Withheld from Working More? Withholding Taxes and the Labor Supply of Married Women

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Abstract

To collect income taxes, almost all countries require employers to withhold monthly tax prepayments which are then fully credited against the final income tax liabilities of their employees. Despite being a fundamental component of income taxation systems worldwide, the impact of these withholding taxes on labor supply is poorly understood. We investigate their importance in the context of married couples in Germany where the withholding tax liability can be redistributed between spouses. We exploit a reform that reduced the withholding tax for some married women more than for others, while inducing no differences in income taxes. Using administrative data for the full population of German taxpayers, we estimate an elasticity of labor income with respect to the withholding tax eight years after the reform of 0.10. Additional evidence from a self-conducted survey suggests imperfect understanding of the tax system and limited pooling of resources within the household as the main mechanisms. As the majority of couples shift parts of the withholding tax liability from the husband to the wife, our results suggest that the increased withholding tax liability of married women contributes to their low labor supply. This highlights the need for governments to be aware of the distortion of labor supply incentives when the design of withholding taxes does not match actual income tax incentives.

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Keywords: Withholding Taxes, Income Taxation, Gender, Labor Supply

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1 Introduction

Many people do not understand how income taxes work. They often do not know the difference between marginal and average tax rates (Gideon, 2017; Liebman and Zeckhauser, 2004; Rees-Jones and Taubinsky, 2020) and which tax rates apply to them (Aghion et al., 2017; Blaufus et al., 2015; Chetty et al., 2013; Farhi and Gabaix, 2020; Fujii and Hawley, 1988; Lardeux, 2023; Leite, 2024; Rees-Jones, 2018). Due to this limited understanding, households' reactions are therefore influenced by how they interpret their incentives (Stantcheva, 2021). These interpretations can be influenced by supposedly irrelevant technical decisions of politicians and bureaucrats.

We study the decision about the role of income tax collection, a so far overlooked cornerstone in understanding labor supply responses to income taxes. Almost all countries require employers to withhold monthly tax prepayments which are then credited against the final income tax liabilities of their employees. The collection of these withholding taxes provides governments with a constant stream of revenue and increases tax compliance (Bagchi, 2025; Bagchi and Dušek, 2021; Schepanski and Shearer, 1995; Slemrod, 2019). There is, however, no clear best practice of how withholding taxes should be designed. Typically, withholding tax rates do not reflect true effective income tax rates. Many governments often collect more withholding taxes than employees owe in income taxes (Engström et al., 2015; Gelman et al., 2022; Hauck and Wallossek, 2024; Rees-Jones, 2018).[1] In those cases, governments issue a refund to taxpayers after the end of the tax year. Conversely, when the government collects less in withholding taxes than employees owe in income taxes, taxpayers are required to make an additional tax payment to the government. This link between withholding taxes and income taxes adds a layer of complexity that might obscure the fact that withholding tax rates have no effect on the total amount of income taxes paid in a year. Besides liquidity constraints and time discounting, how income taxes are collected should therefore have no effect on how much employees decide to work.

It is difficult to identify the effects of withholding taxes, as they are typically closely tied to the underlying income tax system. It is, therefore, usually not possible to use reforms of the income tax system to draw conclusions about the role of withholding taxes. However, the German income tax system offers an institutional setting that allows for such an analysis. We illustrate the core feature of the institutional setting in Figure 1, which displays average withholding tax rates by gender and labor income in Germany. Conditional on labor income, married women are on average subject to higher withholding tax rates than married men. This is a result of the fact that married couples can shift parts of the withholding tax liability from one partner to the other by choosing certain withholding tax schedules. This implies that spouses with identical income can be subject to different withholding tax rates even when the overall household income is the same. Importantly, the decision on withholding tax schedules does not affect the final income

[1] This overwithholding often reaches substantial magnitudes. For example, nearly a third of the amount of all personal income tax payments is returned as tax refunds in the US (Gelman et al., 2022).

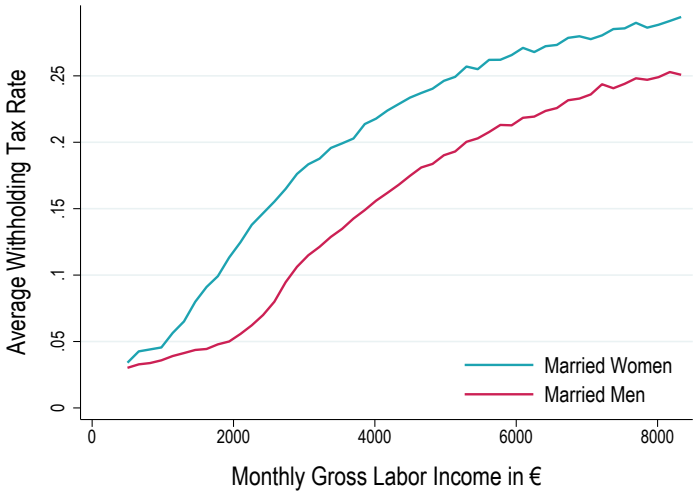


Figure 1: Average Withholding Tax Rate by Gender

Notes: The figure displays the average realized withholding tax rate by gender for married couples in Germany. The values correspond to population means as they are based on the universe of observations from the German Taxpayer Panel (TPP) for the year 2010. The figure illustrates that married couples shift a substantial share of the withholding tax liability from men to women through the choice of withholding tax schedules.

tax rate. However, a married couple can minimize its joint withholding tax liability by shifting some part of the withholding tax liability from the spouse with higher labor income, i.e., the primary wage earner, to the spouse with lower labor income, i.e., the secondary wage earner. This explains the pattern in Figure 1: Married women are typically the secondary wage earner and hence face, on average, a higher withholding tax rate conditional on labor income.[2]

In this paper, we use the German withholding tax system to study how withholding taxes impact labor income. At the core of the paper, we leverage a withholding tax reform that reduced withholding taxes more for some women than for others, allowing us to estimate the effect of withholding taxes on labor income. To understand the underlying behavioral responses, we complement the analysis with a toy model and self-collected survey data. We then compare withholding tax implementations in different countries to discuss the trade-offs policymakers face when implementing withholding taxes.

We conduct our analysis using full-population administrative tax records from the German Taxpayer Panel for the years 2006 to 2018. To obtain exogenous variation in withholding taxes, we exploit a tax reform in 2010 that cut withholding taxes for married women differently across withholding tax schedules. Using a Difference-in-Differences design with continuous treatment intensity, we are able to investigate how married women react to a cut in withholding taxes while keeping income tax liabilities constant.

We estimate an elasticity of labor income with respect to the marginal net-of-withholding tax rate eight years after the reform of approximately 0.10. This effect is more pronounced for women

[2]Conditional on income, there is no other reason for withholding tax rates of husbands and wives to differ as all tax credits and deductions are applied on the household level.

who have greater flexibility in adjusting their labor supply, such as those working part-time or those without children. The estimated elasticity is lower than typical elasticities estimated in response to changes in income tax (Neisser, 2021). Nevertheless, the effect is substantial as we show using a back-of-the-envelope calculation: Aligning the marginal withholding tax rate with the marginal income tax rate for all women whose marginal withholding tax rate is higher than the household's income tax rate would lead to a 1 % increase in labor income for this group.

With the help of a toy model, we discuss three factors that can explain why withholding taxes affect labor supply decisions: First, individuals might not fully understand or internalize the relationship between income and withholding taxes. Therefore, they might think that the net income on their monthly payslip equals their actual net income after income taxes and consequently use withholding taxes as a proxy for income taxes in their labor supply decisions. Second, even when households understand the difference between income and withholding taxes, the distribution of withholding taxes between partners might impact labor supply decisions when households do not act as a unit. Lastly, households might also react to withholding taxes if they have strong time preferences for income during the year, for example due to budget constraints. However, the last channel is unlikely to drive our results as suggested by the small time discounting factors found in the literature (e.g., Falk et al., 2018).

As evidence on the knowledge about the interlinkage between withholding and income taxes and on the organization of household finances is much scarcer, we conduct a pre-registered online survey among 506 married and employed German individuals. First, we find that more than 80 % of the surveyed individuals wrongly think that the choice of withholding tax schedules affects the final income tax liability. This suggests that individuals with the same income tax liability, but with differing withholding tax rates, might perceive their income tax liability differently and consequently make different labor supply decisions. Second, we investigate the impact of the system of withholding tax schedules on the organization of household finances in Germany. As seen in Figure 1, couples often choose withholding tax schedules that shift parts of the withholding tax liability from men to women. In a unitary household model, this would have no impact on real outcomes as all resources are shared. However, if a woman only has limited access to the income of the husband, the observed pattern of assignment of withholding tax schedules lowers her own disposable net income. We find suggestive evidence that in fact there is no equal access of both partners to all household resources.

These findings speak to important considerations regarding the role of withholding taxes in tax systems with joint taxation. Joint income taxation treats married couples as one unit and therefore sets one joint income tax liability for the couple. In contrast, withholding taxes are always levied on the individual level so that there is no clear optimal withholding tax regime in the presence of joint taxation. We therefore compare the implementations of withholding taxes

for married couples in France, US and Germany and study the potential effects of two recently proposed reforms in France and Germany.[3]

Studying these reforms reveals two important lessons: First, we find that policymakers do not attempt to align the perceived incentives with the real incentives as the reforms do not reduce the gap between marginal withholding tax rates and marginal income tax rates. Instead, they set lower marginal withholding tax rates for secondary earners. In light of our empirical results, this suggests that politicians deliberately use withholding taxes to increase the labor supply of married women.

Second, average withholding tax rates are also substantially altered by the reforms. In countries with tax withholding and joint taxation, policymakers face the challenge of determining how the marriage bonus should be distributed among the spouses throughout the year as they have to set an individual average withholding tax rate for every taxpayer. For example, the gap in average tax rates presented in Figure 1 reflects the consequence of the implemented withholding tax system for married individuals in Germany. As we show that couples in Germany do not fully pool their income and as an effect do not fully pool the marriage bonus, this gender gap in withholding taxes might lead to lower work incentives for women. Women might overestimate their individual income tax liability, which can decrease their incentives to work as we show in our toy model. Interestingly, implemented approaches to distributing the marriage bonus vary substantially across countries. The two recently discussed reforms in France and Germany both increase the share of the marriage bonus that the secondary earners receives. This might lead to higher work incentives for married women.

Our paper is closely linked to the behavioral public finance literature studying the interaction between inattention, tax complexity and behavioral responses to taxation. It is well documented empirically, mostly with surveys, that a large share of taxpayers does not understand how income taxation works (Abeler and Jäger, 2015; Aghion et al., 2017; Blaufus et al., 2015; Chetty et al., 2013; Gideon, 2017; Rees-Jones, 2018; Rees-Jones and Taubinsky, 2020; Stantcheva, 2021). Relatedly, the view that the complexity of income tax systems matters for labor supply responses and thereby for the optimal design of tax systems is established in the theoretic literature (Bernheim and Taubinsky, 2018; Farhi and Gabaix, 2020; Gabaix, 2019; Liebman and Zeckhauser, 2004; McCaffery and Slemrod, 2006; Moore and Slemrod, 2021). However, the empirical literature on labor supply effects of limited understanding of tax systems is still emerging (Chetty et al., 2013; Feldman et al., 2016; Kostøl and Myhre, 2021; Lardeux, 2023; Leite, 2024). Specifically withholding taxes have been studied by Becker et al. (2019) and Koch (2024). We contribute to the behavioral public finance literature in two ways. First, we document widespread misunderstanding of the withholding and income tax system in Germany. Second, we highlight the role of income tax

[3]The reform in France will be implemented in September 2025. The German reform was agreed upon by the governing parties in the coalition agreement in 2021, but it did not pass parliament before the coalition broke in fall 2024.

collection for the behavioral reaction to income taxes by providing real-world evidence on the impact of withholding taxes on labor supply.

Also, withholding taxes have been studied in other contexts. First, it has been shown that there exists a positive relationship between withholding tax rates and savings and consequently a negative relationship between withholding tax rates and consumption (Caldwell et al., 2023; Feldman, 2010; Gelman et al., 2022; Jones, 2012; Messacar, 2018; Shapiro and Slemrod, 1995). Second, the consequence and motivation for overwithholding have been investigated. Besides a potential government preference for bolstering the saving rate (Thaler, 1994) and an increase in tax compliance (Schepanski and Shearer, 1995), the motivation for systematic overwithholding can also stem from the fact that taxpayers like getting tax refunds and thus change tax filing behavior discontinuously at the point of exact withholding, e.g., by claiming more tax deductions (Engström et al., 2015; Rees-Jones, 2018). However, our results imply that governments face a trade-off if they prefer overwithholding when designing withholding taxes. When withholding taxes distort labor supply decisions, overwithholding decreases labor supply.

Finally, previous literature has shown that labor supply of women can be detrimentally affected by the design of tax systems. This holds true in particular for income tax systems with joint taxation of married couples (Bick and Fuchs-Schündeln, 2017, 2018; Herold and Wallossek, 2024; LaLumia, 2008; Selin, 2014). As our results imply that income tax collection also plays a role for labor supply decisions, gender gaps in withholding taxes can therefore provide an additional explanation for the observed gender gaps in labor market outcomes. By presenting the trade-offs between different withholding tax regimes in the presence of joint taxation of married couples, we furthermore contribute to the question of how an optimal withholding tax schedule should be designed when also taking into account potential negative effects on labor supply.

The rest of the paper is structured as follows: Section 2 presents in detail the German withholding tax system. Section 3 discusses the data as well as the empirical strategy and Section 4 presents the results. In Section 5.1, we introduce a toy model presenting potential mechanisms which we subsequently investigate with the help of a survey in Section 5.2. Section 6 then discusses the policy implications for the optimal design of withholding taxes and Section 7 concludes.

2 Institutional Setting

In this section, we first provide context for our study by explaining the German joint taxation system and subsequently present the German withholding tax system for married couples. Thereafter, we describe the reform of withholding taxes that we use to identify causal effects.

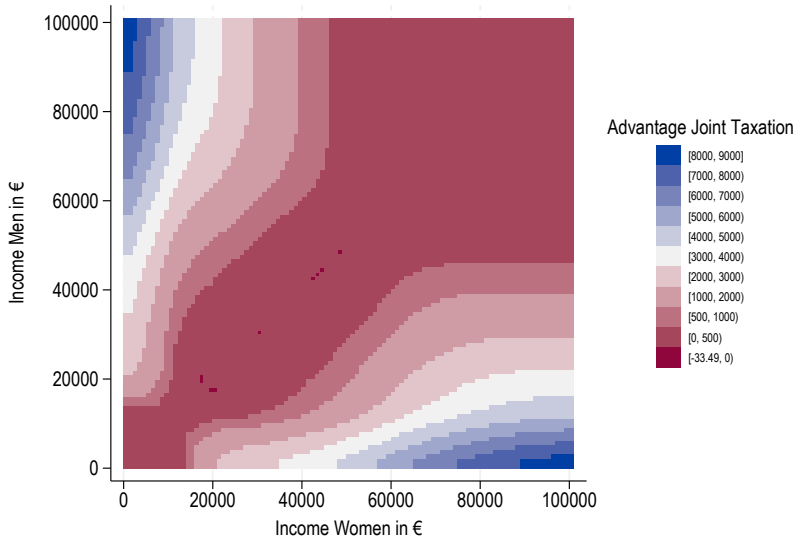


Figure 2: Marriage Bonus of Joint Taxation

Notes: The figure illustrates the system of joint income taxation in Germany. It plots the joint taxation benefits depending on the intra-household income distribution in the year 2010. We assume that both spouses contribute to the public health care and pension systems and do not claim any further deductions. The negative values are a consequence of the *Solidaritätszuschlag*, a surtax that tax filers below a specific income tax liability are not subject to.

2.1 Income Taxation of Married Couples

In Germany, married couples have two distinct options for filing their income taxes. They can opt to file them separately, treating their finances as if they were still single individuals, or they can choose to file jointly. Choosing the latter option enables couples to take advantage of potential tax benefits associated with joint taxation.[4] Under joint income taxation, the individual income tax schedule is applied to half of the joint taxable income for each couple and the resulting tax liability is then doubled. Due to the progressivity of the German income tax system, this creates joint taxation benefits whenever the spouses in a couple would have faced differing marginal income tax rates under separate taxation. For a fixed household income, a couple receives more joint taxation benefits the more unequal the intra-household distribution of income.

We illustrate this feature in Figure 2, where we plot the marriage bonus induced by joint taxation. If both spouses contribute equally to the household income, there are no benefits from joint taxation. However, the more unequally the income is distributed within the household, the more the couple benefits from joint taxation. For example, if one spouse earns €70,000 and the other spouse earns €10,000, the couple receives a marriage bonus of €3,900 a year which equals almost 5 % of the household's gross income. The underlying reason is that the couple's

[4]In fact, for the vast majority of couples, choosing joint taxation is at least weakly better than choosing separate taxation. Apart from special cases of couples with a negative marriage bonus arising from the "Solidaritätszuschlag", only couples in which one partner obtains a substantial amount of income replacement benefits (e.g., parental leave benefits, unemployment benefits or short-time work allowances) can be better off by choosing separate taxation. The reason for that is that those payments, while not being taxable, can increase the marginal income tax rate of the couple ("Progressionsvorbehalt").

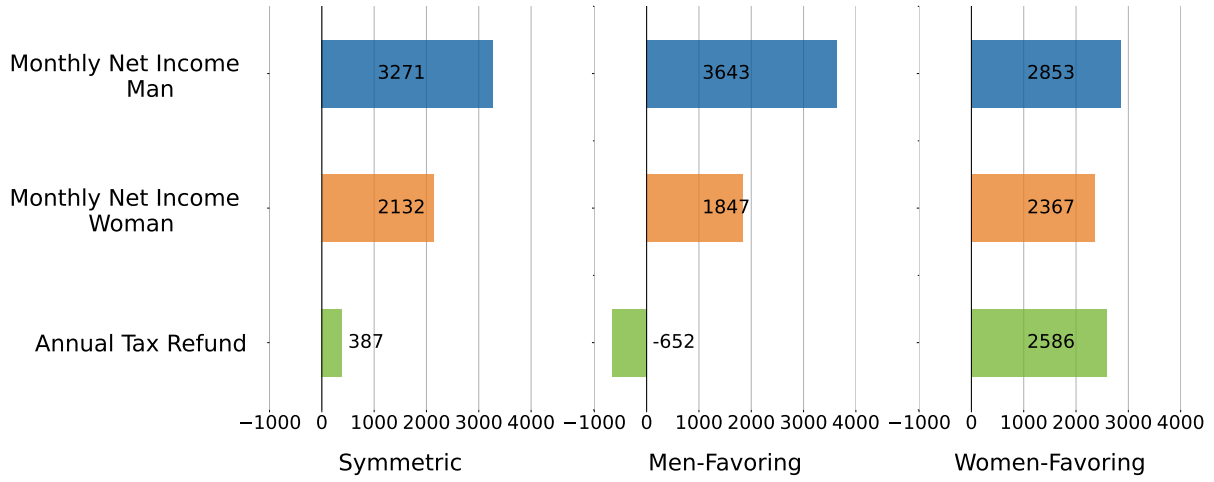


Figure 3: Example Illustrating the Different Withholding Tax Schedules

Notes: The figure illustrates how the different withholding tax schedules affect the monthly net incomes of both spouses and the annual tax refund in the year 2010. Net incomes are calculated for a household in which the husband earns €50,000 and the wife earns €30,000 gross per year. The assessed annual income tax liability of the household is €14,774 under the assumption that the couple does not claim any deductions. The figure shows how the different withholding tax schedules shift the withholding tax liability from one partner to the other and how they can affect the annual refund from the final income tax.

joint income tax liability is €15,800 under joint taxation but would be €19,700 under separate taxation.[5]

2.2 Withholding Taxes of Married Couples

The German government wants to enable couples to profit from the joint taxation benefit already during the year. Therefore, couples have the choice to reduce their withholding tax liability. Married couples can influence both the sum of their withholding tax liabilities and the allocation of their joint withholding tax liability to each spouse. They can effectively choose between three different withholding tax schedules which are illustrated in Figures 3 and 4 and explained in the following.[6] These withholding tax schedules assign each partner a certain so-called withholding tax class (*Lohnsteuerklasse*), which determines the personal withholding tax payments.

[5]Typically, the focus of economists lies on the fact that the secondary earner within the couple faces, in the presence of joint taxation benefits, a higher marginal income tax rate under joint income taxation than under separate income taxation. For example, Bick and Fuchs-Schündeln (2017) have identified that this phenomenon as one key policy that explains the low labor market participation of women. We illustrate how the marginal tax rate depends on partner income in the German joint taxation system in Figure A.1.

[6]In our analysis, we leave out the fourth, least commonly chosen withholding tax schedule. This "schedule with a factor" (*IV mit Faktor*) was introduced in 2010. The tax office takes into account the past income of both spouses and calculates the exact advantage of joint taxation for both spouses individually. Thereby, the tax office can set the withholding tax for both individuals at a level that allows the household to profit from the advantage of joint taxation during the year. More details on the effects of this schedule on marginal and average withholding tax rates can be found in Section 6 where we discuss different implementations of withholding tax schedules that account for joint taxation benefits. There are no official statistics on the use of the schedule with a factor and we do not observe the choice in the data. The German government documents that in 2018 only around 40,000 couples (less than 0.6 % of all married dual-earner couples) used this schedule (*Kleine Anfrage Bundestag* 2019).

Symmetric schedule. After marriage, each couple in which both spouses receive labor income gets assigned the same withholding tax schedule as a default, which we will call the symmetric schedule. This withholding tax schedule is symmetric since it assigns each spouse the same default withholding tax class (officially called "IV"). In this withholding tax class, the monthly withholding tax payments are calculated as if the individual was single, only taking into account the own individual income. Hence, the withholding tax is the same as the income tax for a couple without joint taxation benefits. If a couple realizes joint taxation benefits, the remitted withholding taxes of both spouses will exceed their joint final income tax liability and the couple will receive a tax refund after filing an income tax return. We illustrate this in Figure 3 for a couple in which the husband earns €50,000 and the wife earns €30,000. Being in the symmetric withholding tax schedule causes the couple to receive the joint taxation benefit of €387 as a lump-sum tax refund after filing their income taxes.

