 47 million US non-filers with no filing obligation.

Using the 2014 IRS withholding tables for employers (IRS, 2013), we can simulate monthly withholdings for US non-filers as a function of annual gross income and months employed. While different withholding systems, we show that implications of optional filing are qualitatively similar for lowest-income non-filers in the US and Germany: although they should pay zero income taxes they can face substantial positive  $ATR^E$  when not employed for full 12 months (see Figure E.10 for details). This is in line with findings for the US from Goodman et al. (2023). Simulating pre-populated forms for 2019, they estimate that the average optional non-filer over-remits \$36 in income taxes. Conditional on over-withholding, they report an average



Fig. 5. Non-Filing Share by Potential Over-Withholding

<u>Notes:</u> This figure shows the non-filing share over potential over-withholding that taxpayers face if not filing (2014, optional filers, weighted data). Panel A plots the non-filing share over potential over-withholding in absolute terms (100- $\in$ -bins). Panel B plots the non-filing share over potential over-withholding in relative terms, as share of annual gross income (1-%-bins). This is equivalent to the additional ATR that taxpayers pay because of over-withholding (i.e., the wedge between  $ATR^E$  and  $ATR^S$ ). Reading example: 67% of optional filers with an annual over-remittance of  $\in$  1,000 do not file an income tax return (Panel A). Optional filers whose  $ATR^E$  is 10 percentage points higher than their  $ATR^S$  do not file an income tax return in 68% of the cases (Panel B).

income tax refund potential of  $390 = \text{e} 293.^{12}$  In addition, US nonfilers often forgo further refunds that they are eligible for, such as the EITC (see e.g., Ramnath and Tong, 2017; Goldin et al., 2022).

#### 5. Policy implications

If the statutory tax schedule maps the intended degree of redistribution, the regressive effects from non-filing on the effective taxation can be considered as unintended redistribution. The coherent policy implication in this case is to automatically refund over-remittances for optional filers to realign statutory and effective taxation. This benefits non-filers without imposing any costs on them. Intuitively, automatic refunds generate equity gains without efficiency losses: They generate welfare gains for low-income non-filers by reducing their effective ATR while at the same time, lower effective MTRs create labor supply incentives. Aligning effective and statutory taxation increases effective progressivity and also strengthens horizontal equity between filers and non-filers at a given income level. It should be noted however, that the system of automatic refunds is only applicable in cases of optional filing where exact withholding or over-withholding takes place. Whenever taxpayers have discretion about the degree of withholding, i.e. under-withholding is possible, automatic refunds are no viable policy recommendation.

Importantly, non-filers benefit from automatic refunds irrespective of the reason for their non-filing. Particularly, because automatic refunds do not require any action from non-filers, potential filing costs will not dampen the progressive effect of automatic refunds for low-income taxpayers. Furthermore, automatic refunds also benefit voluntary filers who no longer need to file an income tax return if they only want to correct for over-withholding.

While non-filers benefit from automatic refunds, drawbacks for other groups of taxpayers and the government are limited. As concerns voluntary filers, automatic refunds can be combined with an option to file an additional tax return if taxpayers want to itemize deductions (as is done in Austria for instance). This allows voluntary filers to realize the same refunds as in the status quo. Assuming that filing requirements are reduced with automatic refunds, because more information is automatically provided by tax authorities, voluntary filers would additionally face lower filing costs. At the same time, automatic refunds reduce the benefit from voluntary filing since overwithholdings are automatically refunded. It is thus unclear, ex-ante, whether there would be more or less voluntary filers under automatic refunds. For compulsory filers, automatic refunds for non-filers do not affect their filing or alter their absolute filing costs or benefits.