To avoid this overpayment of withholding taxes during the year, a couple can decide to switch from the symmetric schedule to a withholding tax schedule that aims at reducing the monthly withholding tax payments to account for the joint taxation benefits already during the tax year.[7]

Men- or women-favoring schedule. The most popular alternative withholding tax schedules are the men-/women-favoring withholding tax schedules.[8] In those schedules, one spouse is assigned the favorable withholding tax class ("III"), while the other spouse is assigned the unfavorable withholding tax class ("V"). The spouse in the favorable withholding tax class is taxed as if the spouse was the single earner, while the withholding tax for the unfavorable withholding tax class is calculated as if the spouse was contributing a third of the household income (Spangenberg et al., 2020). This leads to a lower withholding tax liability for the spouse in the favorable withholding tax class as compared to being in the default withholding tax class. Simultaneously, the withholding tax liability of the spouse in the unfavorable withholding tax class is higher than in the default withholding tax class and therefore also higher than without marriage. The second column in Figure 3 shows that, in the presence of joint taxation benefits, this decreases the joint withholding tax payments during the year if the primary earner is assigned to the favorable withholding tax class. In this setting with the husband earning more than the wife, choosing the men-favoring schedule shifts the timing of the realization of the joint taxation benefit for the couple forwards and eliminates the lump-sum tax refund at the end of the year. In this concrete example, it even leads to the household paying too little in withholding taxes during the year which obliges them (in the absence of other deductions) to make an additional tax payment at the end of the year.

Conversely, if this couple had chosen the women-favoring schedule, which in this case puts the primary earner into the unfavorable withholding tax class and the secondary earner into

[7] Switching away from the symmetric schedule requires the stated consent of both spouses. For switching back, however, unilateral action suffices.

[8] These terms are not official but our own creations. In particular, the law does not explicitly refer to genders.

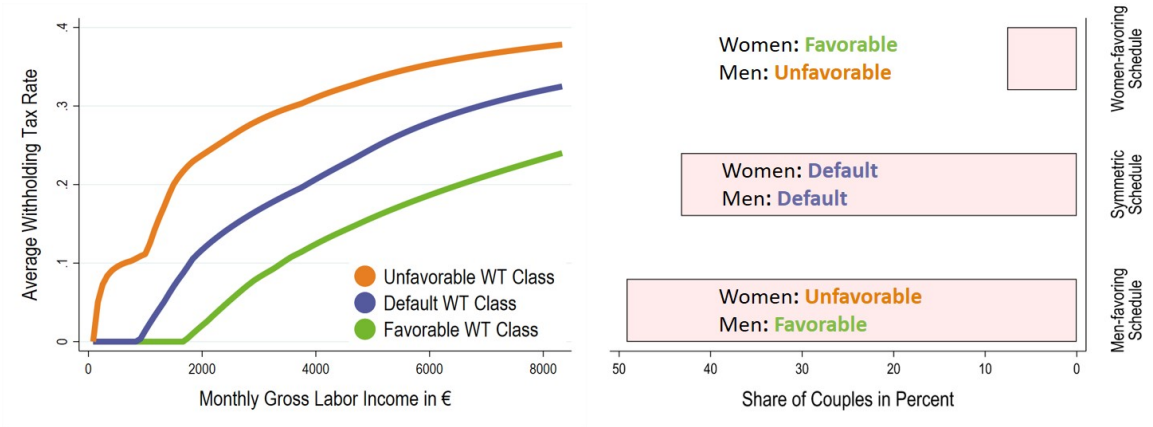


Figure 4: Illustration of Different Withholding Tax Schedules

Notes: The figure illustrates the frequency and implications of the different withholding tax schedules. On the left-hand side, the average withholding tax rate by withholding tax class in 2009 is shown. Compared to the default withholding tax class, being in the unfavorable withholding tax class leads to a much higher and being in the favorable withholding tax class to a much lower average withholding tax rate. On the right-hand side, the possible withholding tax schedules and their frequency are shown for the year 2009 for couples where both partners have labor income. Approximately 50 % of these couples choose the men-favoring schedule, in which the man is assigned the favorable withholding tax class and the woman the unfavorable withholding tax class. Around 45 % of the couples choose the symmetric schedule, which keeps both spouses in the default withholding tax class. Finally, less than 10 % of the couples choose the women-favoring schedule.

the favorable withholding tax class, they would have paid even higher withholding taxes than under the default symmetric schedule and would have received an even larger tax refund at the end of the year. However, the women-favoring schedule is rarely chosen when the income of the husband is higher than that of his wife.

Effect on tax rates. The shift of withholding tax liability from the primary to the secondary earner cannot only reduce the joint withholding tax liability but also has large effects on the withholding taxes paid by each spouse. The left-hand side of Figure 4 displays the average withholding tax rate by withholding tax class. Compared to the default withholding tax class, the average withholding tax in the favorable withholding tax class is lower while the average withholding tax in the unfavorable withholding tax class is higher. These differences are substantial. An individual earning €4,000 monthly gross income pays on average around 20 % in withholding taxes in the default withholding tax class. The average withholding tax liability of the same individual increases to around 30 % when being in the unfavorable withholding tax class and reduces to around 10 % when being in the favorable withholding tax class. Consequently, the marginal withholding tax rates differ substantially between the different withholding tax classes (see Figure A.2).

Choice of the different schedules. The right-hand side of Figure 4 shows the frequencies with which the different withholding tax schedules are chosen and which withholding tax class these schedules allocate to each spouse. Approximately 50% of the couples pick the men-favoring

schedule that shifts the withholding tax liability from men to women and around 45% stick with the symmetric schedule. Less than 10% of the couples pick the women-favoring schedule with lower withholding tax rates for women than for men.

Importantly, while the different choices of withholding tax schedules have strong effects on the amounts of withholding tax payments, they do not affect the final income tax liability of the couple. Couples cannot decrease their final income tax liability by choosing a certain withholding tax schedule, but can only change the timing of the income tax payments throughout the year. However, when taking into account discount rates and liquidity constraints, couples can have benefits or costs from delaying their income tax payments.[9]

3 Empirical Strategy and Data

In this paper, we study the causal effect of withholding taxes on labor supply. Identification of this effect would be straightforward if withholding tax schedules were randomly assigned to each couple. However, the choice of withholding tax schedules is highly endogenous. Hence, simply comparing the outcomes of individuals in the different withholding tax schedules can potentially lead to a biased estimate of the effect of withholding taxes on labor supply.

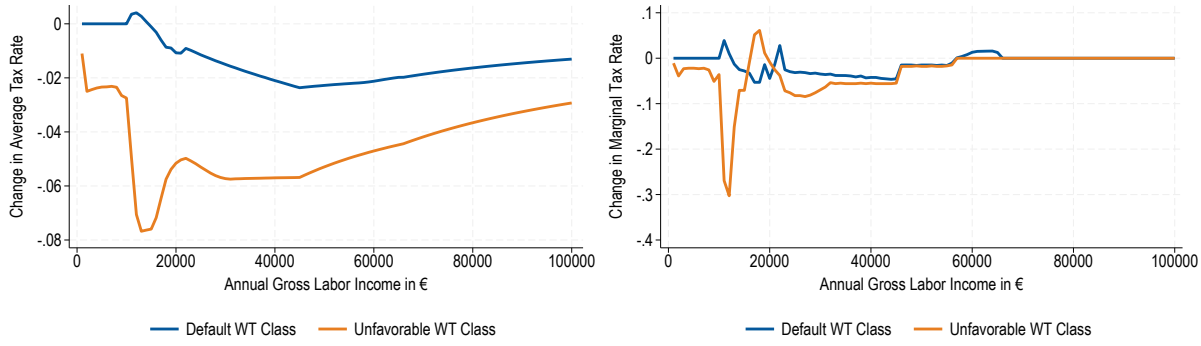
We circumvent this problem by making use of a withholding tax reform in 2010 in Germany, which we outline in Section 3.1. The reform disproportionally reduced the withholding tax liability of individuals in the unfavorable withholding tax class compared to individuals in the other two withholding tax classes. In Section 3.2, we present the data we use to analyze the reform, in Section 3.3 we discuss the sample restrictions, in Section 3.4 we show descriptive statistics and in Section 3.5 we present the empirical strategy together with the identifying assumptions.

3.1 Withholding Tax Reform of 2010

Background. For the causal identification of the effect of withholding taxes on labor supply, we make use of a German tax reform in 2010 that changed the tax deductibility of the mandatory health care insurance contributions. Prior to 2010, health insurance contributions were only taken into account in the calculation of withholding taxes for the default and favorable withholding tax class, but not for the unfavorable tax class. This changed in 2010, resulting in a substantial decrease in the withholding tax liability for individuals in the unfavorable tax class. The reform is described in detail in Stöwhase (2011a).

At the same time, the reform enabled all taxpayers to deduct a much larger share of their health care insurance contributions from the income tax. As the contributions to health care

[9] Additionally, the choice of withholding tax schedules impacts the size of wage replacement payments like parental leave benefits, unemployment benefits or short-time compensations. As we document in Section F, this is a not well-known fact (also see Illing et al. (2024) and Spangenberg et al. (2020)).



(a) Average Tax Rates

(b) Marginal Tax Rates

Figure 5: Reform on Withholding Taxes by Withholding Tax Class between 2009 and 2010

Notes: The figure plots the effect of the withholding tax reform 2010 on average and marginal withholding tax rates depending on the withholding tax class.

insurance are automatically deducted in the calculation of the withholding tax, the reform was equivalent to a cut in withholding taxes across all withholding tax schedules.

However, as the deductibility was newly introduced for the individuals in the unfavorable withholding tax class, the reform as a whole reduced, conditional on income, the withholding tax for those individuals much more than for the individuals in the other withholding tax schedules.

Reform effect. Figure 5 shows how average and marginal withholding tax rates changed from 2009 to 2010 by withholding tax class and annual gross labor income. Figure A.3 plots the absolute changes in the withholding tax rates. For example, for individuals with an annual gross labor income of €25,000, the average withholding tax rate decreased by about 5 % (€1300 for each year) for individuals in the unfavorable withholding tax class and by about 1 % (€280) for individuals in the default withholding tax class. The marginal withholding tax rate decreased by 8 % for individuals in the unfavorable withholding tax class and by 3 % for individuals in the default withholding tax class. For higher income levels, the change in the marginal tax rate is identical for both groups. In other years, there are only minor changes to the withholding tax schedule. Figure A.4 shows the withholding tax schedules for the years between 2006 and 2018 and for an annual individual income of €25,000, approximately the modus income of married women in 2009. The pattern is essentially the same along the whole income distribution.

Anticipation and salience. The reform was passed into law on July 23, 2009. There was no public debate about the effect the reform has on withholding taxes. It was not discussed in parliament and there were no newspaper articles discussing changes in withholding tax rates. In fact, we do not find any discussion about the withholding tax reform anywhere on the internet. This strongly suggests that the reform was neither anticipated nor salient. This assessment is corroborated by looking at Google Trends (see Appendix Figure A.5). No striking movements are visible before the dates of the reform announcement and introduction. This implies that couples

are not expected to have changed their withholding tax schedules around the reform date in response to the reform or adjusted their labor supply already prior to the reform. However, people were searching more for the term *withholding tax calculator* ("Lohnsteuerrechner") in January 2010 directly after the reform, suggesting that some people have perceived a change in their monthly wage income and tried to understand it. Furthermore, the reform's non-salience implies that spouses in the unfavorable withholding tax class might be unaware that their eventual income tax liability, regardless of it being perceived individually or jointly with their spouse, was not changed to the same extent. The only feature concerning withholding taxes that was indeed salient is the lower monthly withholding tax, i.e., a higher net income on the payslips.[10]

3.2 Data Set

Our study is based on the German Taxpayer Panel (TPP). The German Taxpayer Panel is an administrative dataset that contains information on the whole population of taxpayers in Germany for the years 2001 to 2018.[11] It includes information on various characteristics such as income, gender, age, number and age of children, withholding tax class and other tax-related information.[12] The TPP consists of around 63 million records on individuals for whom tax information is available for at least two years. The waves of the TPP for the years 2001 to 2011 were created from the annual income tax statistics, which include data from the tax returns of about 27 million German taxpayers who filed their income taxes. Starting in 2012, the annual federal statistics on wages and income tax replaced the income tax statistics that had been used previously, and the TPP has been continued using data from this statistic. As a result, from 2013 on, the TPP also includes data on about 12 million taxpayers who did not file their income taxes but who did face withholding taxes. In our analysis, we use the TPP for the years 2006 to 2018. In Appendix Section H, we describe in detail how we calculate withholding taxes.

3.3 Sample Restrictions

In the following, we outline the restrictions that we impose on our sample. Their stepwise impact on the sample size is presented in Table 1.

Basic restrictions. We restrict our sample to married dual-earner couples, i.e., couples in which both spouses received labor income in 2009, the year before the withholding tax reform was implemented. This restriction ensures that these individuals are actually treated at the time of the reform.

[10] In addition, households might eventually also realize that they get lower tax refunds or have to pay higher additional tax payments in the upcoming year. However, it remains unclear whether they would connect this to the change on their payslip, particularly because tax refunds or additional tax payments occur on the couple level.

[11] RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2022

[12] At the time of the reform, same-sex couples were not yet allowed to benefit from joint taxation and were not allowed to choose their withholding tax classes. Thus, our sample contains only opposite-sex couples.

Table 1: Sampling Steps

Sampling stage	Restriction	Households 2009	Household × year observations
1.	Married dual-earner couples 2009	4,545,622	51,980,518
2.	Symmetric or men-favoring schedule 2009	4,015,516	46,216,194
3.	At most 60 years old	3,684,206	38,148,740
4.	Self-employed income 2009 < €1000	3,526,104	36,506,879
6.	Employed income 2009 < €100,000	3,389,714	35,068,697
7.	Civil servant	3,106,409	32,458,708
8.	Couple observable in years between 2006 and 2009	2,583,000	27,716,719
9.	No wage replacement (unemployment benefit, short-time work,...) between 2006 and 2009	1,735,414	18,854,273
10.	Change in annual income smaller than 15% between 2006 and 2009	671,624	7,253,108
11.	Women older than 40 years	574,163	6,084,411
12.	No change in withholding tax schedule between 2006 and 2009	490,288	5,196,307

We focus on couples in the two most common withholding tax schedules: the men-favoring and the symmetric schedule. We do so for two reasons. First, as shown in Section 2.2, the vast majority of dual-earner couples, around 95 %, has chosen either the men-favoring or symmetric schedule. Second, we deem the couples in those two schedules to be more comparable. In most couples in the women-favoring schedule, only the woman is earning labor income while the husband is self-employed or is claiming pensions. Hence, these couples are very different from the couples in the other two schedules.

We also exclude observations where at least one partner is older than 60, as early-retirement schemes allow individuals to save taxes to reallocate income to later tax years, during which they no longer work. For computational reasons, we also exclude observations where one partner earns more than €100,000.[13] To ensure that labor income is the main source of work income, we exclude couples in which, in the year 2009, at least one spouse received income of more than €1,000 from self-employment. We also exclude couples with individuals earning no more than €4,800 per year. This condition ensures that we exclude individuals in marginal employment, who could earn at most €400 per month at the time of the reform and are exempt from the income tax. We also exclude civil servants as they were subject to a different withholding tax reform.

Financial crisis. The withholding tax reform of 2010, which we use for our identification, partially coincides with the financial crisis in Germany. We see in our data that couples in the men-favoring schedule experienced more extreme variations in labor income during the crisis

[13] As explained in Section 3.5, we add interacted cell fixed effects in €5,000 steps, so keeping higher incomes scales up the complexity of the regression model. The main result is almost unchanged when including all incomes, which is not surprising as within the cells for high incomes there is almost no variation in the choice of withholding tax schedules and no variation in our measure of treatment intensity, the change in the marginal withholding tax.

years. Therefore, to make the couples in the two schedules more comparable, we exclude couples which were especially affected by the crisis. We do so by excluding couples in which at least one spouse received unemployment benefits or short-time work compensation in 2009 and by removing all couples in which at least one spouse had a change in annual labor income of more than 25 % from any one year to the next during the pre-reform years.

Stability of withholding tax schedule choice. A threat to identification is that households might change their withholding tax schedule and thereby be subject to a different withholding tax schedule. There are three potential risks: (i) Households might anticipate the reform and change their withholding tax schedule before the reform, (ii) households might change their withholding tax schedule as a reaction to the reform, and (iii) households might change their withholding tax schedule for other reasons in which case the estimated reform effect would be watered down. In principle, the choice of the withholding tax schedule is not fixed and can be changed by the couple every year.

However, as we observe empirically, typically couples decide on their withholding tax schedule once at marriage, often change it at the birth of the first child and then stick to it for the rest of the working life. Figure B.1 plots the withholding tax around the birth of the first child. We see that the withholding tax schedule is changed around the birth of the first child, but then remains stable. Figure B.2 depicts the transitions between the different withholding tax schedules of couples in the three different withholding tax schedules for all couples who were married in 2009. Typically, less than 1% of the couples change their withholding tax schedule in a given year and there is no evidence for an increase in withholding tax schedule changes before or after the reform.

In our preferred specification, we apply two sample restrictions to ensure that the withholding tax schedule is stable and that the reform is exogenous to the withholding tax schedule choice. First, we restrict the sample to households where the wife is older than 40 years in 2009. As we observe empirically in the tax data, almost no woman has the first child at the age of above 40, so households are much less likely to switch withholding tax schedules. Second, we restrict the sample to households that did not change their withholding tax schedule in the pre-reform periods between 2006 and 2009. As the reform was not salient (see Section 3.1), couples are not expected to change their withholding tax schedule before or after 2009 as a reaction to the reform. However, with this conservative assumption we ensure that the withholding tax schedule is stable and that the reform is exogenous to the withholding tax schedule choice for all households. We show in robustness checks that our results are robust to the removal of both restrictions.

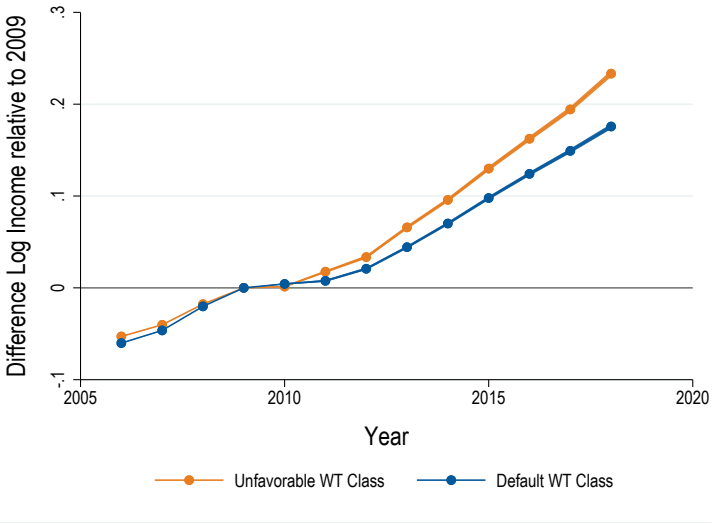


Figure 6: Income Growth Relative to 2009

Notes: The figure plots the log income difference in year t relative to 2009. The sample restrictions summarized in Table 1 are applied. The values correspond to population means as they are based on the universe of observations from the German Taxpayer Panel (TPP).

3.4 Descriptive Statistics

Income growth. Figure 6 displays the development of our main outcome variable, the difference in log labor income in year t relative to 2009. The coefficients thereby approximate growth rates in income relative to 2009. In the years before 2009, average income growth is similar for women in the unfavorable and default withholding tax classes. Between 2009 and 2011, the effects of the financial crisis are visible and income increases only moderately. After 2010, the labor income growth rate is higher for women in the unfavorable withholding tax class.

Difference between groups. While in the years until 2009 the income growth looks very similar, it is important to note that the income distribution of the two groups is very different. Figure 7 shows in a heatplot the share of couples in the two withholding tax schedules depending on the income of the wife and the husband. It is visible that the choice of the withholding tax schedule strongly depends on the distribution of income within the household. The larger the income of the husband relative to the wife, the more likely the couple is to choose the men-favoring withholding tax schedule. For example, at the cell with the highest number of observations (wife earning between €15,000 and €20,000, husband earning between €35,000 and €40,000) 77% of the couples are in the men-favoring schedule while 23% are in the symmetric schedule.[14] However, the two groups do not only differ in income variables. As Table 2 documents, the groups are also different in other observables. Specifically, couples in the men-favoring schedule

[14] Buettner et al. (2019) document that the men-favoring and women-favoring schedules are not chosen symmetrically. This is not visible in Figure 7, as couples in the women-favoring schedule are not part of our sample.

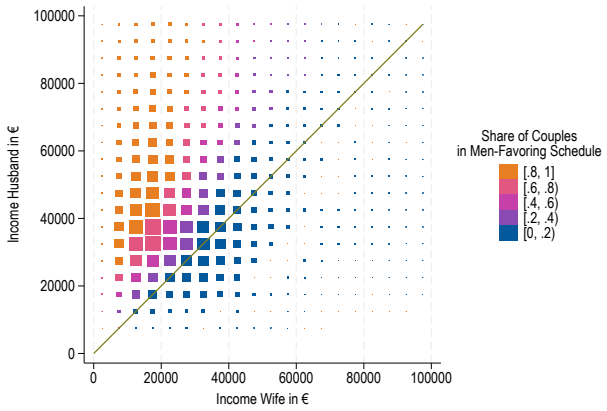


Figure 7: Heatplot of the Number of Observations and Share of Couples in Men-Favoring Schedule

Notes: The figure displays the number of observations and the exploited treatment variation by income cells. Each dot represents observations that lie in an interval of €5,000 wife and husband income. For example, the cell at the top-right corner contains women and men with incomes between €95,000 and €100,000. The larger the dot size, the more observations are in the respective cell. The color displays the share of couples in each cell who are in the men-favoring as opposed to the symmetric withholding tax schedule at the time of the reform. Incomes below €5000 are not displayed as these individuals are not subject to income taxes. The size of each bin represents the number of observations in our sample. The sample restrictions summarized in Table 1 are applied, so in particular couples in the women-favoring schedule are excluded.

are more likely to have a child and substantially less likely to live in Eastern Germany. We account for these differences with our estimation strategy that we present in the following.

3.5 Estimation Strategy

We focus our analysis on comparing women in the unfavorable withholding tax class, who received a large withholding tax cut, to women in the default withholding tax class, who only experienced a modest withholding tax cut.

Treatment intensity. A naive approach would simply compare the evolution of incomes over time between women in the men-favoring and symmetric schedule using a difference-in-differences design. However, as previously shown in Figure 5, individuals' exposure to the reform is not only determined by their withholding tax class but also by their own pre-reform labor income. Therefore, depending on the own pre-reform labor income, there are large differences in the absolute and relative changes in withholding taxes induced by the reform.

To account for these differences in the intensity of treatment and to be able to calculate the elasticity of labor income with respect to withholding taxes, we perform our analysis using a continuous treatment variable. The continuous treatment variable measures the log change in the marginal net-of-withholding-tax rate of the woman induced by the reform.[15] We construct the treatment variable for each couple by taking the labor income of the woman in 2009 and

[15]Using the change in the marginal net-of-withholding-tax rate instead of the marginal tax rate is standard in the literature on income tax elasticities (see for good overviews Jakobsen and Søgaard, 2022; Saez et al., 2012).

Table 2: Descriptive Statistics for the Year 2009

	Men-Favoring	Symmetric
Income Wife	19651.74	33321.58
	(8470.72)	(13402.3)
Income Husband	49737.3	39453.28
	(17046.99)	(15233.01)
Female Income Share	0.29	0.46
	(0.09)	(0.11)
Age Wife	44.63	44.69
	(4.47)	(4.97)
Age Husband	46.57	46.39
	(4.43)	(4.8)
Eastern Germany	0.08	0.36
	(0.27)	(0.48)
Has a Child	0.67	0.31
	(0.47)	(0.46)
Number of Children	1.42	0.76
	(0.88)	(0.86)
Catholic Wife	0.4	0.23
	(0.49)	(0.42)
Catholic Husband	0.37	0.2
	(0.48)	(0.4)
Public Servant Wife	0.12	0.12
	(0.32)	(0.33)
Public Servant Husband	0.2	0.15
	(0.4)	(0.36)
N	243,996	246,334

Notes: The table displays descriptive statistics for the year 2009 for couples who picked either the men-favoring or symmetric withholding tax schedule. The sample restrictions summarized in Table 1 are applied. Eastern Germany comprises the area of the former German Democratic Republic and West Berlin.

calculating the percent change of her marginal net-of-withholding-tax rate resulting from using the tax schedule of 2010 compared to using the one of 2009. The reform-induced change in the marginal net-of-withholding-tax rate is plotted in Figure 8.

Identifying assumptions. As the core estimate, we want to measure the elasticity of labor income with respect to the withholding tax rate to obtain an estimate that is comparable to the elasticity of taxable income (ETI). Naturally, our estimation strategy is closely related to the estimation strategies that identify the effects of ETI. Jakobsen and Søgaard (2022) provide a comprehensive framework of the empirical challenges. They differentiate between *between-income tax variation* and *within-income tax variation*. *Between-income tax variation* is exploited by the typical identification strategy for estimating elasticities in the taxation literature that makes use of differential reform effects across income, for example comparing high-income individuals who were subject to a tax reform with low income individuals who were not. In contrast, *within-income tax variation* exploits variation between groups with the same income level. This applies

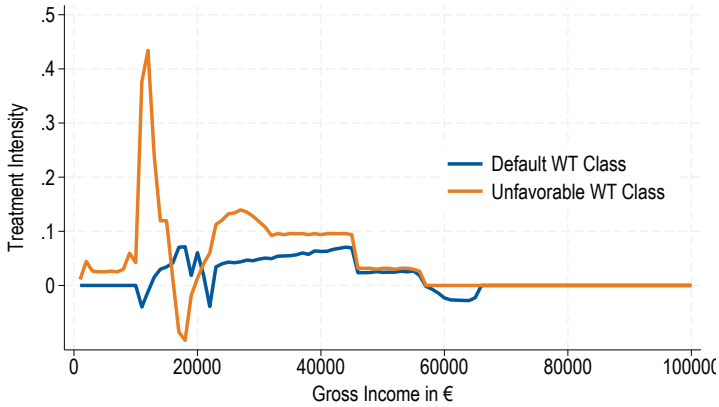


Figure 8: Reform-Induced Treatment Intensity

Notes: This figure displays the change in the net-of-withholding tax rate induced by the reform in 2010 depending on an individual's 2009 gross income.

to our case where we compare women in the unfavorable withholding tax class to women in the default withholding tax class conditional on income.

Settings with *within-income tax variation* require two specific assumptions: First, conditional on income, the income growth of the two groups would be identical in the absence of the withholding tax reform. We can test this assumption for the periods before treatment, where the income trends of the two groups should be similar and placebo reforms should display no effect.[16] Second, our approach requires the assumption of effect homogeneity as both groups are treated (Callaway et al., 2024). This implies, that both groups would react to an identical reform identically. A natural test for this assumption would be a withholding tax (or income tax) reform that hits both groups with the same treatment intensity. Unfortunately, there were no other major reforms in our observed period (see Figure A.4).

Regression equation. Using the treatment intensity, we are able to estimate a difference-in-differences equation which yields us an estimate for the elasticity of outcome y with respect to the withholding tax:

$$\ln\left(\frac{y_{i,t}}{y_{i,2009}}\right) = \sum_{\substack{t=2006 \\ t\neq 2009}}^{2018} \beta_t \left[\ln\left(\frac{1-\text{MWTR}_{i,2010}}{1-\text{MWTR}_{i,2009}}\right) * \mathbb{1}(\text{Year}_t)\right] + \delta f(y_{i,2009}, y_{-i,2009}, \text{child}_{c,2009}, \text{east}_{c,2009}) \times \mathbb{1}(\text{Year}_t) + \theta X_{i,-i,c,2009} + \epsilon_{i,t}, \tag{1}$$

Consequently, β_t measures the percent change in labor income in year t relative to 2009 if the marginal net-of-withholding-tax rate of a woman increases by one percent. Further, $X_{i-,i,c,2009}$

[16] Similarly, *between-income tax variation* requires the assumption that, in the absence of changes in the tax schedule, the income growth in each year is identical across the income distribution. This often is a threat to identification due to mean reversion and differential secular income trends (see Jakobsen and Søgaard (2022) and Weber (2014)).

controls for characteristics of the woman i, her partner $-i$ and the couple c as a whole in 2009. For both spouses individually we control for age and age squared and for the couple as a whole for the number of children and the region of residence.

We add dense couple-level cell fixed effects $f(y_{i,2009}, y_{-i,2009}, \text{child}_{c,2009}, \text{east}_{c,2009})$ interacted with year dummies. We do this by binning wives' and husbands' incomes in 2009 in steps of €5,000 and interacting these bins with each other. In our preferred specification, we also interact these cells with indicators for whether a child lived in the household in 2009 and whether the household was located in Eastern Germany in 2009.

These controls are crucial for our identification: First, the controls for own income ensure that we only exploit variation in treatment intensity conditional on income. As the treatment intensity within a withholding tax class varies along the income distribution, a specification without the income controls would also pick up variation within withholding tax classes. Second, the interaction with the controls for partner income further ensures that we compare similar households. Controlling only for the income of the wife would not ensure that households have a similar distribution of income and are subject to the same income tax liability. We also illustrate the mechanics behind these cell controls graphically with a more detailed explanation in Appendix C.

Lastly, interacting the income controls with the child and region indicator makes the comparison between groups even cleaner. As Table D.1 shows, the child and region indicators are, besides income, the main determinants of different withholding tax class choices. By adding these characteristics as additional controls, we then only compare the evolution of income for households where prior to the reform both partners earn a similar amount, have at least one or no child and live in the same region. By interacting these controls with time fixed effects, we allow for different time trends for each cell.

4 Empirical Results

In this section, we present our empirical results showing that individuals adjust their labor income in response to changes in withholding taxes. We present event-study Diff-in-Diff estimates, show a robustness analysis and heterogeneities.

4.1 Main Results

First, we present in Figure 9 the results of the event-study Diff-in-Diff estimation as laid out in Equation 1. The independent variable is the treatment intensity of the reform measured by the log change in the marginal net-of-withholding-tax rate between 2009 and 2010. We thereby compare women in the favorable withholding tax class to women in the default tax class who were treated differently by the reform. The dependent variable is the log difference in income

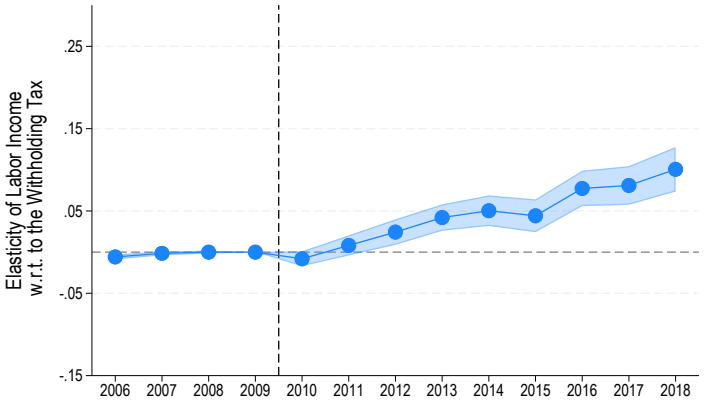


Figure 9: Event-Study Diff-in-Diff Estimates

Notes: The figure plots the estimates for the elasticity of labor income with respect to the marginal net-of-withholding tax estimated based on Equation 1 for the whole sample. The dependent variable is the log income difference in year t relative to 2009. The independent variable is the log difference in the marginal net-of-withholding-tax rate of the woman induced by the reform of the withholding tax in 2010. The regression includes controls for potentially time-varying characteristics of the couple. Cell fixed effects control for binned own and spousal pre-reform labor income interacted with dummies for parenthood, residence in Eastern Germany, and years. Confidence intervals are plotted at the 95 % level and based on heteroscedasticity-robust standard errors clustered at the household level. The sample excludes households in which at least one member experienced a drop in income by more than 15 % from one year to the next before 2010 to ensure that no individuals directly hit by the financial crisis are part of the sample. This explains the smaller standard errors before the reform. The regression is based on 5,483,974 observations with an adjusted R-squared of 0.095.

between year t and 2009. Hence, the coefficients can be interpreted as elasticities of labor income with respect to the withholding tax rate in the respective year.

Interpretation of pre-reform estimates. As discussed in Section 3.5, one implication of the parallel trend assumption is that we should not see economically significant effects of the reform before it takes place. The estimates of this placebo test are displayed in Figure 9. The pre-reform estimates are not statistically significantly different from zero at the 5 % level for most years and generally economically insignificant.[17]

Interpretation of post-reform estimates. We find significant positive estimates for the elasticity of labor income with respect to the withholding tax rate. The effect size gradually increases over time and reaches an elasticity of approximately 0.10. These results imply that a one percent higher change in the marginal net-of-withholding tax rate in 2010 results in an around 0.10 percent higher labor income eight years after the reform. More intuitively, the results indicate that a woman whose marginal withholding tax rate was reduced from 30 % to 23 %, so whose

[17] There are two reasons why our sample restrictions (see Section 3.3) result in smaller error bands before the reform compared to after the reform. First, we condition that each household is observable in all pre-reform years but after the reform households need not be observable in every year. This results in a larger sample size in the pre-reform years. Second, we exclude from the analysis households in which at least one individual was affected by the financial crisis.

marginal net-of-withholding tax rate increased by 10 percent from 70 % to 77 %, increased her labor income by approximately 1.0 percent eight years after the reform.

Comparison to ETI literature. There are no established elasticities of labor income with respect to the withholding tax that we can relate our estimated elasticity to. However, estimates from the literature on the elasticity of taxable income (ETI) with respect to the income tax provide a useful benchmark. As Neisser (2021) stresses in a meta-analysis, estimates for the ETI are strongly context-dependent with an average elasticity of 0.29. Hence, our measured elasticity estimate is smaller than the typical estimate for a change in income taxes. This is in line with our expectation. As the reform changed only tax prepayments, only households with strong time preferences should react which would result in an elasticity very close to zero. Instead, as we discuss in Section 5.1, we expect that information frictions and incomplete pooling of household resources drive labor market responses of individuals.

Back-of-the-envelope calculation. To illustrate the magnitude of the effect, we estimate with a simple back-of-the-envelope calculation the expected impact of a reform that abolishes the choice of withholding tax schedules and instead assigns each individual the marginal income tax rate of the respective couple to reflect the true work incentives of both spouses under joint taxation.[18] We illustrate the effects on the marginal tax rate for both examined withholding tax classes in Figure D.1. Such a reform has diverse effects, as the change depends on the partner's income and the withholding tax class before the reform. Focusing only on women who would experience a decrease in withholding taxes, the average decrease in withholding taxes of such a reform would be 5.5 %, resulting in an increase of the marginal net-of-withholding tax rate of 8.5 %. Using the elasticity of 10 %, this translates to an increase in labor income of about 1 %. However, these reform effects would be counteracted by women whose marginal withholding tax rate is lower than the income tax. For them, the marginal tax rate would increase by 7.5 % on average and, consequently, the marginal net-of-withholding tax rate would decrease by 9 %. As a result, labor income for this group would decrease by about 1 %.

Gradual increase. The gradual increase of the observed effect size is in line with our expectation: First, it may take time for individuals to learn about the change in withholding taxes as the reform was non-salient. Shapiro and Slemrod (1995) find that one month after a much-debated cut in withholding taxes only a third of the respondents self-report that they noticed the change in withholding taxes even though employers were asked to actively inform their employees about the withholding tax change. As the reform we investigate was not noticed by the public (see Section 3.1), it can only have an effect if people realize the cut in withholding taxes independently. For example, individuals might realize that the monthly take-home pay changes or they

[18] A similar withholding tax system is in place in France, where both spouses are assigned the income tax rate of the couple in the previous year. For more details see Section 6.

might consult withholding tax calculators when considering a change in working hours or a job change.

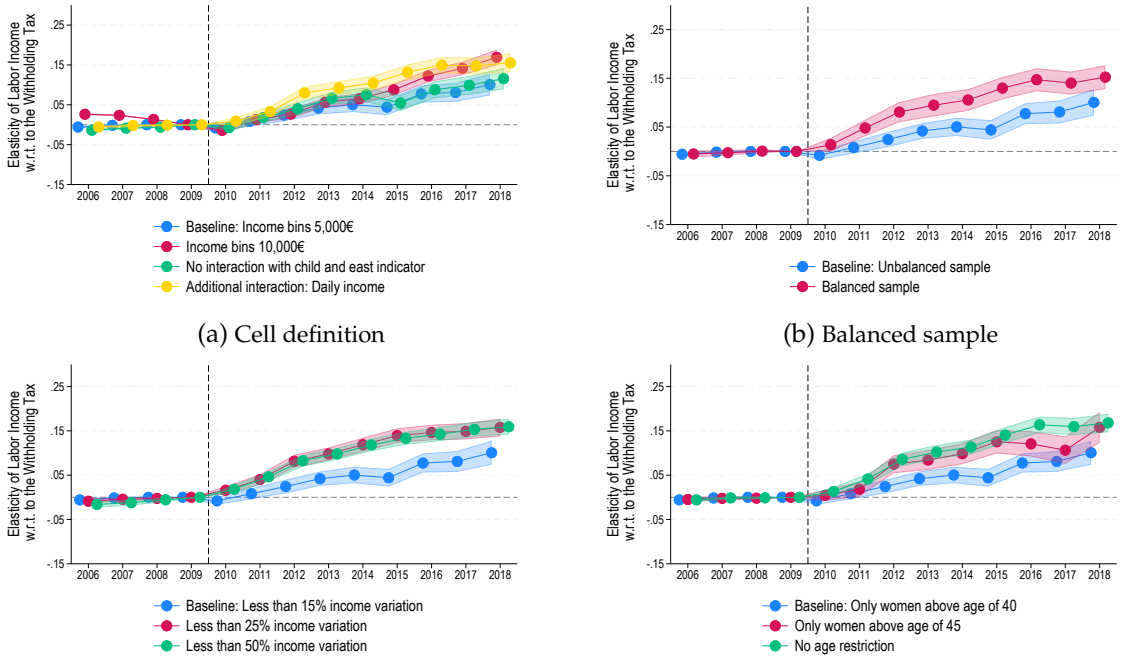
Second, due to labor market frictions the response time of individuals might be heterogeneous. We think that a substantial part of the treatment effect occurs when women obtain an offer from their employer to increase their working hours and then evaluate their marginal gains from doing so using the now lower withholding taxes as their reference point. It is difficult to compare the finding of the gradual increase to the existing ETI literature, as it is uncommon in the ETI literature to report the development of coefficients over time. However, our finding is in line with Gudgeon and Trenkle (2024) who show that low-income workers in Germany react slowly to changes in the German tax schedule.

Furthermore, it is striking that the treatment effect estimates never exhibit a reversing trend. One could expect that taxpayers might update their beliefs on the income tax system and, in particular, the interlinkage between withholding taxes and income taxes, after seeing their income tax returns sometime in the middle of the year following the tax year. If they by this learned about the true relationship between withholding taxes and income taxes, this should incentivize them to revoke potential reactions to the withholding tax reform. The fact that we cannot see such reactions might indicate that they do not gain understanding of the tax system by filing their income tax declaration and receiving the final tax statement. This is in line with our survey evidence (see Section 5.2) where we show that the general understanding of withholding taxes is low.

4.2 Robustness

In Figure 10, we explore the robustness of our empirical results to different restrictions on bin size and sample composition. We plot the estimates before the reform to investigate whether the pre-trends are robust to sample choices and the post-estimates to gauge the sensitivity of the estimates to changing the restrictions.

Other cell definitions. In Panel a, we vary the composition of the cell fixed effects. The cell fixed effects are chosen such that the identification of the reform stems from similar couples. If we allow the comparison of less similar couples by increasing the bin size of income controls to €10,000, the pre-reform estimates suggest a slightly different trend and the post-reform estimates are slightly larger. However, removing the interaction with the dummies for having a child in the household and living in Eastern Germany barely changes the estimates. Particularly interesting is the introduction of an additional interaction with daily income. In principle, we only observe annual income, but for a subset of observations that file their commute we also observe the annual number of working days. This shrinks the overall number of observations from 5,481,626 to 3,275,653. For these observations, we generate 10 percentiles of daily income and add them



(a) Cell definition

(b) Balanced sample

(c) Alternative income restrictions

(d) Alternative age restrictions

Figure 10: Robustness

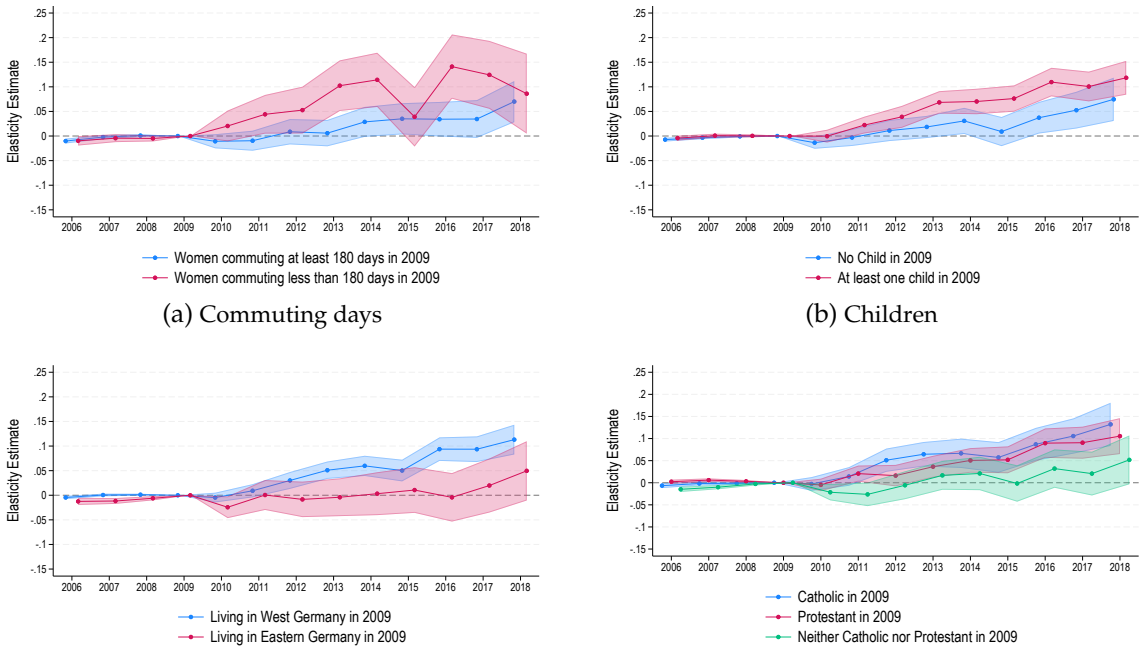
Notes: See notes to Figure 9.

to the interacted fixed effects in equation 1. The estimated elasticity is slightly larger for this particularly comparable group.

Balanced sample. For the years before 2012, we only observe couples that file taxes, afterwards we observe all individuals with taxable work income in Germany (see Section 3.2). To ensure that our results are not driven by differences in tax filing behavior or by leaving the sample for other reasons, Panel b shows the estimate for a balanced sample which slightly increases the main result but has no effect on pre-trends.