With respect to tax authorities and the more broader government, automatic refunds are unlikely to jeopardize the governmental budget: Over-remittances from non-filing taxpayers constitute only about 0.15% of Germany's  $\in$  644 billion tax revenue in 2014 (Federal Statistical Office, 2022). Otherwise, the government could for example increase the top MTR to offset the loss in tax revenue. We provide two back-of-the-envelope calculations for such budget neutral reforms in Appendix G. The additional costs for tax authorities associated with refunding over-remittances should be minimal. Information relevant to the computation is readily available and of high quality, as it is provided by third parties. Therefore, tax authorities simply need bank account information for each taxpayer to automatically transfer refunds.

One problem that automatic refunds cannot solve is temporary overwithholding throughout the year, i.e., before over-remitted taxes are refunded. Such temporary over-withholdings can still have negative implications, particularly for low-income taxpayers who are more likely to face liquidity constraints (Jones, 2012; Caldwell et al., 2023).

If automatic refunds are not feasible due to administrative or legal constraints, tax authorities can automatically send out pre-populated forms to optional filers. Pre-populated forms increase the salience of over-withholding and reduce the costs associated with filing (see e.g., Benzarti, 2021; Goodman et al., 2023). The automatic provision of pre-populated forms is popular and used in countries worldwide (OECD, 2021b).<sup>13</sup>

What if the effective tax schedule under non-filing maps the intended degree of redistribution? Non-filers face not only higher effective ATRs but also higher effective marginal tax rates (MTR). Leaving aside equity concerns, this raises questions of efficiency. We analyze the efficiency properties of this effective tax schedule relative to comparable changes in the statutory tax schedule in Appendix H. Intuitively, increasing effective tax rates via non-filing generates less tax revenue

<sup>&</sup>lt;sup>12</sup> Conversion to 2019 Euros using purchasing power parities from OECD (2022).

<sup>&</sup>lt;sup>13</sup> In Germany, such forms are available only upon request (European Commission, 2019). However, the German government has agreed to introduce pre-populated forms more broadly as per their 2021 coalition treaty (Bundesregierung, 2021).

than comparable increases in statutory tax rates because the mechanical tax revenue effect is limited. Increasing the statutory MTR for a given income range, the textbook case, raises tax revenue from taxpayers in that range as well as from higher-income taxpayers. In contrast to a change in statutory MTRs, higher effective MTRs for non-filers have no such mechanical effect on other taxpayers. Hence, most of the revenue potential is not realized when increasing only effective MTRs. If the effective schedule observed under non-filing maps the desired degree of income tax progressivity, then policy makers could generate more tax revenue by automatically refunding over-withholdings and adjusting the statutory tax rates accordingly.

Taken together, our results document the importance of non-filing for the effective reach of tax and transfer policies: Policy makers should take non-filing behavior into account when designing tax policy. This is not only relevant for income taxes, but for any policy that is administered via the income tax code and only granted upon filing. This includes social welfare or income support programs such as the EITC.

Our findings also underscore the relevance of behavioral frictions for the effectiveness of public policy outcomes more broadly. Public policies designed to improve outcomes for individuals commonly require some active behavior. We document that even when requirements are minimal and benefits are sizable, take-up can be substantially impeded, leading to potentially unintended consequences. The broader implication is that minimizing the requirements for active behavior and implementing automation wherever feasible are expected to help maximize public policy effectiveness.

#### 6. Conclusion

We show that, while seemingly innocuous, optional tax non-filing for employees has a sizable impact on effective taxation. Under optional non-filing, lowest income earners are most likely not to file, while at the same time often being subject to over-withholding. Non-filing thus harms mostly those with lowest income who have substantially higher effective average tax rates than intended by the tax schedule.

So far, the deviation between effective and statutory taxation and its implications for progressivity have been studied mostly in the light of tax evasion of rich taxpayers. We add a new perspective to this by highlighting the role of optional non-filing. Non-filing is fundamentally different from evasion: low income taxpayers face legal tax overremittances because of their passive behavior. However, the result is qualitatively the same: Both non-filing and evasion weaken the effective tax progressivity. In this sense, non-filing acts like "reverse evasion".

#### 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.

#### Data availability

The data that has been used is confidential.

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#### Appendix A. Supplementary data

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