Financial crisis. To limit the impact of the financial crisis on our results, we have applied a restriction on the variation of the pre-reform incomes (see Section 3.3). In the baseline, we only consider couples in which both spouses had no year-over-year income change larger than 15 % prior to the reform. Relaxing this restriction to 25 % or 50 % in Panel c results in slightly higher estimates.

Stability of the withholding tax choice. Finally, as discussed in Section 3.3 we want to ensure that our results are not driven by changes in the withholding tax class after 2009. Withholding classes are often changed after childbirth, so in our main specification we concentrate on women older than 40. In Panel d, we show that setting this age restriction to 45 or abolishing it has only small effects on the regression results.



(a) Commuting days

(b) Children

(c) West/Eastern Germany

(d) Religious affiliation wife

Figure 11: Effect Heterogeneity

Notes: See notes to Figure 9. Eastern Germany comprises the area of the former German Democratic Republic and West Berlin.

4.3 Heterogeneity

Figure 11 displays the estimated effects for various subgroups. For each subgroup, we estimate the effect in separate regressions with a sample split.

Scope for behavioral changes. The effect is slightly stronger for subgroups who have more scope to adapt their labor supply. As we do not observe working hours in the data set, we proxy working part-time by the number of commuting days. If a woman commutes on less than 180 days in a given year, we categorize her as a part-time worker. We find that the estimated effect is slightly larger for women working part time (Panel a).[19] In line with this finding, we also observe that the effect is smaller for the group without a child in the household in 2009 as they are more likely to work already full-time before the reform.[20] This is in line with previous studies investigating the behavioral reaction to income tax changes that typically find small behavioral reactions of men and substantial effects for women. This is typically explained by the larger scope for behavioral changes (Keane, 2011).

[19] We only observe commuting days for individuals who claim commuter allowance which applies to 60% of the women in the sample.

[20] It is worth noting that our analysis only includes dual-earner couples and therefore excludes couples where one partner solely provides childcare.

Other heterogeneities. First, we study the effect separately for Western and Eastern Germany (Panel c). We find that the effect is smaller in Eastern Germany. The reason for that could be that women in Eastern Germany generally work more and therefore have less potential to increase their working hours. Second, we observe a larger effect for Catholic and Protestant households than for other households (Panel d).[21]

5 Mechanisms: Theoretic Model and Survey

For a better understanding of our empirical results, we present a simple toy model to illustrate potential mechanisms that rationalizes why withholding taxes can matter for labor supply decisions. The core idea is that withholding taxes are only irrelevant for labor supply decisions if individuals fully internalize tax refunds and are indifferent to the timing of cash flows. We then provide evidence for the relevance of these mechanisms using survey data.

5.1 Theoretic Model

We set up a simple labor supply model in Appendix E and derive the optimal labor supply decision as a function of three parameters: the understanding of the tax system (α), the share of the tax refund that the individual expects to receive (γ) and the factor with which the individual values money today in comparison to when the tax refund is paid out (ω). We discuss each of these parameters in the following and summarize their expected labor supply effects in Table 3.

Understanding of the difference between income and withholding taxes: α. The parameter α describes the degree to which individuals understand the difference between income and withholding taxes. If $\alpha = 0$, the individual does not realize that withholding taxes are only a prepayment to the income tax and that the payslip is not informative about the actual income tax. The higher α, the more the tax refund affects the labor supply decision. If $\alpha = 1$, the individual fully understands the interlinkage between withholding taxes and income taxes.

Share of tax refund that the individual expects: γ. If a married couple is overwithheld, the resulting tax refund is paid out to a single bank account as they are taxed jointly. The share of the couple's tax refund that each of the spouses receives is thus at the couple's discretion and the result of intra-household bargaining. The share of the tax refund that is expected by an individual is expressed in the parameter γ. The higher γ, the larger the share of the tax refund that the individual receives or that is - in case the tax refund is remitted to a joint bank account of the couple - attributed to the individual. As both spouses face the same average income tax rate under joint taxation, $\gamma = 1$ reflects a distribution of the household's tax refunds between partners such that this equality of average income tax rates is upheld. Assuming that the average

[21] Most other religions and denominations do not collect their church tax through the German income tax system and their religious affiliation is thus not observable.

Table 3: Parameters Determining Relevance of Tax Refund

Parameter	Description	Effect on labor supply
α	Degree of understanding of withholding tax system	Lower understanding increases effects of withholding tax change
γ	Share of tax refund that individual expects to receive	Lower share of expected tax refund increases effects of withholding tax change
ω	Time preference	Lower discount factor increases effects of withholding tax change

Notes: The table displays the parameters of the theoretic model.

withholding tax rate of both spouses is equal, this implies that each spouse receives a share of the tax refund that is equal to their share of labor income.[22] If $\gamma < 1$, the individual receives a smaller share of the tax refund and ends up with a tax liability higher than implied by the income tax. Conversely, if $\gamma > 1$, the individual receives a larger share of the tax refund and ends up with a tax liability lower than implied by the income tax.

Time preference: ω. The parameter ω captures the degree to which the tax refund is discounted. If $\omega = 1$, the individual is indifferent between obtaining income today and receiving the same sum as a tax refund after the tax year. There are three reasons why ω could be smaller than 1. First, it might simply reflect time preferences. Second, discounting might be impacted by borrowing constraints. If monthly income is essential for the individual to pay for occurring costs of living, then the individual has a strong preference for obtaining the payment today. Third, rational investors can invest money received earlier. So the larger the real interest rate, the lower ω should be for the rational investor. This is especially relevant in countries like Germany or the US, where the government does not usually pay interest on overwithheld taxes.

Optimal Labor Supply. Solving our theoretic model in Appendix E results in the following first order condition:

$$z_{it} = n_{it} \left[\tau_{it}^{WT} - f(\alpha\gamma\omega)(\tau_{it}^{WT} - \tau_{it}^{IT})\right]^{\varepsilon}, \tag{2}$$

where z_{it} denotes the taxable income and n_{it} the individual's counterfactual income in the absence of taxation. ε is the parameter of interest of our study, the elasticity of taxable income with respect to the marginal net-of-tax rate. $\tau_{it}^{WT} = 1 - T_t'^{WT}(z_{it}; x_{it})$ denotes the individual marginal net-of-tax rate with respect to the withholding tax and $\tau_{it}^{IT} = 1 - T_t'^{IT}(z_{it}; x_{it})$ the individual marginal net-of-tax rate with respect to the income tax in year t.

[22] To make the underlying idea more generalizable to other withholding tax systems, we have not explicitly modelled the German system of withholding tax schedules which we use for identification in this paper. In withholding tax systems that shift the withholding tax liability between partners, spouses must potentially have access to the labor income of the spouse in the favorable tax class above and beyond the tax refund to ensure that $\gamma = 1$.

The main finding is that the optimal labor supply depends on the weight that an individual assigns to the tax refund. Assuming a positive tax refund, which implies that $\tau_{it}^{WT} > \tau_{it}^{IT}$, labor supply is impacted positively by the three parameters α, γ and ω. Intuitively, all factors that reduce the weight an individual assigns to the tax refund increase the relevance of withholding taxes for the labor supply. If one of the three parameters is 0, labor supply only depends on the withholding tax τ and is independent of the income tax rate $\hat{\tau}$. In this case, the size of the tax refund is irrelevant for the individual. In contrast, if all three factors are equal to 1, the withholding tax rate τ has no impact on the labor supply decision. Thus, in this case the only factor determining labor supply is the income tax. It is important to note that the three factors interact. For example, even a fully-informed individual without time discounting might still show a strong reaction to the size of withholding taxes if the dynamics within the household are such that she is not expecting the full tax refund that is attributed to her under equal average tax rates.

Regarding the time preferences ω, it is well documented in the literature that individuals have time discounting factors smaller than 1 (Falk et al., 2018; O'Donoghue and Rabin, 1999). For the other two factors, it is unclear whether they can influence behavioral reactions to withholding taxes.[23] Therefore, we study them with the help of self-collected survey evidence.

5.2 Survey

The goal of the survey is to study the understanding of the interlinkage between withholding taxes and income taxes, as well as the organization of household finances among married German couples.

In this section, we focus on the core results of our final analysis sample consisting of 506 (258 men, 248 women) married respondents in Germany. We provide more details on the setup of the survey in Appendix F: Section F.1 includes information on the implementation and our sample restrictions, Section F.2 provides more-in-depth analyses, and Section F.3 displays additional descriptive figures. Section I displays the original survey questionnaire in German and a translation into English. We have pre-registered our survey at the Open Science Foundation (registered as project SGXBP).

5.2.1 Understanding of Withholding Taxes

In our model in Section 5.1, we introduced the parameter α that captures the understanding of the difference between income and withholding taxes. To learn about α, we elicit whether our survey participants know that withholding taxes, and thus the choice of withholding tax schedules, do not affect a married couple's joint final income tax liability.

[23] We know from other settings that the institutional knowledge of individuals is limited (Chetty et al., 2013; Gideon, 2017; Rees-Jones and Taubinsky, 2020) and that households do not fully pool resources (see Almås et al., 2023, for a recent survey of the literature).

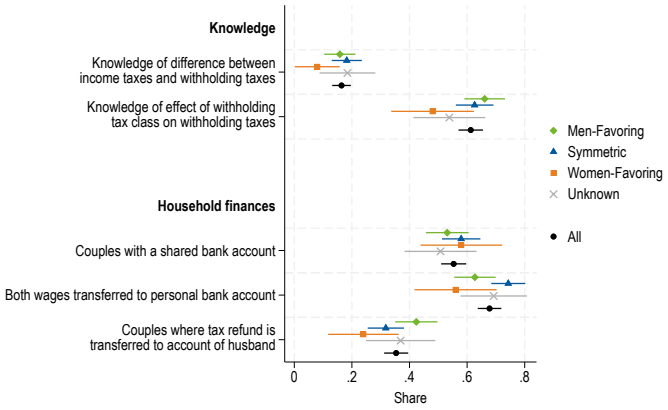


Figure 12: Survey on Potential Channels for the Effect of Withholding Taxes

We do so by creating a realistic example of gross labor incomes of two spouses (one spouse earning €60,000 per year, the other one €30,000) and then ask the survey participants to select the withholding tax schedule which results in the lowest final income tax liability of the couple. We provide five answer options: the three withholding tax schedules, that it does not matter, and that they do not know the answer.[24] As discussed in Section 2.2, irrespective of the choice of the withholding tax schedule, the final income tax liability of the couple is the same.

The first row of Figure 12 presents the share of individuals who correctly answered the question. We find that only around 16 % of the surveyed individuals know about the irrelevance of the withholding tax schedule for the final income tax liability at the beginning of our survey. Respondents in the men-favoring tax schedule have a better knowledge than respondents in the women-favoring schedule but the knowledge is very limited across all schedules. In Appendix Figure F.2, we also document heterogeneity in additional dimensions. In particular, men (20 %) are better informed than women (13 %) and individuals filing taxes themselves have better knowledge (22 %) than individuals not doing so (13 %).[25]

Importantly, this observation is not driven by the fact that people are generally unaware of the functioning of withholding taxes. To test the general knowledge we use the fact that in the German withholding tax system the names of the different withholding tax classes are number coded. So for example, the favorable class is called *Steuerklasse 3* while the unfavorable class has the name *Steuerklasse 5*. As the second row documents, 61 % of the respondents can correctly identify that relative to the default class (*Steuerklasse 4*), the withholding tax is lower in *Steuerklasse 3* while it is higher in *Steuerklasse 5*. This knowledge is lower for individuals in the women-favoring schedule but, as Appendix Figure F.3 documents, homogeneous with respect to

[24] See Question D7 in Appendix Section I for the exact wording of the question.

[25] In Appendix Section F.2, we show that (1) knowledge correlates with own tax filing for men and women likewise, (2) men file taxes alone more often than women, but that (3) that gender gap in tax filing cannot explain the gender gap in knowledge to a substantial degree.

gender, withholding tax class, age except for the youngest cohort, and to whether the individual files taxes herself.[26]

Combining the two knowledge questions, we find that 48 % of all respondents know that, and how, withholding tax classes change withholding taxes but not that withholding taxes are tax prepayments and have no impact on the final income tax liability. This is a remarkable finding as it implies that a large share of married couples in Germany might fall for the fallacy that they can save income taxes by choosing a certain withholding tax schedule. Couples who know that the partner in the favorable withholding tax class is subject to lower withholding tax rates and the partner in the unfavorable one is subject to higher withholding tax rates (compared to the symmetric schedule and to individual taxation) might then strategically assign their primary earner to the favorable and their secondary earner to the unfavorable class (corresponding to the men- or women-favoring withholding tax schedule) due to the underlying lack of understanding of the interlinkage between income and withholding taxes. This then distorts the relative intra-household distribution of labor income as paid out by the employers.

The low rate of understanding suggests that for many individuals the relationship between withholding taxes and tax refunds is not salient. For these individuals, the withholding tax rate impacts labor supply decisions as people misperceive withholding taxes as informative for their income taxes.

5.2.2 Organization of Household Finances

In the model, the parameter γ identifies the share of the tax refund of the household that the individual expects to receive. This is why we also investigate the organization of household finances in our survey.

The basic assumption underlying withholding tax classes is that married couples act as unitary households. If this assumption does not hold, the choice of withholding tax schedule might impact the eventual intra-household distribution of labor income and by that the size of each spouse's budget and their within-household bargaining power. This is particularly relevant for couples choosing the men- or women-favoring withholding tax schedule as their intra-household distributions of take-home income are distorted compared to their distributions of gross income.[27] Sophisticated couples could make implicit transfers from the spouse in the favorable withholding tax class to the spouse in the unfavorable withholding tax class by getting wages of the spouse in the favorable withholding tax class transferred to either a shared bank account or the bank account of the spouse in the unfavorable withholding tax class and thereby

[26] After explaining the institutional setting, we also ask people to self-report whether they had understood the system correctly before (see Table F.1). 54 % of the individuals claim that they had understood that the choice of the withholding tax schedule does not impact the final income tax liability, while 95 % claim that they knew that the choice of withholding tax classes impacts their withholding taxes.

[27] Figure 13 shows that for the median couple the wife in the men-favoring schedule has on average less take-home pay compared to separate taxation as not only the entire joint taxation benefit but also an additional amount is attributed to her spouse.

undo the shifting of withholding taxes created by the men- or women-favoring schedule. Moreover, they could channel tax refunds to the spouse in the unfavorable tax class to (partly) account for the shifting of the withholding tax liability. We thus asked whether married couples use shared bank accounts and to which bank account potential tax refunds are transferred.[28]

Bank accounts. We test the assumption that married couples act as unitary households by examining the occurrence of shared bank accounts. If a couple does not have a shared bank account, it is very likely that the distortion of the relative intra-household distribution of labor income induced by choosing the men- or women-favoring withholding tax schedule remains largely unchanged as this couple is less likely to have established a compensatory sharing rule. As shown in the first row of the lower part of Figure 12, as much as 47 % of the respondents in the men-favoring withholding tax schedule state to not have a shared bank account as a couple. We consider these couples unlikely to account for the distortion of the relative intra-household distribution of labor income arising from the choice of that schedule. In this context, it is noteworthy that shared bank accounts do not seem to be used more often by couples in the men-favoring schedule than by those in other schedules, indicating that the choice of having a shared bank account is not commonly used to strategically counteract this distortion. However, as shown in the following row, couples in the men-favoring schedule less often get both their wages transferred to the respective personal bank account than couples in the symmetric schedule. Given that joint taxation benefits are distributed to both spouses in the latter but not in the former group, this difference is still strikingly small. This indicates that couples in the men-favoring schedule only use bank accounts to a very limited extent to counteract the distortions arising from the shift of withholding taxes between the spouses.

Tax refunds. Furthermore, we document that the distortion is even aggravated by the way couples deal with tax refunds. As the lowest row of Figure 12 shows, 42 % of the couples in the men-favoring withholding tax schedule (16 % of those with and 72 % of those without a shared bank account) let tax refunds be transferred to the husband's personal bank account whereas that share is lower for couples in the other withholding tax schedules. In comparison, only 24 % of the women in the men-favoring schedule get the tax refunds onto their personal bank account.

Taken together, we anticipate that the relative intra-household earnings will be skewed in favor of the husband for the majority of couples in the men-favoring schedule. Moreover, the disposable net income of married women is, on average, reduced compared to separate taxation. This could lead them to overestimate their individual income tax liability, which may negatively impact their bargaining power within the household and diminish their perceived work incentives. Consequently, these findings provide suggestive evidence that a large proportion of households does not fully pool their resources. This suggests that the share of a couple's tax refund that the

[28] See Questions D16a and D17c in Appendix I for the exact wording of the questions.

individual expects to receive (parameter γ in the model in Section 5.1) might be substantially different from 1.

Given that a large share of married couples do not seem to choose the instruments they have available to distribute joint taxation benefits among themselves, the (default) options offered by governments deserve special attention. In the following, we thus examine the question of how withholding tax systems in the presence of joint taxation are designed in various countries and of how they should ideally be designed.

6 Implementation of Withholding Taxes for Married Couples

Joint income taxation treats married couples as one unit and therefore sets one joint income tax liability for the couple. In contrast, withholding taxes are always levied on the individual level. Not accounting for potential joint taxation benefits in the withholding tax system can lead to substantial overwithholding in progressive tax systems, i.e., couples end up having substantially more withholding taxes remitted during the year than they have to pay in income taxes after filing their taxes. Therefore, minimizing the overwithholding of couples requires the implementation of a withholding tax system specifically for married individuals. Consequently, governments have to take a stance on the distribution of the withholding tax liability within the couple (average withholding tax rates) and on the marginal work incentives in the withholding tax system (marginal withholding tax rates). In this section, we compare the current implementations of withholding taxes for married individuals in Germany, France and the US and evaluate potential effects of two recently proposed withholding tax reforms in Germany and France.

Different withholding tax implementations. Interestingly, while countries with joint taxation have a distinct withholding tax design for married individuals, it differs substantially across countries. These differences are indicative of the diverse set of objectives that policymakers seek to achieve through withholding taxes.

In 2018, *France* introduced a linearized withholding tax system in which the withholding tax rate is determined based on the most recent tax return. The tax authority uses the effective average income tax rate paid by the couple based on its past income and then sets this rate as a common withholding tax rate for both spouses so that marginal and average withholding tax rates are identical. In September 2025, the current system is replaced by an individualized withholding tax system. In this system, the withholding tax rate of the secondary earner is solely based on their own individual past income under the assumption of being unmarried. The primary earner's withholding tax rate, however, depends on the past household income and both spouses' past individual incomes as it is determined by the difference between the expected income tax of the household and the withholding tax paid by the secondary earner.[29]

[29] Couples already have the possibility to opt for this system since 2018.

In this individualized system, marginal and average withholding tax rates are also identical, albeit now only on the individual level whereas they may differ between spouses.

In the *US*, all working individuals are asked to submit a W-4 form to their employer to decide on their amount of withholding. Households have an incentive to match their withholding to the expected income tax as they can be fined when underwithheld (Gelman et al., 2022; Jones, 2012). For married couples that file their taxes jointly, the most prominently presented option by the tax authorities is a system where for both spouses the withholding tax is determined similarly to the favorable schedule in Germany, i.e., under the assumption that the other spouse has no labor income.[30] To avoid potentially large underwithholding arising from the fact that both spouses are thus assumed to be the sole earner, couples are then asked to manually adapt the withholding of only the primary wage earner. The tax authorities provide tabulations and a tax calculator that suggest - based on the expected income of both spouses - how much in additional withholding taxes the primary wage earner should pay. If the couple claims additional deductions, e.g. the child tax credit, the tax authorities also recommend that only the withholding tax of the primary wage earner should be decreased.

For *Germany*, we compare the current implementation on the basis of the men-favoring withholding tax schedule with a widely-discussed reform option that decreases overwithholding by adjusting the withholding tax rates of both spouses based on past household incomes.[31] More explicitly, the reform option scales down the individual withholding tax rates that both spouses would have faced had they not been subject to joint taxation by a common factor. The factor ensures that the combined withholding tax payments of both spouses equal the expected income tax payment of the couple.

In the absence of year-over-year income changes, all implementations discussed above can completely eliminate overwithholding caused by the presence of joint taxation savings. However, they differ in how they affect both the marginal and the average withholding tax rates of the primary and secondary earner. We evaluate these differences separately with respect to average and marginal withholding tax rates for an example of a couple that is subject to the German income tax system and in which both the husband and the wife earn the respective median income of married men and women in Germany. Importantly, we compare the different implementations using the German income tax rates so that the differences are not driven by country-specific tax rates. Also we assume that the couple does not claim any further deductions which could change the observed effects in the French and US withholding tax systems substantially.

[30] Alternatively, couples can pick a withholding tax schedule that is similar to the German default symmetric schedule that, however, mechanically overwithholds substantially when the income gap between spouses is large.

[31] In the German coalition agreement of 2021 (*German Coalition Agreement* 2021), the parties agreed to abolish the current *system with a choice* and to replace it with the *schedule with a factor*. As a result of the break-up of the coalition in November 2024, the reform was, however, not implemented.

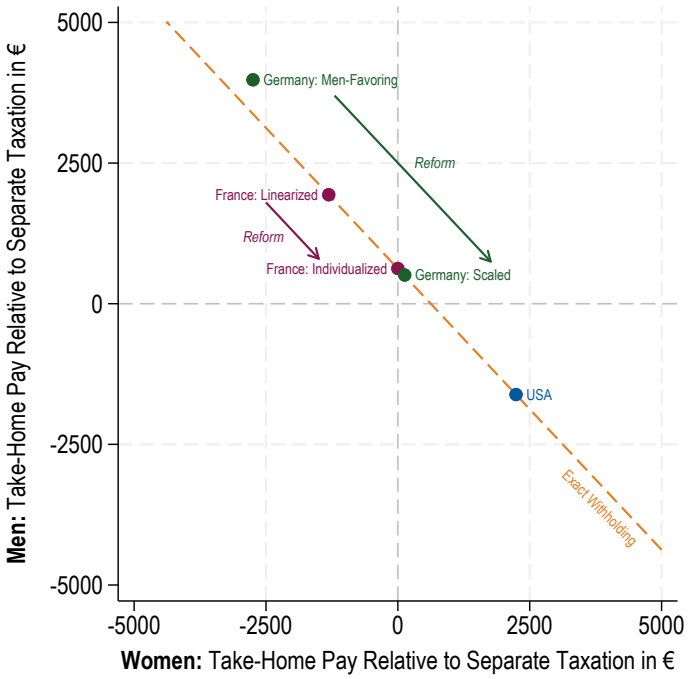


Figure 13: Average Withholding Tax: Monthly Take-Home Pay of Spouses After Marriage Relative to Separate Taxation

Notes: The figure illustrates the difference in the monthly take-home pay of joint taxation relative to separate taxation for both spouses in different withholding tax schedules given the German income tax system. All withholding tax schedules on the red dashed line feature precise withholding, i.e., the sum of withholding taxes of the two spouses matches the respective couple's income tax. In withholding tax systems below the red dashed line, households are overwithheld, while households in tax systems above are underwithheld. To the right of the y-axis (above the x-axis), the monthly take-home pay of the wife (husband) is larger than without marriage. The figure is based on a couple in which both the husband and the wife earn the respective median income of married men (€49,000) and women (€22,860) in Germany in 2010. We assume that the couple does not claim any credits or deductions when filing their income taxes.

Average withholding tax rates. We start by evaluating the effects on the individual average withholding tax rate by showing how the monthly take-home pay of each spouse compares to the benchmark of separate taxation under the different withholding tax schedules in Figure 13. Withholding tax schedules in the upper-right quadrant result in a higher take-home pay for both the man and the woman compared to separate taxation, while those in the upper-left quadrant result in a higher take-home pay for the man and a lower take-home pay for the woman and those in the lower-right quadrant in a higher take-home pay for the woman and a lower take-home pay for the man. All withholding tax schedules that lie on the dotted red line avoid both over- and underwithholding by fully accounting for the joint taxation benefits of the couple in the withholding tax.

The figure shows that the three current withholding tax systems in Germany, France and the US all eliminate overwithholding for the example couple (the men-favoring schedule in the German system even slightly underwithholds the couple) but change the take-home pay of each spouse differently. In the German and French systems, the woman has a lower take-home

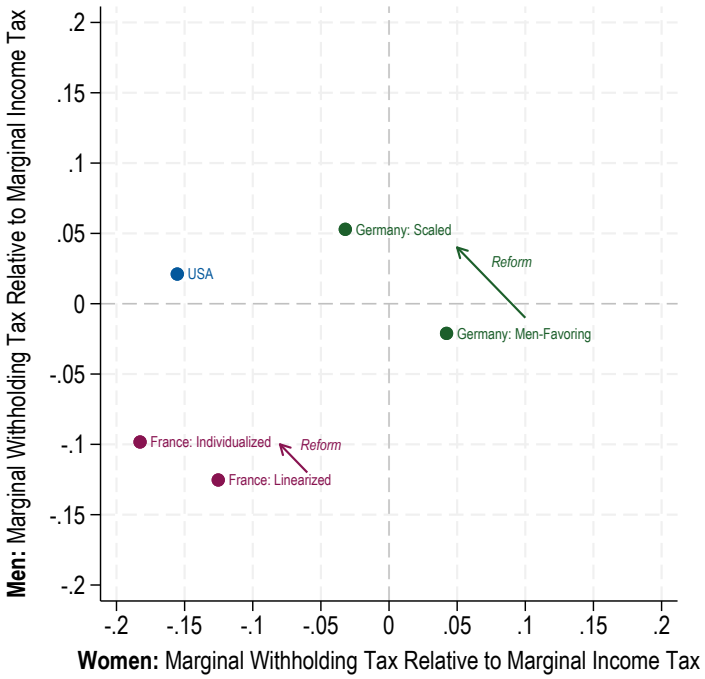


Figure 14: Reform Effects: Marginal Withholding Tax Rates of Spouses After Policy Reform

Notes: The figure illustrates the difference between the marginal withholding tax rates of the spouses and the marginal income tax rates of the couple. To the right of the y-axis (above the x-axis), the marginal withholding tax rate of the wife (husband) is larger than the marginal income tax of the couple. The figure is based on a couple in which both the husband and the wife earn the respective median income of married men (€49,000) and women (€22,860) in Germany in 2010. We assume that the couple does not claim any credits or deductions when filing their income taxes.

pay relative to separate taxation after marriage, while the man has a higher take-home pay. This implies that the husband receives all of the joint taxation benefits and an additional transfer from his wife. In the US system, the opposite is true. The woman has a higher take-home pay and the man a lower take-home pay relative to separate taxation. Consequently, the joint taxation benefit and a transfer from the husband are assigned to the wife. Both recently discussed withholding tax reforms in Germany and France similarly and dramatically reduce the effects of marriage for both spouses. As a result of the reforms, the husband would face a higher average withholding tax rate and therefore would receive a lower take-home pay, while the wife would face a lower average withholding tax rate and consequently would receive a higher take-home pay.[32]

Marginal withholding tax rates. An additional policy variable is the extent to which the individual marginal withholding tax rates mirror the couple's marginal income tax rate. In Figure 14, we illustrate how the individual marginal withholding tax rates differ from the couple's marginal income tax rate. Withholding tax schedules in the upper-left quadrant result

[32]While the illustrations in Figure 13 allow us to compare the effects that the different withholding tax schedules have on the monthly take-home pay for the example couple, it is impossible to gauge from this figure the effect that a reform of the withholding tax system would have for all couples. Therefore, to assess the consequences of a reform of the current withholding system in Germany, we compare the effects on the monthly take-home pay for married primary and secondary earners in the men-favoring schedule along the income distribution in Figure G.1.

in a higher marginal withholding tax rate for the man and a lower marginal withholding tax rate for the woman compared to the couple's marginal income tax rate, while those in the lower-left quadrant result in a lower marginal withholding tax rate compared to the couple's marginal income tax rate for both spouses.

The figure shows that for the example couple the men-favoring schedule in Germany comes close to precisely implementing the marginal income tax rate of the couple in the spouses' marginal withholding tax rates but the marginal tax rate is slightly too low for men while it is somewhat too high for women.[33] The reform to the scaled schedule flips this relationship by decreasing the marginal withholding tax rate for women and increasing it for men.[34]

The current French implementation is characterized by lower marginal withholding tax rates compared to the couple's marginal income tax rate for both spouses. The reform results in a lower marginal withholding tax rate for the wife and a higher marginal withholding tax rate for the husband. The US implementation is marked by a lower marginal withholding tax rate compared to the couple's marginal income tax rate for the wife, but in a slightly higher marginal withholding tax rate compared to the couple's marginal income tax rate for the husband.

Implications for policymakers. Figures 13 and 14 illustrate the trade-offs that policymakers face when designing withholding tax systems for married couples in the presence of joint taxation benefits. Not accounting for joint taxation benefits in the withholding tax system can lead to substantial overwithholding. Although high overwithholding provides governments with a temporary, interest-free loan, it can have (unintended) consequences on households' labor supply decisions.

Figure 13 shows that all examined withholding tax schedules are able to eliminate overwithholding, but differ in how they distribute the benefits among the primary and secondary earner. The distribution of the joint taxation benefits among the spouses is relevant because, as we have shown in our survey, households often do not fully pool their income. Receiving a higher share of the joint taxation benefit might then increase the individual work incentives. The recently discussed withholding tax reforms in Germany and France both increase the take-home pay of the wife and decrease the take-home pay of the husband. This can potentially increase the work incentives of the wife.

The design of withholding taxes also affects the perceived marginal work incentives. This is of particular importance for secondary earners as the couple's marginal income tax rate is typically higher than the counterfactual marginal income tax rate of the secondary earner under individual taxation. Previous research (e.g., Bick and Fuchs-Schündeln, 2017) has argued that

[33]The men-favoring schedule is designed such that it mirrors well the work incentives for a couple in which the primary earner earns two thirds of the household income. This is approximately the case for the median couple which explains why the difference between marginal withholding and income tax rates is so small.

[34]To assess the consequences of a reform of the current withholding system in Germany for all household income constellations, we compare the effects on the marginal withholding tax rate for married primary and secondary earners in the men-favoring schedule along the income distribution in Figure G.3.

this higher marginal tax rate caused by joint taxation can lower the work incentives of secondary earners. However, with the help of the withholding tax system, policymakers can decide how closely the individual marginal withholding tax rates reflect the couple's marginal income tax rate. In light of our findings regarding the labor supply effects of withholding taxes, they can potentially attenuate the negative work incentives for secondary earners. Figure 14 shows that the example couple choosing the withholding-tax-minimizing schedule in the current withholding tax system in Germany approximately faces the "correct" marginal work incentives as each spouse's marginal withholding tax rate is fairly similar to the couple's marginal income tax rate.[35]

In contrast, the current French and US implementations "deceive" the individuals about their marginal work incentives as the marginal withholding tax does not equal the couple's marginal income tax. Given our findings, deceiving secondary earners by lowering their marginal withholding tax rates below the couple's marginal income tax rates could to some extent circumvent the negative work incentives of joint taxation for secondary earners and thereby increase the labor supply of women. The two recently proposed reform options do just that and thereby increase the work incentives for secondary earners. For primary earners, the figure shows that in both the US implementation and the German reform implementation the marginal withholding tax rates are above the couple's marginal income tax rates. Moreover, the two reform options both increase the marginal withholding tax rate of the primary earner compared to the respective current situation, which could decrease their work incentives. However, as the labor market attachment of primary earners is high and their labor supply relatively inelastic, we would expect that these higher marginal withholding taxes do not substantially affect their labor supply.

7 Conclusion

We show that withholding taxes impact labor supply decisions. Examining a reform that reduced withholding taxes more for some women than for others allows us to estimate the elasticity of labor income with respect to the marginal net-of-withholding tax rate. We estimate an elasticity that is larger than what would be expected from the response of a rational, fully-informed individual, since only budget constraints and other time preferences should affect the labor supply decision of such an individual. At the same time, our estimate is smaller than typical estimates for an income tax cut (Neisser, 2021). Based on a model that relates withholding taxes to income taxes and tax refunds, we identify two main mechanisms underlying our findings: imperfect understanding of the relationship between withholding and income taxes, and limited resource pooling within households. Using a self-designed survey, we provide empirical support

[35]The fit between the income and withholding tax rate depends on the chosen withholding tax schedule of the household. For many married couples in Germany, the chosen withholding-tax-minimizing schedule results in marginal withholding tax rates that are close to the respective couple's marginal income tax rate for both spouses (see Figure G.2).

for both mechanisms. First, fewer than 20 % of respondents are aware that withholding taxes can be fully credited against income taxes. Second, we find evidence that married couples do not fully pool their financial resources. These findings suggest that changes in withholding taxes may have real effects on the individual disposable incomes of spouses within joint taxation systems.

The novel finding that withholding taxes affect labor supply could help to bridge the gap between two parallel strands of the existing literature on behavioral responses to income taxation. On the one hand, it is well documented that individuals respond to income taxation (see Neisser, 2021, for a comprehensive review). On the other hand, people often exhibit a limited understanding of income taxes (see for example Feldman et al., 2016; Stantcheva, 2021). This raises the question of how individuals can respond to taxes that they often do not fully understand. Our results suggest that withholding taxes can constitute a central cornerstone in understanding how people learn about the tax rates they face and should thus be taken into consideration alongside income taxes when studying the topic of tax complexity.

For instance, we posit that withholding taxes may help explain the empirical finding that individuals tend to overestimate average income tax rates on average (Gideon, 2017; Rees-Jones and Taubinsky, 2020) and for median households (Stantcheva, 2021). Stantcheva (2021) links this observation to ironing (Liebman and Zeckhauser, 2004), but it could also be explained by the substantial overwithholding in the US (Gelman et al., 2022), meaning that withholding taxes are higher than incomes taxes for most taxpayers. If individuals do not fully associate their own overwithholding with subsequent tax refunds and if they are guided rather by withholding taxes than by income taxes, this may lead to inflated perceptions of their effective income tax liabilities. The likelihood of this is high for two reasons. First, we show that the majority of taxpayers does not understand the interlinkage between withholding taxes and income taxes. Second, withholding taxes arguably often represent taxpayers' primary point of contact with the income tax system via their monthly payslips.

Consequently, future research on withholding taxes in the context of tax complexity could provide valuable insights into the cognitive processes and heuristics that shape individuals' responses to income taxation. These insights could inform the design of more efficient tax systems that explicitly account for the role of withholding taxes.

Apparently, the potential to influence the decision making of households with the design of withholding taxes is already recognized within the political sphere. In the US, the W-4 form to claim withholding taxes was substantially simplified in 2020, which should reduce the overwithholding of households. In both France and Germany, reforms of the withholding tax systems have been proposed that would reduce the withholding tax burden for secondary earners at the expense of primary earners. Even though withholding taxes only marginally affect resources at the household level, reforms are difficult to implement when they redistribute income from one spouse's paycheck to the other spouse's paycheck. For example, the German

proposal substantially decreases withholding taxes for the secondary earner while increasing them for the primary earner. In combination, this increases the monthly take-home pay for the secondary earner at the expense of the primary earner. This kind of reform affects disposable income on individual level if households do not pool resources, for which we show evidence in this paper.

An additional interesting aspect of the proposed reforms is that they do not aim to align marginal withholding tax rates with marginal income tax rates. Instead, they reduce marginal withholding tax rates for secondary earners while increasing them for primary earners, suggesting that withholding taxes are used as tools to increase the labor supply of women.

References

Abeler, Johannes and Simon Jäger (2015). "Complex Tax Incentives". *American Economic Journal: Economic Policy* 7.3, pp. 1–28.

Aghion, Philippe, Ufuk Akcigit, Matthieu Lequien, and Stefanie Stantcheva (2017). Tax Simplicity and Heterogeneous Learning. *National Bureau of Economic Research*, p. 104537.

Almås, Ingvild, Orazio Attanasio, and Pedro Carneiro (2023). "Household Decisions and Intra-Household Distributions". *Handbook of the Economics of the Family*. Vol. 1. Elsevier, pp. 111–149.

Bagchi, Sutirtha (2025). "The Effects of Introducing Withholding on Tax Compliance: Evidence from Pennsylvania's Local Earned Income Tax". *National Tax Journal* 78.2, pp. 327–367.

Bagchi, Sutirtha and Libor Dušek (2021). "The Effects of Introducing Withholding and Third-Party Reporting on Tax Collections: Evidence from the U.S. State Personal Income Tax". *Journal of Public Economics* 204.

Becker, Johannes, Jonas Fooken, and Melanie Steinhoff (2019). "Behavioral Effects of Withholding Taxes on Labor Supply". *The Scandinavian Journal of Economics* 121.4, pp. 1417–1440.

Bernheim, B. Douglas and Dmitry Taubinsky (2018). "Behavioral Public Economics". *Handbook of behavioral economics: Applications and Foundations 1* 1, pp. 381–516.

Bertrand, Marianne, Emir Kamenica, and Jessica Pan (2015). "Gender Identity and Relative Income within Households*". *The Quarterly Journal of Economics* 130.2, pp. 571–614.

Bick, Alexander and Nicola Fuchs-Schündeln (2017). "Quantifying the Disincentive Effects of Joint Taxation on Married Women's Labor Supply". *American Economic Review* 107.5, pp. 100–104.

— (2018). "Taxation and Labour Supply of Married Couples across Countries: A Macroeconomic Analysis". *The Review of Economic Studies* 85.3, pp. 1543–1576.

Blaufus, Kay, Jonathan Bob, Jochen Hundsdoerfer, Christian Sielaff, Dirk Kiesewetter, and Joachim Weimann (2015). "Perception of Income Tax Rates: Evidence from Germany". *European Journal of Law and Economics* 40.3, pp. 457–478.

Buettner, Thiess, Katharina Erbe, and Veronika Grimm (2019). "Tax Planning of Married Couples and Intra-Household Income Inequality". *Journal of Public Economics* 179, pp. 1040–1048.

Caldwell, Sydnee, Scott Nelson, and Daniel Waldinger (2023). "Tax Refund Uncertainty: Evidence and Welfare Implications". *American Economic Journal: Applied Economics* 15.2, pp. 352–376.

Callaway, Brantly, Andrew Goodman-Bacon, and Pedro H. Sant'Anna (2024). Difference-in-Differences with a Continuous Treatment. *National Bureau of Economic Research*.

Chetty, Raj, John N. Friedman, and Emmanuel Saez (2013). "Using Differences in Knowledge Across Neighborhoods to Uncover the Impacts of the EITC on Earnings". *American Economic Review* 103.7, pp. 2683–2721.

Engström, Per, Katarina Nordblom, Henry Ohlsson, and Annika Persson (2015). "Tax Compliance and Loss Aversion". *American Economic Journal: Economic Policy* 7.4, pp. 132–164.

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde (2018). "Global Evidence on Economic Preferences". *The Quarterly Journal of Economics* 133.4, pp. 1645–1692.

Farhi, Emmanuel and Xavier Gabaix (2020). "Optimal Taxation with Behavioral Agents". *American Economic Review* 110.1, pp. 298–336.

Feldman, Naomi E. (2010). "Mental Accounting Effects of Income Tax Shifting". *Review of Economics and Statistics* 92.1, pp. 70–86.

Feldman, Naomi E., Peter Katuščák, and Laura Kawano (2016). "Taxpayer Confusion: Evidence from the Child Tax Credit". *American Economic Review* 106.3, pp. 807–835.

Fujii, Edwin T. and Clifford B. Hawley (1988). "On the Accuracy of Tax Perceptions". *The Review of Economics and Statistics* 70.2, pp. 344–347.

Gabaix, Xavier (2019). "Behavioral Inattention". *Handbook of Behavioral Economics: Applications and Foundations 1*. Vol. 2. Elsevier, pp. 261–343.

Gelman, Michael, Shachar Kariv, Matthew D. Shapiro, and Dan Silverman (2022). "Rational Illiquidity and Consumption: Theory and Evidence from Income Tax Withholding and Refunds". *American Economic Review* 112.9, pp. 2959–2991.

Gideon, Michael (2017). "Do Individuals Perceive Income Tax Rates Correctly?" *Public Finance Review* 45.1, pp. 97–117.

Gudgeon, Matthew and Simon Trenkle (2024). "The Speed of Earnings Responses to Taxation and the Role of Firm Labor Demand". *Journal of Labor Economics*, p. 723831.

Hauck, Tobias and Luisa Wallossek (2024). "Optional (Non-)Filing and Effective Taxation". *Journal of Public Economics*.

Herold, Elena and Luisa Wallossek (2024). "The Marriage Earnings Gap". *Working Paper*.

Illing, Hannah, Fabian Reutzel, and Jakob Wegmann (2024). "Gendered Unemployment Benefits: Withholding Taxes and Their Propagated Behavioral Impact". *Mimeo*.

Jakobsen, Katrine Marie and Jakob Egholt Søgaard (2022). "Identifying Behavioral Responses to Tax Reforms: New Insights and a New Approach". *Journal of Public Economics* 212, p. 104691.

Jones, Damon (2012). "Inertia and Overwithholding: Explaining the Prevalence of Income Tax Refunds". *American Economic Journal: Economic Policy* 4.1, pp. 158–185.

Keane, Michael P (2011). "Labor Supply and Taxes: A Survey". *Journal of Economic Literature* 49.4, pp. 961–1075.

Kleine Anfrage Bundestag (2019). Kleine Anfrage Drucksache 19/12857: Ehegattensplitting Und Gleichstellung Im Deutschen Steuersystem.

German Coalition Agreement (2021). Koalitionsvertrag Zwischen SPD, Bündnis 90/Die Grünen, FDP.

Koch, Leonie (2024). "Income Taxation of Couples and Gender (In)Equality in Earnings". *Working Paper*.

Kostøl, Andreas R. and Andreas S. Myhre (2021). "Labor Supply Responses to Learning the Tax and Benefit Schedule". *American Economic Review* 111.11, pp. 3733–3766.

LaLumia, Sara (2008). "The Effects of Joint Taxation of Married Couples on Labor Supply and Non-Wage Income". *Journal of Public Economics* 92.7, pp. 1698–1719.

Lardeux, Raphaël (2023). "Behavioral Cross-Influence of a Shadow Tax Bracket: Evidence from Bunching Where Income Tax Liabilities Start". *Journal of Public Economics* 226, p. 104950.

Leite, David (2024). "Tax Withholding and Labor Supply - Evidence from Bunching at the Withholding Eligibility Threshold". *Working Paper*.

Liebman, Jeffrey B. and Richard J. Zeckhauser (2004). "Schmeduling". *Working Paper*.

McCaffery, Edward and Joel Slemrod (2006). Behavioral Public Finance. Russell Sage Foundation.

Messacar, Derek (2018). "The Effect of Tax Withholding on Pre-Retirement Savings Withdrawals: Evidence from Canada". *Journal of Pension Economics and Finance* 17.4, pp. 534–553.

Moore, Dylan T. and Joel Slemrod (2021). "Optimal Tax Systems with Endogenous Behavioral Biases". *Journal of Public Economics* 197, p. 104384.

Neisser, Carina (2021). "The Elasticity of Taxable Income: A Meta-Regression Analysis". *The Economic Journal* 131.640, pp. 3365–3391.

O'Donoghue, Ted and Matthew Rabin (1999). "Doing It Now or Later". *American Economic Review* 89.1, pp. 103–124.

RDC of the Federal Statistical Office and Statistical Offices of the Federal States (2010). Lohn- und Einkommenssteuerstatistik 2010, Scientific Use File.

— (2022). Taxpayer-Panel 2001-2018.

Rees-Jones, Alex (2018). "Quantifying Loss-Averse Tax Manipulation". *The Review of Economic Studies* 85.2, pp. 1251–1278.

Rees-Jones, Alex and Dmitry Taubinsky (2020). "Measuring "Schmeduling"". *The Review of Economic Studies* 87.5, pp. 2399–2438.

Saez, Emmanuel, Joel Slemrod, and Seth H. Giertz (2012). "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review". *Journal of Economic Literature* 50.1, pp. 3–50.

Schepanski, Albert and Teri Shearer (1995). "A Prospect Theory Account of the Income Tax Withholding Phenomenon". *Organizational Behavior and Human Decision Processes* 63.2, pp. 174–186.

Selin, Håkan (2014). "The Rise in Female Employment and the Role of Tax Incentives. An Empirical Analysis of the Swedish Individual Tax Reform of 1971". *International Tax and Public Finance* 21.5, pp. 894–922.

Shapiro, Matthew D. and Joel Slemrod (1995). "Consumer Response to the Timing of Income: Evidence from a Change in Tax Withholding". *American Economic Review* 85.1, pp. 274–283.

Slemrod, Joel (2019). "Tax Compliance and Enforcement". *Journal of Economic Literature* 57.4, pp. 904–954.

Spangenberg, Ulrike, Giesela Färber, and Corinna Späth (2020). "Mittelbare Diskriminierung im Lohnsteuerverfahren. Auswirkungen der Lohnsteuerklassen auf Nettoeinkommen und Lohnersatzleistungen". *Working Paper Forschungsförderung*. Vol. 190. Hans-Böckler-Stiftung.

Stantcheva, Stefanie (2021). "Understanding Tax Policy: How Do People Reason?" *The Quarterly Journal of Economics* 136.4, pp. 2309–2369.

Stöwhase, Sven (2011a). "Bürgerentlastungsgesetz Krankenversicherung: Ambivalente Effekte auf die Lohnsteuer". *Zeitschrift für Wirtschaftspolitik* 60.1, pp. 3–23.

— (2011b). "Non-Minimization of Source Taxes on Labor Income: Empirical Evidence from Germany". *Review of Economics of the Household* 9.2, pp. 293–306.

Thaler, Richard H (1994). "Psychology and Savings Policies". *The American Economic Review* 84.2, pp. 186–192.

Weber, Caroline E. (2014). "Toward Obtaining a Consistent Estimate of the Elasticity of Taxable Income Using Difference-in-Differences". *Journal of Public Economics* 117, pp. 90–103.

Appendix A Institutional Setting

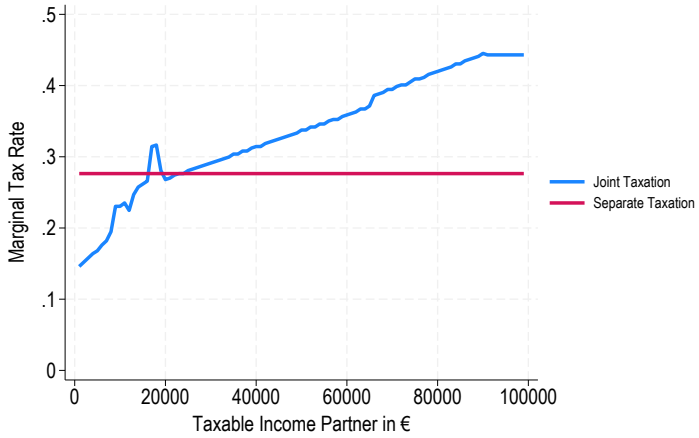


Figure A.1: Marginal Income Tax for Income of 24,000 €

Notes: The figure shows the marginal income tax rate depending on the income of the partner for an individual earning €24,000 under both joint and separate taxation. When a couple is taxed jointly, the marginal income tax rate for the individual increases in partner income as the marginal income tax is a function of household income. If the couple is taxed separately, the marginal income tax rate of each spouse does not depend on partner income.

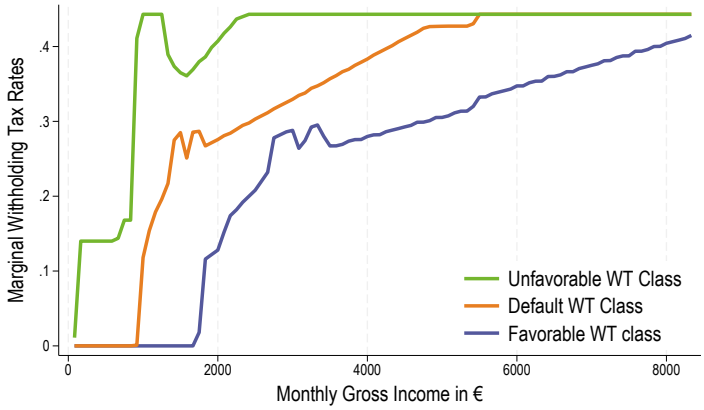


Figure A.2: Marginal Withholding Tax Rates 2009

Notes: The figure plots the marginal withholding tax rates by withholding tax class in 2009.

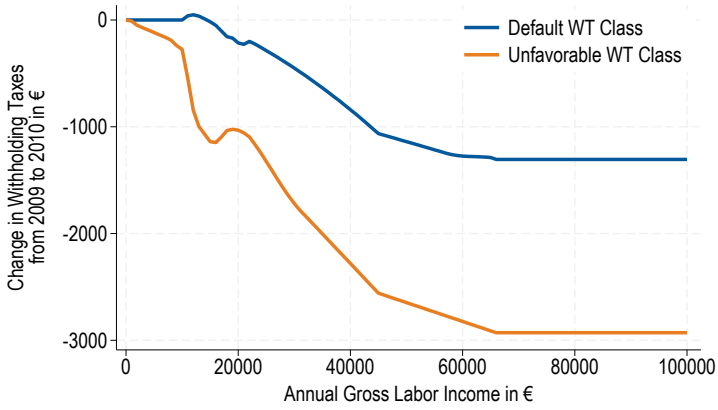


Figure A.3: Absolute Size of Reform on Withholding Taxes by Withholding Tax Class Between 2009 and 2010

Notes: The figure plots the effect of the withholding tax reform 2010 on average and marginal withholding tax rates depending on the withholding tax class.

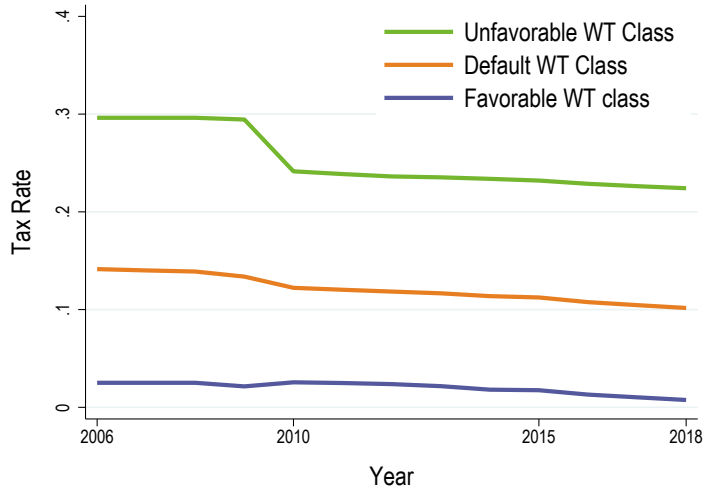
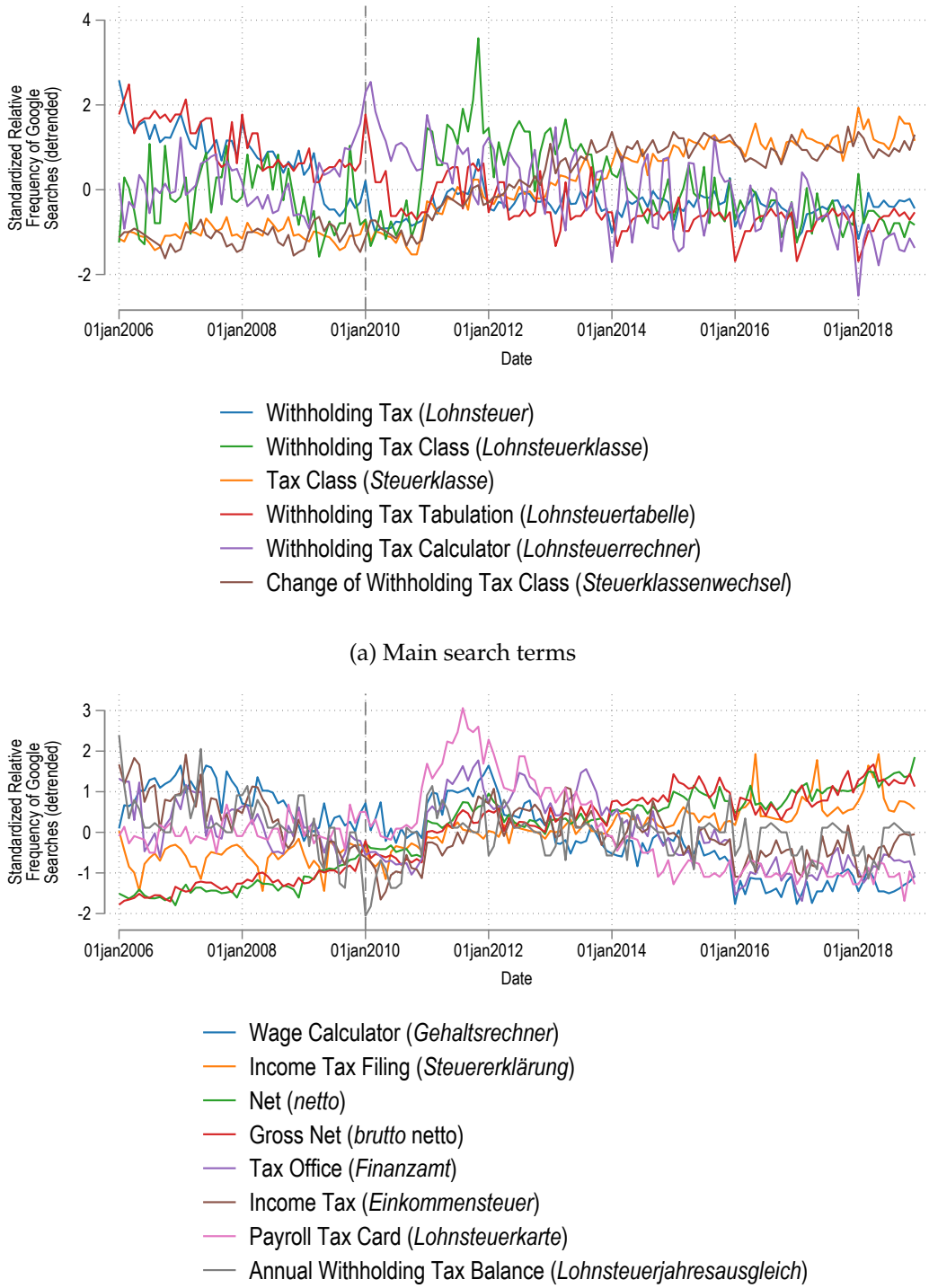


Figure A.4: Development of the Average Withholding Tax Rate

Notes: The figure plots the size of withholding tax payments depending on the withholding tax class for the period from 2006 to 2018. It illustrates for an income of €25,000 that there were no other major reforms changing withholding tax payments except for the 2010 reform that we study in this paper. This holds true along the whole income distribution.



(a) Main search terms

(b) Other search terms

Figure A.5: Trends in Relevant Google Search Terms

Notes: The figure plots the mean-standardized detrended search for terms relevant in the context of withholding taxes on Google.de. For the terms withholding tax reform (*Lohnsteuerreform*), tax prepayment (*Steuervorauszahlung*), other synonyms for a change in the withholding tax class (e.g. *Steuerklassenänderung*, *Steuerklasse ändern/wechseln*), or explicit searches for withholding tax classes (like *Steuerklasse V*), the search volume is so low that the results are not published by Google.
Source: trends.google.de

Appendix B Descriptive Statistics

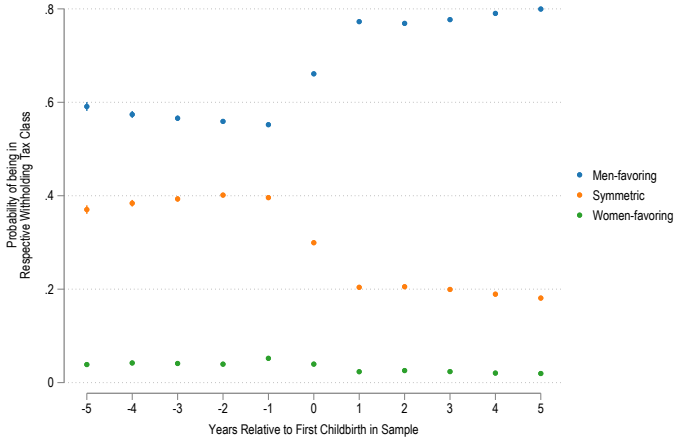


Figure B.1: Choice of the Withholding Tax Schedule Relative to the Birth of the First Child

Notes: The figure displays the share of couples in the three different withholding tax schedules around the birth of the first child for all children born between 2008 and 2018.

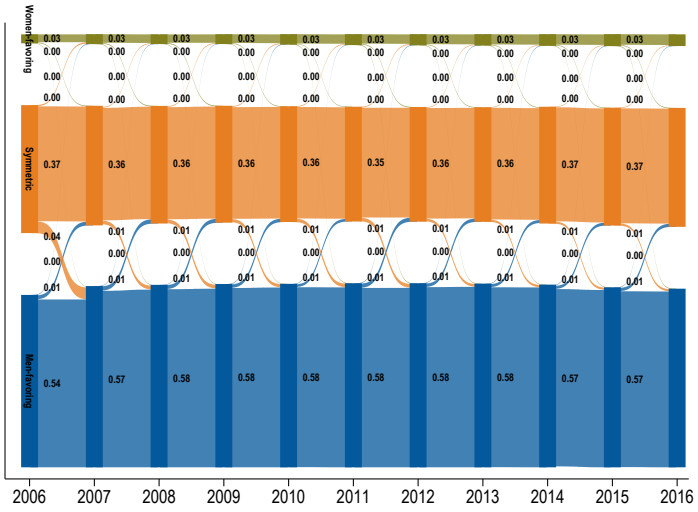


Figure B.2: Changes in the Choice of Withholding Tax Classes Over Time

Notes: The figure displays the share of couples in the three different withholding tax schedules and the transitions between the different withholding tax schedules over time. The figure shows that the choice of withholding tax schedules is relatively stable over time. Couples typically stick with their choice of withholding tax schedules and only a few couples change between different withholding tax schedules. Note that we only consider direct transitions between withholding tax schedules. So we do not include cases where couples do not file their taxes in a specific year and later reenter the dataset with a different withholding tax schedule. The difference in the shares to Figure 4 stems from the changed data composition. While this figure has no sample restrictions, the right side of Figure 4 documents the share only for couples where both spouses are working.

Appendix C Empirical Strategy

In our empirical strategy, we control for binned own and spousal pre-reform labor income interacted with dummies for pre-reform parenthood and residence in Eastern Germany by adding couple-level cell fixed effects to our regression (see Section 3.5). We motivate the underlying reason for the cell controls in the following in more detail.

Controlling for own pre-reform labor income is necessary as the treatment intensity does not only vary across withholding tax classes, but also across labor income. This is illustrated in the lower part of Figure C.1, which displays the change in the net-of-withholding tax rate, i.e., the treatment intensity, induced by the reform. As we only want to use the variation in treatment intensity caused by the different choice of withholding tax classes, it is important to control for own pre-reform income.

Moreover, there are also reasons why it is important to additionally control for spousal pre-reform labor income. First, controlling for joint household income enables us to compare women that face the same income tax liability on the couple level but different changes in their withholding taxes. Second, controlling for the relative within-household labor income allows us to control for the economic importance of own labor income and a couple's labor market related gender norms. Gender norms of the within-household division of labor arguably play a large role in explaining labor market decisions of spouses as well as their choice of withholding tax schedule.[36]

In order to address these above-outlined channels, we follow an empirical strategy that is similar to **carbonnier_who_2022**. The idea is to divide observations into cells to exploit variation in treatment within each cell. In our preferred specification, we classify each individual into one of 1,600 cells based on own and spousal pre-reform labor income in 2009 and dummies indicating parenthood and residence in Eastern Germany. We include the dummies to make sure that we account for the most relevant predictors of the withholding tax schedule choice as shown in Figure D.1. Thereby, we ensure that the compared individuals are more similar in observable characteristics. The cells are created by interacting evenly spaced bins of €5,000 of both own and partner income up to the maximum individual income of €100,000. Each of the resulting 400 cells is then interacted with dummies for parenthood and residence in Eastern Germany. By adding the resulting couple-level cell fixed effects interacted with years as controls we only use the variation in treatment intensity within each cell. We thus compare women with similar own and spousal pre-reform income characteristics. The remaining variation in treatment that we exploit then only comes from the different choices of withholding tax schedules.

We illustrate how the cell approach helps to tackle endogeneity concerns in Figure C.1. Along the x-axis, the cells help to control for own pre-reform labor income so that differences in

[36] Our survey shows that couples in the men-favoring schedule hold more traditional gender norms than those in the symmetric schedule (see Figure F.1). Comparing only couples with a similar within-household division of labor income could mitigate this problem because, as we show in Table 2, this division is correlated with the choice of withholding tax schedule.

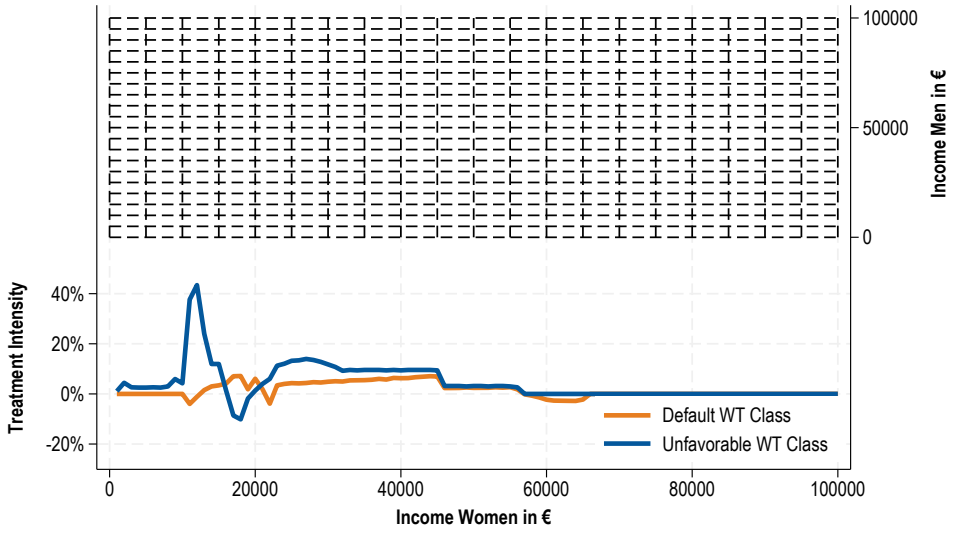


Figure C.1: Illustration of Income Cell Approach

Notes: This figure illustrates the idea behind using income cell fixed effects. The lower part of the figure displays the change in the net-of-withholding tax rate induced by the reform in 2010. The upper part of the figure illustrates the income cell approach. We create bins for the income of women and men, interact them with each other and interact the resulting income cells with our sample years. By adding these interacted cells to our regression equation, we only exploit variation in the treatment within the cells.

treatment intensity are only induced by the choice of withholding tax schedule, not by the income level. Along the y-axis, differences in relative within-household labor income are accounted for. Two women with the same own labor income but different withholding tax classes can still be very different with regards to other relevant factors such as the economic importance of own labor income which is driven by the size of their partners' income. A woman earning €30,000 with a partner earning €20,000 has very different work and tax incentives compared to the same woman with a husband earning €80,000. Using the cell approach therefore ensures comparing more similar couples.

Given the arguments brought forward so far, though, controlling for both own and spousal income separately would be sufficient. However, not only relative within-household labor income but also absolute household labor income might play a role. Couples with higher absolute labor income might tend to choose other withholding tax schedules but also react differently to changes in the net-of-withholding-tax rate. Thus, the bin approach controls for differences in absolute household labor income along the diagonal of the upper part of Figure C.1.

The variation that we can exploit with the cell approach is illustrated in Figure 7. It shows for each of the income cells the share of couples who are treated in a binary sense, i.e., the share of couples being in the men-favoring withholding tax schedule at the time of the reform conditional on being in the men-favoring or symmetric withholding tax schedule. The size of each cell represents the number of observations, meaning that cells with larger dots contain a larger share of the observations in our sample. The plot shows that for the largest shares of

couples the husband earns between €20,000 and €50,000 and the wife between €10,000 and €40,000 and that within those cells there is a considerable amount of variation in the choice of withholding tax schedules.

Appendix D Results

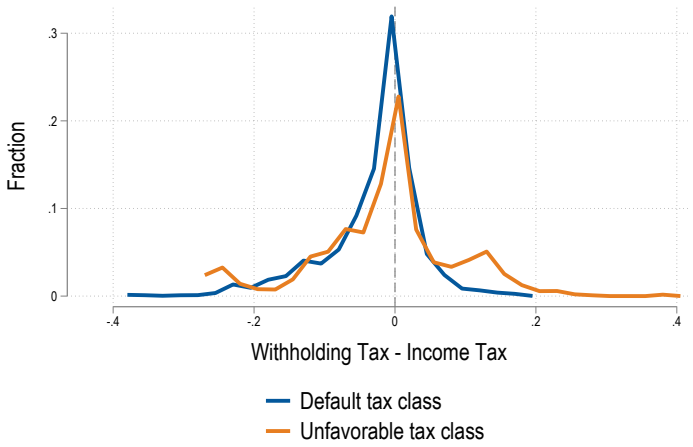


Figure D.1: Difference Between Marginal Withholding and Marginal Income Tax Rates for Married Women

Notes: The figure displays the deviations of married women's marginal withholding tax rates from their marginal income tax rates. The deviations are shown separately for women who chose the default withholding tax class and for women who chose the unfavorable withholding tax class. A positive coefficient implies that the marginal withholding tax rate is larger than the marginal income tax rate. To ease interpretation, we ignore all non-standard deductions. All calculations are based on a 10 % sample of German administrative tax records from the year 2010 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2010), using the German tax code.

Table D.1: Determinants of the Choice of Withholding Tax Schedules

	Choice of Men-Favoring Schedule
Eastern Germany	−0.221***
	(0.011)
Female Income Share	−0.017***
	(0.001)
Income Wife (1000 Euro)	−0.005***
	(0.001)
Has a Child	0.113***
	(0.011)
Number of Children	0.058***
	(0.006)
Catholic Wife	0.005
	(0.01)
Catholic Husband	0.027***
	(0.01)
Age Wife	0.003**
	(0.001)
Age Husband	0.005***
	(0.001)
Constant	0.891***
	(0.054)
N	490,330
Adj. R^2	0.51

Notes: The table displays which characteristics of a couple are predictive for the choice of the men-favoring schedule instead of the symmetric schedule. The coefficients stem from the regression of a dummy indicating the men-favoring schedule on various characteristics of couples in the year 2009, just before the withholding tax reform. Heteroscedasticity-robust standard errors are displayed in brackets.

Appendix E Theoretic Model

To better understand the underlying mechanism, we present a simple toy model to illustrate potential mechanisms that can rationalize why withholding taxes can matter for labor supply decisions. The core idea is that withholding taxes are only irrelevant for labor supply decisions if individuals fully internalize tax refunds and are indifferent to the timing of cash flows. We provide evidence for the relevance of these mechanisms in Section 5.2.

E.1 Tax Refund and Determinants of its Relevance for Labor Supply

The tax refund that an individual receives after the tax year is specified as

$$R_t\left(z_{it}; x_{it}; w_{it}\right) = T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right) - T_t^{IT}\left(z_{it}; x_{it}\right), \tag{E.1}$$

where $T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right)$ denotes the withholding tax liability that depends on taxable income z_{it}, a set of other tax-relevant variables x_{it} (following the notation of Jakobsen and Søgaard, 2022) and the individual's withholding tax class w_{it}. $T_t^{IT}\left(z_{it}; x_{it}\right)$ denotes the eventual income tax liability, which does not depend on the individual's withholding tax class w_{it}.

In a model without behavioral factors, an individual's tax liability $T_t\left(z_{it}; x_{it}\right)$ is equal to their withholding tax liability minus the tax refund

$$\begin{aligned} T_t\left(z_{it}; x_{it}\right) &= T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right) - R_t\left(z_{it}; x_{it}; w_{it}\right) \\ &= T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right) - [T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right) - T_t^{IT}\left(z_{it}; x_{it}\right)]. \end{aligned} \tag{E.2}$$

Importantly, $T_t^{IT}\left(z_{it}; x_{it}\right)$ is equal to $T_t\left(z_{it}; x_{it}\right)$ which demonstrates that the withholding tax liability is not a determinant of the total tax liability.

In the following, we expand Equation E.2 to investigate how the introduction of different behavioral factors that influence the perception of future tax refunds can impact labor supply decisions: the understanding of the tax system (α), the share of the tax refund that the individual expects to receive (γ) and the factor with which the individual values money today in comparison to when the tax refund is paid out (ω). We model these factors as a weight that individuals assign to the tax refund and discuss them extensively in Section 5.1.

Adding the three parameters α, γ and ω as weights to the tax refund in Equation E.2, the individual tax liability is given as follows:

$$T_t\left(z_{it}; x_{it}\right) = T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right) - f(\alpha\gamma\omega)[T_t^{WT}\left(z_{it}; x_{it}; w_{it}\right) - T_t^{IT}\left(z_{it}; x_{it}\right)]. \tag{E.3}$$

E.2 Derivation of Optimal Labor Supply

To derive optimal labor supply in our model with withholding taxes, tax refunds and the three parameters α, γ and ω we specify the standard quasi-linear utility function with respect to consumption c_{it} and taxable income z_{it}

$$u_{it}\left(c_{it}, z_{it}\right) = c_{it} - \frac{n_{it}}{1+\frac{1}{\varepsilon}}\left(\frac{z_{it}}{n_{it}}\right)^{1+\frac{1}{\varepsilon}}, \tag{E.4}$$

that each individual maximizes subject to the following budget constraint

$$c_{it} \leqslant z_{it} - T_t\left(z_{it}; x_{it}\right). \tag{E.5}$$

The parameter n_{it} expresses the individual's counterfactual income in the absence of taxation while ε is the parameter of interest, the elasticity of taxable income with respect to the marginal net-of-tax rate.

The individual tax liability given by Equation E.3 gets plugged into the budget constraint given by Equation E.5. Utility maximization then results in the following first-order condition with $\tau_{it}^{WT} = 1 - T_t'^{WT}\left(z_{it}; x_{it}\right)$ denoting the individual marginal net-of-tax rate with respect to the withholding tax and $\tau_{it}^{IT} = 1 - T_t'^{IT}\left(z_{it}; x_{it}\right)$ denoting the individual marginal net-of-tax rate with respect to the income tax in year t

$$z_{it} = n_{it}\left[\tau_{it}^{WT} - f(\alpha\gamma\omega)(\tau_{it}^{WT} - \tau_{it}^{IT})\right]^{\varepsilon}. \tag{E.6}$$

Appendix F Survey

In this section, we provide more information on the implementation of the survey (F.1), discuss additional findings from the survey concerning the filing behavior of couples and gender norms, and present results from an information treatment (F.2).

F.1 Implementation

We pre-registered our survey with the Open Science Foundation (registered as project SGXBP) and subsequently ran it on the micro job platform Clickworker between December 2022 and April 2023. We prescreened the participants so that they all speak German, are between 20 and 60 years old, married, and employed. We remove 73 respondents from our sample who fail at least one of two attention checks.[37] Furthermore, we restrict the sample to respondents with employed spouses. This makes the sample more comparable to the sample for our main analysis with observational data.[38] Our final sample then consists of 506 respondents (258 men, 248 women).

The survey questions can be divided broadly into four main categories. First, we directly inquire about the participants' understanding of withholding taxes in Germany. Second, we ask for information on the intra-household division of tax-planning and financial decisions. Third, we elicit participants' preferences on changing their weekly working hours and check whether an information treatment, which informs the participants about the withholding tax system in Germany, changes these preferences. Lastly, we elicit respondents' gender norms. Table F.1 documents descriptive statistics of the survey answers.

F.2 Detailed Survey Analysis

Filing of taxes. One way to gauge which couples are particularly affected by the intra-household distortion of earnings and thus by adverse labor supply incentives for women is to examine the role of the filing of taxes in the income tax declaration made in the calendar year following the respective tax year. We asked respondents about their tax filing behavior and concentrate on those who file their income taxes jointly as a married couple as it is the case for our analysis sample in the administrative data.[39]

[37] The attention checks can be found in the questions A2 and D15 in Appendix I.

[38] We also exclude respondents from our analysis who are in a same-sex marriage, where one of the two partners is non-binary or when the gender is not stated. This is for two reasons: First, there is an option for spouses in a same-sex marriage to keep that marriage secret from their employers by choosing withholding tax class I instead of III, IV, or V. This might then influence their knowledge of withholding taxes in an unforeseeable way. Second, same-sex couples were not yet allowed to benefit from joint taxation and were thus not allowed to choose their withholding tax classes at the time of the 2010 reform.

[39] This applies to 82 % of our respondents. A joint tax declaration has to be signed by both spouses but no other participation in filing the declaration is needed. See Question D17 in Appendix I for the exact wording of the question.

Table F.1: Survey Descriptives

	N	Mean	SD	Min	Max
Demographics					
Women	506	0.49	0.50	0	1
Age	506	39.39	8.67	22	57
At least one child	500	0.61	0.49	0	1
High school degree	506	0.79	0.41	0	1
Work-related Variables					
Income	443	46,896	23,532	5,000	100,000
Income partner	438	43,790	23,904	5,000	100,000
Working hours	506	34.45	9.74	5	65
Working hours partner	506	34.08	10.53	0	70
Gender Norms					
Husband should have last word at home	506	1.89	1.43	1	7
Both partners should work the same	506	2.63	1.71	1	7
Husband should take care of financial security	506	2.80	1.86	1	7
Gender norm index	506	0.00	1.00	-1.13	3.58
Household Finances					
Men-Favoring WT schedule	506	0.35	0.48	0	1
Tax consultant decided on WT class	506	0.09	0.28	0	1
Husband decided on WT class alone	506	0.09	0.29	0	1
Wife decided on WT class alone	506	0.05	0.22	0	1
Shared bank account	506	0.55	0.50	0	1
Income tax filing	501	0.96	0.19	0	1
Husband's wage transferred to shared bank account	506	0.27	0.45	0	1
Tax refund on shared bank account	506	0.44	0.50	0	1
Feel financial constraint at end of month	483	0.44	0.50	0	1
Tests of Knowledge					
Correct identification of existing WT schedules	506	0.39	0.49	0	1
Understood difference IT/WT before survey	506	0.16	0.37	0	1
Understood impact WT schedule on WT	506	0.61	0.49	0	1
WT impacts parental leave benefits	506	0.43	0.50	0	1
WT impacts unemployment benefits	506	0.30	0.46	0	1
Self-reported Knowledge					
Difference IT/WT before survey	506	0.54	0.50	0	1
- Among those who failed knowledge test	423	0.52	0.50	0	1
Impact WT class on WT before survey	506	0.95	0.22	0	1
- Among those who failed knowledge test	196	0.91	0.29	0	1
Overall Sample Size	506				

Notes: The Table displays descriptive statistics for the answers to the survey (see Appendix I for the full questionnaire). Income and working hours were asked in brackets and the respective mean was assigned to every individual for this tabulation. The gender norm index is calculated by summing up the item responses to the three questions (inverting the answers to Question 2) and mean-standardizing this sum.

Looking at heterogeneities by gender, we find that, among these respondents, 56 % of men but only 37 % of women state that they usually do the majority of the tax declaration alone. This difference in tax filing behavior is driven by couples in the men-favoring withholding tax schedule. Of all men in the men-favoring withholding tax schedule, 65 % do the tax declaration mostly alone, while this only applies to 35 % of the women in that schedule. In the symmetric schedule, however, the gender difference is much lower with 50 % of the men and 46 % of the women claiming to do the tax declaration mostly alone, respectively. This shows that a more gender-equal exposure to the income tax system correlates with a less distortive distribution of withholding taxes in favor of men.

As documented in Figure F.2, women less often than men know that withholding taxes do not have an influence on the final income tax liability. This gender gap in knowledge about the tax system could be linked to the amount of time and effort spent dealing with it by preparing tax declarations. Moreover, we see that those respondents that do most of the tax declaration alone also exhibit a larger knowledge about the irrelevance of withholding taxes for the final income tax liability at the beginning of the survey. For women, knowledge increases from 10 % to 17 % when they deal with the tax declaration mostly alone, for men from 16 % to 25 %.

A possible conclusion from these findings is that couples in which predominantly the husband deals with taxes are also more affected by the incentive distortions arising from the shifting of the withholding tax liability from husbands to wives. This may indicate a self-manifesting role of the household division of tasks, whereas this division itself might be linked to gender norms.

Gender norms. As Stöwhase (2011b) and Buettner et al. (2019) show with administrative tax records, German married couples are more likely to choose the men-favoring withholding tax schedule when the husband outearns the wife than to choose the women-favoring schedule when the wife outearns the husband.[40] This phenomenon could be attributed to a gender norm that prescribes the husband to be the main breadwinner (Bertrand et al., 2015). As a consequence, couples with such a norm should be more likely to choose the men-favoring withholding tax schedule.

We investigate this by asking the respondents three questions, each with seven ordered answer options, to elicit their norms regarding gender roles in households.[41] From the answers to these questions, we create a standardized index of the traditionality of gender norms where a

[40] Moreover, they also more often choose the men-favoring schedule when the wife outearns the husband than they choose the women-favoring schedule when the husband outearns the wife.

[41] See Question D18 in Appendix Section I for the exact wording of the questions. All three questions have been asked in this form in previous waves of the German Socio-Economic Panel (GSOEP).

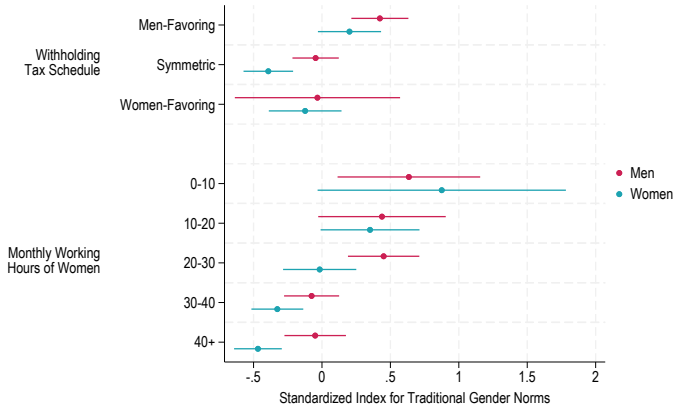


Figure F.1: Gender Norms Index by Gender

Notes: The figure plots standardized index values for gender norms by gender for different withholding schedules and bins of monthly working hours of the wife. A higher value of the gender norms index is associated with more traditional gender norms, i.e., a desired larger role for husbands than for wives with regards to decision-making in the household and market work.

higher value means that the respondent wants to have a larger role for husbands than for wives with regard to decision-making in the household and to market work.

As shown in Figure F.1, respondents in the men-favoring have more traditional gender norms than those in the symmetric withholding tax schedule. This holds true for both men and women and indicates that those most affected by distortions of labor supply incentives are also those who favor a traditional division of market and non-market work. This is particularly relevant as the figure also shows that women who hold more traditional gender views are, as expected, also those that have the highest margin for adjusting their working hours as they tend to have fewer working hours than women with more progressive gender norms.

Information treatment. We also implemented an information treatment, consisting of an explanation of the German withholding tax system, in particular of the relationship between the choice of withholding tax classes and monthly take-home pay and of the irrelevance of the withholding tax choice for the income tax. We then assessed whether treated participants - those 423 out of the 506 interviewed individuals who did not know before our provided explanation that the choice of the withholding tax schedule is irrelevant for the income tax - want to change their withholding tax classes and adapt their working hours with these new information at hand.[42] After the explanation of the withholding tax system, we asked again about the optimal withholding tax choice. As Table F.2 documents, only 42 % (179 individuals) of the 423 individuals who could have learned about the system with the help of our explanation indeed learned that

[42]Questions D10 and D11 explain the system while Question D12 tests the understanding of the irrelevance of the withholding tax choice for the income tax. Questions D13a-c ask about intended behavioral consequences.

Table F.2: Information Treatment

	N	Mean	SD	Min	Max
Success Inform. Treatment					
Would change working hours now	171	0.04	0.20	0	1
Would have changed working hours in the past	171	0.15	0.35	0	1
Would change withholding tax class	158	0.05	0.22	0	1
No Success Inform. Treatment					
Would change working hours now	232	0.12	0.32	0	1
Would have changed working hours in the past	232	0.20	0.40	0	1
Would change withholding tax class	213	0.20	0.40	0	1
Observations	403				

Notes: The table displays the answers to the information treatment for the sample of those survey participants who did not know before our provided explanation that the choice of the withholding tax schedule is irrelevant for the income tax. Also it excludes the individuals who answered "do not know" to the respective questions before or after the treatment.

the choice of withholding tax schedules is irrelevant for the income tax. Thereby, the statistical power is too small for a meaningful analysis of the information treatment. Suggestively, the treatment has a negative impact on the intention of changing working hours today or in the past.

F.3 Additional Survey Figures

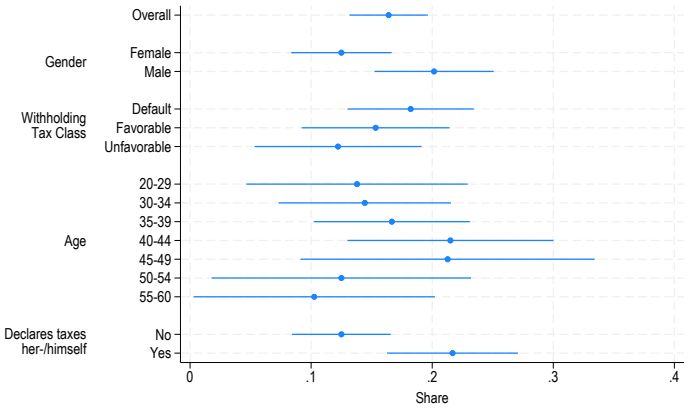


Figure F.2: Knowledge of Interlinkage between Withholding Tax and Final Income Tax Liability by Subgroups

Notes: The figure plots the overall and subgroup-specific shares of surveyed individuals who correctly identify that the choice of withholding tax class does not impact the final income tax liability given an example of the labor incomes of two spouses (one spouse earning €60,000 per year, the other one €30,000). See Question D7 in Appendix I for the exact wording of the question.

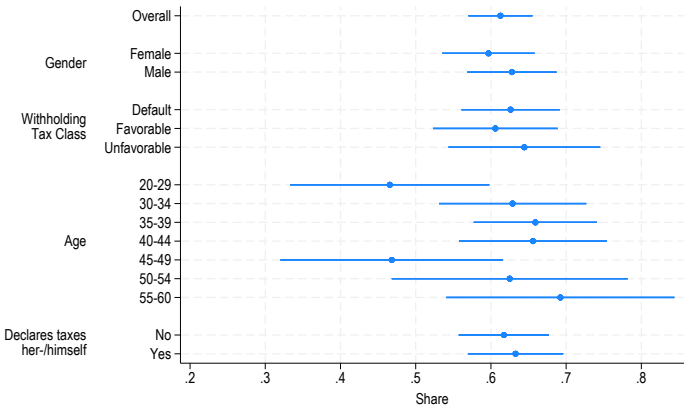
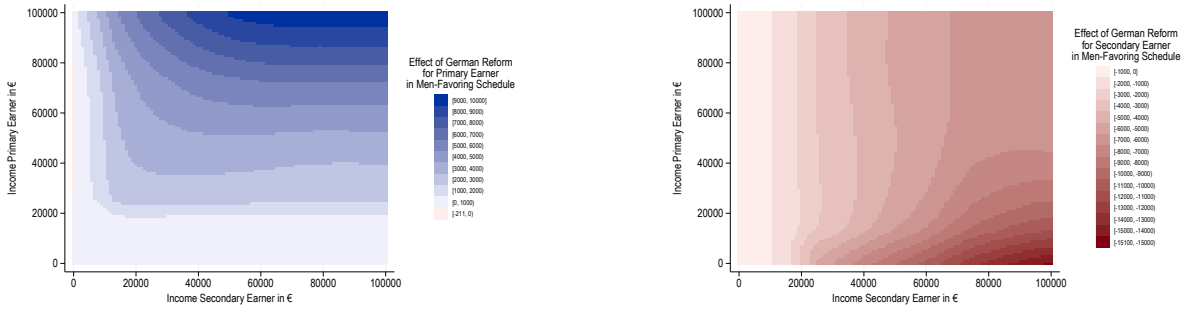


Figure F.3: Knowledge of Interlinkage Between Withholding Tax Classes and Monthly Payslip

Notes: The figure plots the overall and subgroup-specific shares of surveyed individuals who correctly identify that and in which way the choice of withholding tax classes impacts the monthly net wage received from one's employer. Respondents are classified as being knowledgeable if they both answer correctly what happens qualitatively with respect to monthly wage transfers from their employers when changing from the default withholding tax class to (1) the favorable withholding tax class and (2) the unfavorable withholding tax class. See Questions D8 and D9 in Appendix I for the exact wording of the questions.

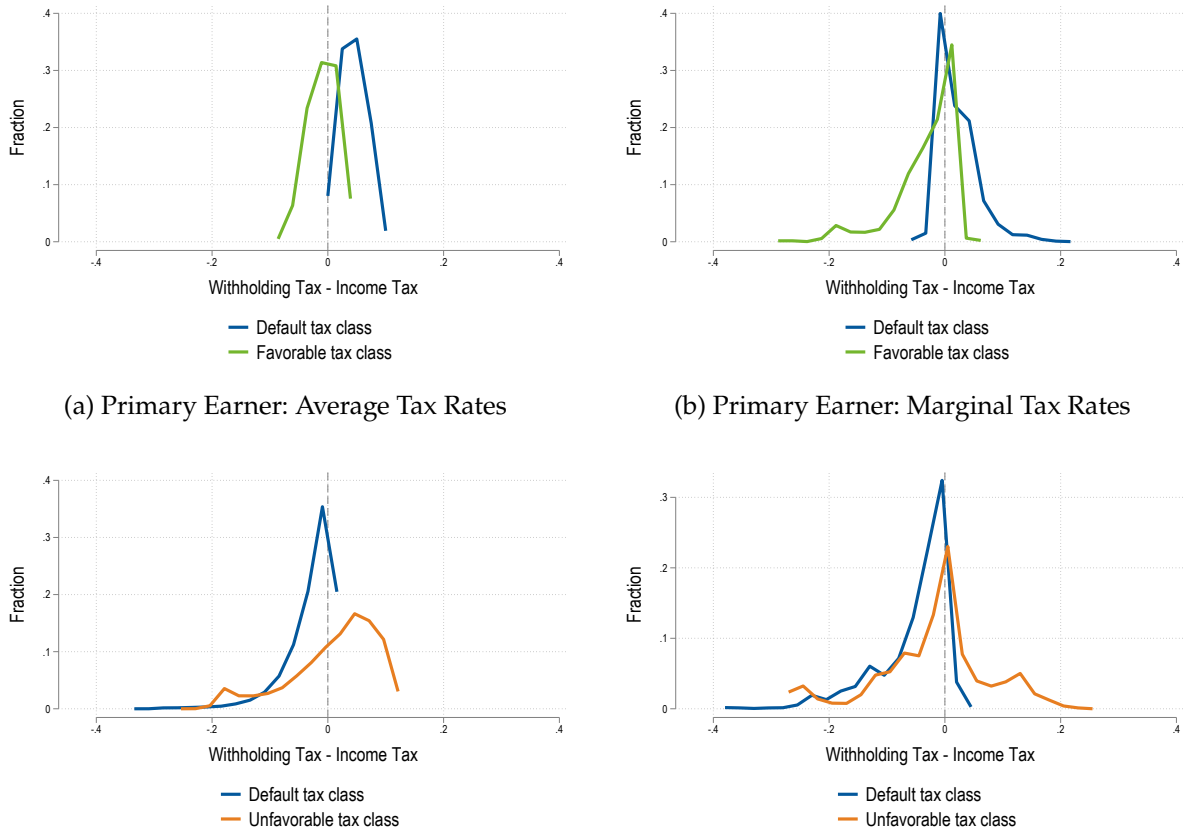
Appendix G Implementation of Withholding Taxes for Married Couples



(a) Primary Earner (b) Secondary Earner

Figure G.1: Effect of German Reform on Take-Home Pay for Both Spouses

Notes: The figures display the change in the annual take-home pay resulting from the reform option for primary and secondary earners in the men-favoring schedule. The effects are displayed for all possible income combinations below €100,000 of individual annual labor income. With "primary earner" we denote the individual in the household with higher labor income and with "secondary earner" we denote the individual in the household with lower labor income. We assume that the couple does not claim any credits or deductions when filing their income taxes. For almost all primary earners, the withholding tax substantially increases due to the reform while it decreases for secondary earners.



(a) Primary Earner: Average Tax Rates

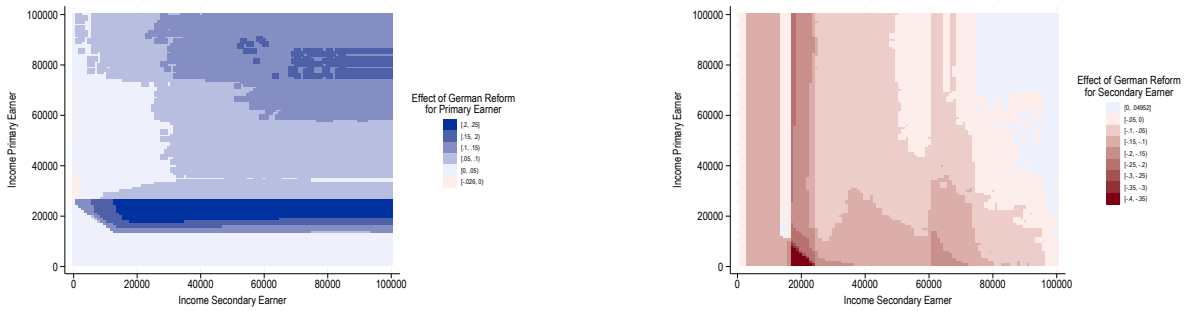
(b) Primary Earner: Marginal Tax Rates

(c) Secondary Earner: Average Tax Rates

(d) Secondary Earner: Marginal Tax Rates

Figure G.2: Difference between Withholding and Income Tax Rates

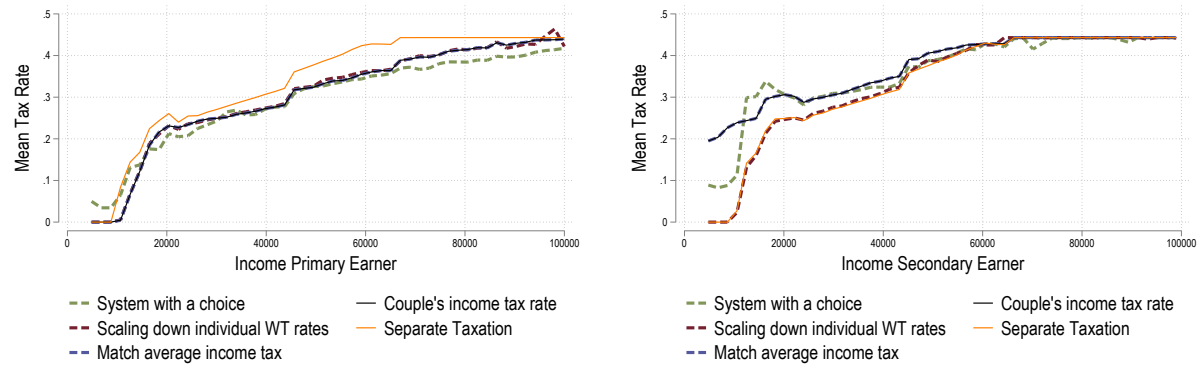
Notes: The figures display histograms of the deviations of marginal and average withholding tax rates from the couple's income tax rates. The deviations are shown separately for individuals that chose the default withholding tax class and for individuals that chose the favorable/unfavorable withholding tax class. A positive x-axis value implies that the withholding tax rate is larger than the income tax rate. We display the deviations in tax rates separately for primary earners in Panel (a) and (b) and for secondary earners in Panel (c) and (d). All calculations are made using the German tax code and are based on a 10 % sample of German administrative tax records from the year 2010 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2010). With "primary earner" we denote the individual in the household with higher labor income and with "secondary earner" we denote the individual in the household with lower labor income. We assume that the couple does not claim any credits or deductions when filing their income taxes.



(a) Primary Earner (b) Secondary Earner

Figure G.3: Effect of German Reform on Marginal Tax Rates for Both Spouses

Notes: The figures display the change in the marginal withholding tax rate resulting from the reform option for primary and secondary earners in the men-favoring schedule. The effects are displayed for all possible income combinations below €100,000 of individual annual labor income. With "primary earner" we denote the individual in the household with higher labor income and with "secondary earner" we denote the individual in the household with lower labor income. We assume that the couple does not claim any credits or deductions when filing their income taxes.



(a) Primary Earner: Marginal Tax Rates (b) Secondary Earner: Marginal Tax Rates

Figure G.4: Marginal Withholding Tax Rates in Different WT Regimes for Married Couples

Notes: The figures display the *long-term* mean marginal withholding tax rates induced by different withholding tax systems. Additionally, the couple's mean income tax rates and the mean income tax rates under separate taxation are displayed. We display the tax rates separately for primary earners in Panel A and for secondary earners in Panel B. All calculations are based on a 10,% sample of German administrative tax records from the year 2010, using the German tax code (RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2010). With "primary earner" we denote the individual in the household with higher labor income and with "secondary earner" we denote the individual in the household with lower labor income. When interpreting the figures it is important to keep in mind that along the x-axis individuals have partners with different income. Typically, individuals with higher income also have a partner with higher income. Moreover, in contrast to the remainder of the paper, the figures also include couples where only one partner has wage income. Hence, the panels for the primary earner include more households than the panels for the secondary earner. To ease the interpretation of the figures, we ignore all non-standard deductions.

Appendix H Calculation of Withholding Taxes

Our aim is to calculate the withholding tax as precisely as possible, because our treatment intensity is based on the withholding tax in 2009 and 2010. In Subsection H.1, we discuss how we calculate the withholding tax (*Lohnsteuer"*) in detail and in Subsection H.2 how we deal with other withheld taxes and social security contributions. In Subsection H.3, we compare the estimated withholding tax with the withholding tax observed in the data and show that overall we approximate the withholding tax liability well.

H.1 Details on the Calculation of Withholding Taxes

The goal of the German government when designing the withholding tax system was to match income tax payments as closely as possible. All standard deductions for the income tax are thus implemented for the withholding tax as well. For the calculation of withholding taxes, we follow the program flowchart (*Programmablaufplan*) published by the Federal Ministry of Finance. To ensure the correctness of the code we test our calculations against the officially published withholding tax tabulations for employers (*Prüftabelle Allgemeine Lohnsteuer* and *Prüftabelle besondere Lohnsteuer*). Also, together with the program flowchart, the ministry publishes random test cases. Our calculator also passes all of these. The calculation depends on various, not always obvious, input parameters that we discuss in this section.

H.1.1 Income and Withholding Tax Class

We observe every taxpayer's yearly income and withholding tax class.

H.1.2 Payments for Insurance

The contributions for insurance are partly deductible from the income tax and consequently they are also automatically deducted from the withholding tax.

Individuals fully insured in the public social security system. Contributions to the public pension, health and care insurance are partly deductible from the income tax. The exact same rules are applied to the automatic deduction from the withholding tax.

Additional contributions specific to the health insurance provider. Additional contributions specific to the health insurance provider (*Kassenindividuelle Zusatzbeiträge*) were introduced in 2010, but only from 2015 onwards they were taken into account for the calculation of withholding taxes.

Individuals without children. Individuals aged 23 and older without children pay an increased contribution rate to the public care insurance. We take that into account.

Saxony. In Saxony, the contribution rate to the public care insurance is higher than in the rest of Germany. We consider that.

Private health insurance. Conditional on specific characteristics (most importantly occupation, age and income) individuals have the possibility or obligation to opt out of the public health and care insurance system. Public and private health care insurance are slightly differently taken into account in the calculation of withholding taxes and women in the men-favoring schedule in the private health care insurance experienced a smaller cut in withholding taxes in 2010. Unfortunately, we cannot differentiate between privately and publicly insured individuals in the data and assume that everybody is publicly insured. So for this group we potentially underestimate the effect of withholding taxes, and we estimate a lower bound of the elasticity.

No contributions to public pension. Civil servants are excluded from the public pension system and typically hold private health insurance without contributing to the public health insurance. We exclude them from the analysis, as they are treated differently by the reform in 2010.

H.1.3 Proportional Tax Allowances for Elderly Retired Persons

As we only consider individuals in working age (between 20 and 60), we do not take into account the proportional tax allowances for elderly non-retired persons (*Altersentlastungsbeiträge*).

H.1.4 Variation of Income During the Year

The withholding tax is calculated by the employer every month and does not depend on the income of previous months. Consequently, if the income of an employee fluctuates between the months or a thirteenth or even fourteenth salary is paid out as christmas pay (*Weihnachtsgeld*) or holiday pay (*Urlaubsgeld*), the withholding tax liability is higher than in cases of stable income due to tax progressivity. For individuals with the symmetric withholding tax schedule, employers with more than 10 employees have to offset the difference between the withholding tax withheld during the year and the expected income tax of the individual under the assumption that the couple is not filing together (*Lohnsteuerjahresausgleich*). This rule is in place as couples who have chosen the symmetric withholding tax schedule do not have to file taxes (Hauck and Wallossek, 2024) and thereby get compensated if they were overwithheld due to income variation within

the year. For individuals in the men- or women-favoring tax schedule, employers are not allowed to offset the overwithheld amount during the year.

H.1.5 Non-Observable Factors

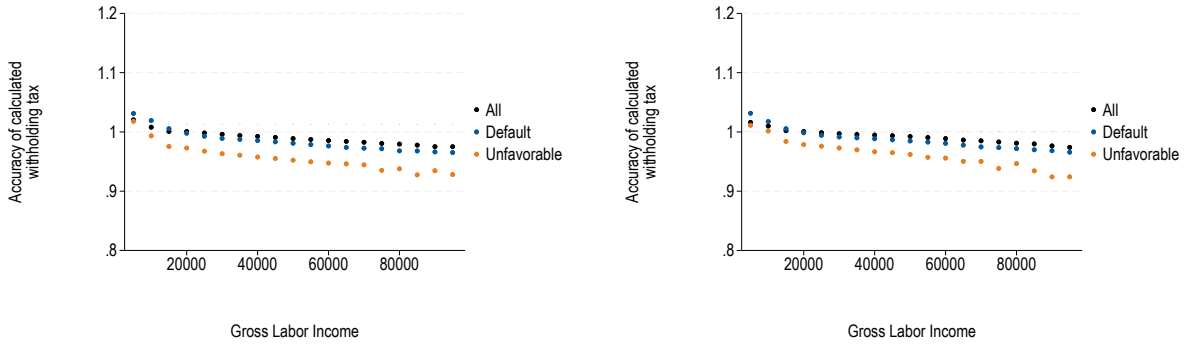
In case of additional income, in particular severance pay and death benefits (*Sterbegeld*), the withholding tax calculation differs. As these extraordinary sources of income are not separable from normal income in the tax data, we cannot implement the calculation. Individuals have under very special circumstances the possibility to decrease their withholding tax. First, the *Hinzurechungsbetrag* allows individuals with more than one job to minimize their withholding tax liability by pooling the withholding tax liability at one employer. Second, individuals who have regular deductions from taxes can request a deduction in the withholding tax (*Freibetrag*). This deduction typically applies to disabled people who have specific deductions from the income tax that they can also claim for the withholding tax. Unfortunately, in the data we do not observe any variables that are informative on whether individuals have filed a form to the financial authorities to use any of these tools to adapt their withholding tax.

H.2 Other Withheld Taxes and Social Security Contributions

Solidarity surcharge. The solidarity surcharge (*Solidaritätszuschlag*) is a surtax on the income tax that is subject to withholding. Different to the withholding tax, it also depends on the number of children. We calculate the solidarity surcharge and treat it as part of the withholding tax.

Church taxes. The German government collects income for the church. The church tax is a surtax on the income tax, typically between 8 % and 9 %. The church tax is collected as part of the withholding tax and also fully credited against the church tax liability when a household files income taxes. The church tax rate is a function of the religious denomination of the individual, the religious denomination of the spouse and the church parish the individual belongs to. As there is no comprehensive data set of church taxes, we approximate the withheld church tax empirically for each individual. For that, we divide for each individual and year the observed withheld church tax with the observed withholding tax and assume that the church tax rate from 2009 remains constant for the individual.

Social security contributions. In Germany, pensions, health care, and unemployment insurance are primarily financed by social security contributions which are a function of labor income. These social security contributions are withheld every month and credited against the final social



(a) 2009 (b) 2010

Figure H.1: Quality of Withholding Tax Estimation

Notes: The Figure displays the results of a regression of the calculated withholding tax on the actually withheld withholding tax for the women in our estimation sample. The assumptions to estimate the withholding tax are discussed in Section H.1 and H.2.

security contributions at the beginning of the next year. So they might be perceived as withholding taxes. However, we decided to exclude social security contributions from our definition of withholding taxes, because they are not taxes and are therefore not informative about the misconception of withholding taxes.

H.3 Quality of Withholding Tax Calculations

Figure H.1 displays the quality of the withholding tax calculation along the income distribution for 2009 and 2010 by regressing the calculated withholding tax on the actually withheld withholding tax for the women in our estimation sample. Along the whole income distribution, the overall estimate is close to 1. Deviations mostly likely come from the fact that we do not observe whether individuals contribute to the private or the public health insurance. Also, the withholding taxes are less precisely estimated for women in the unfavorable withholding tax class, probably because for them the employer does not offset the within-year fluctuation in the withholding tax at the end of the year (see Section H.1.4). But also for them, the estimate is always larger than 0.9.

Appendix I Survey Questions

This section documents the survey questions. Section I.1 includes the original questions in German. Depending on the answer to Question A1a, the gender of the interviewed, and A1b, the gender of the partner, the personal pronouns were adapted in all questions and explaining texts. Section I.2 provides a translation into English.

I.1 German Version

Guten Tag!

Wir sind Forscher an den Universitäten Bonn und Göteborg und bedanken uns schon jetzt herzlich für Ihre Teilnahme an unserer Umfrage und Ihre damit verbundene Unterstützung unserer Forschung! Ihre Antworten in der Umfrage haben keine Auswirkung auf Ihre persönliche Auszahlung. Wir möchten Sie deshalb darum bitten, alle Fragen ohne Hilfsmittel (Internetrecherche, etc.) zu beantworten.

Wer ist verantwortlich für die Studie?

Kontaktdaten

Welchen Zwecken dient die Studie?

Zweck der Studie ist die Untersuchung ökonomischen Verhaltens. Wie bei ökonomischen Studien üblich, erfolgt daher vorab keine umfassende Aufklärung über den Forschungshintergrund.

Was geschieht mit meinen Daten?

Alle beteiligten Mitarbeiter und Wissenschaftler arbeiten selbstverständlich nach den Vorschriften der DatenschutzGrundverordnung, dem Bundesdatenschutzgesetz und den einschlägigen Landesdatenschutzgesetzen. Die Daten werden auf einem Server der Universität Bonn innerhalb der EU gespeichert. Ihre Daten werden nach erfolgter Auszahlung anonymisiert und anschließend statistisch ausgewertet. Aus den Ergebnissen lassen sich anschließend keine Rückschlüsse auf Sie ziehen.

Welche Rechte habe ich?

Sie haben das Recht, Auskunft über die zu Ihrer Person gespeicherten Daten zu erhalten (Art. 15 DS-GVO). Sollten unrichtige personenbezogene Daten verarbeitet werden, steht Ihnen ein Recht auf Berichtigung zu (Art. 16 DS-GVO). Liegen die gesetzlichen Voraussetzungen vor, so können Sie die Löschung oder Einschränkung der Verarbeitung verlangen sowie Widerspruch gegen die Verarbeitung einlegen (Art. 17, 18 und 21 DS-GVO). Sie haben das Recht, sich mit einer Beschwerde an die zuständige Aufsichtsbehörde für Datenschutz zu wenden. Die hier erklärte Einwilligung können Sie jederzeit mit Wirkung für die Zukunft widerrufen. Sofern Ihre

Daten bereits anonymisiert wurden, können Ihnen diese aber nicht mehr zugeordnet werden. Wir können Ihre Angaben also nicht aus dem Ergebnis „herausrechnen“.

Einwilligungserklärung

Hiermit willige ich in die Verarbeitung meiner personenbezogenen Daten für das Forschungsvorhaben ein. Die Einwilligung kann ich jederzeit widerrufen. Ich habe die Hinweise zur Verwendung meiner Daten und zu meinen Rechten in der Datenschutzerklärung zur Kenntnis genommen.

Ich bin einverstanden. (Ja, Nein)

Page Break

Screening

S1 Haben Sie momentan Einkommen aus Lohnarbeit? (Ja, Nein)

S2 Sind Sie verheiratet? (Ja, Nein)

Page Break

A1a Was ist Ihr Geschlecht? (Weiblich, Männlich, Divers)

A1b Was ist das Geschlecht Ihres Ehepartners/Ihrer Ehepartnerin? (Weiblich, Männlich, Divers, Ich habe keinen Ehepartner/keine Ehepartnerin, Keine Angabe)

Page Break

A2 Die nächste Frage betrifft folgendes Problem: In Umfragen wie unserer gibt es manchmal Teilnehmerinnen und Teilnehmer, die die Fragestellungen nicht sorgfältig durchlesen, sondern sich nur schnell durch die Umfrage klicken. Dies führt zu vielen zufälligen Antworten, die die Qualität der Forschungsvorhaben beeinträchtigen. Bitte wählen Sie "Sehr stark interessiert" und "Überhaupt nicht interessiert" als Ihre Antwort auf die kommende Frage, um uns zu zeigen, dass Sie unsere Fragen sorgfältig lesen. Gegeben dieser Information, wie interessiert sind Sie am Thema Steuern?

(Überhaupt nicht interessiert, Fast gar nicht interessiert, Etwas interessiert, Stark interessiert, Sehr stark interessiert)

Page Break

A3 Stellen Sie sich vor, dass Ihr Arbeitgeber Ihnen eine freie Wahl Ihrer wöchentlichen Arbeitsstunden anbietet: Wie würden Sie sich entscheiden? (Ich würde meine Arbeitsstunden erhöhen, Ich würde meine Arbeitsstunden verringern, Ich würde meine Arbeitsstunden unverändert lassen, Weiß nicht)

Page Break

D4 Was ist Ihre momentane Lohnsteuerklasse? (1, 2, 3, 4, 4 mit Faktor, 5, 6, Weiß nicht)

D5 Wer hat über die Steuerklasse entschieden? (Ich, Mein Ehepartner, Mein Ehepartner und ich zusammen, Ein Steuerberater/Eine Steuerberaterin, Eine andere Person, Niemand, Weiß nicht)

Page Break

D_Text Wir wollen nun mehr über Ihr generelles Verständnis der Steuerklassen herausfinden, es geht also in den folgenden Fragen nicht um Ihre eigene Steuerklasse.

Page Break

D6 Existieren die folgenden Steuerklassenkombinationen (Ihr Ehepartner erstgenannt, Sie zweitgenannt)? (Ja, Nein, Weiß nicht)

(4/4, 5/4 , 3/5 , 5/5 , 4/1 , 3/3 , 4/5 , 5/3 , 1/4)

Wenn D4 == "4 mit Faktor":

(4/4, 5/4 , 3/5 , 5/5 , 4/1 , 3/3 , 4/5 , 5/3 , 1/4, 4 mit Faktor/3, 4 mit Faktor/4 mit Faktor, 3/4 mit Faktor, 5/4 mit Faktor, 4 mit Faktor/5)

Page Break

D7 Stellen Sie sich vor, dass Sie 60.000 € und Ihr Ehepartner 30.000 € brutto pro Jahr verdienen und dass Sie eine gemeinsame Steuererklärung machen. Bei welcher Steuerklassenkombination tragen Sie als Paar zusammen die geringste jährliche finale Steuerlast (entspricht der Einkommensteuer)? Alle drei genannten Steuerklassenkombinationen existieren.

(Ich in Steuerklasse 5 und mein Partner in Steuerklasse 3, Ich in Steuerklasse 4 und mein Partner in Steuerklasse 4, Ich in Steuerklasse 3 und mein Partner in Steuerklasse 5, Egal, Weiß nicht)

Page Break

D8 Nehmen Sie nun an, Sie wären in Steuerklasse 4. Was stimmt? Wenn Sie nun von 4 in 3 wechseln, dann bekommen Sie persönlich monatlich...

(...mehr netto von Ihrem Arbeitgeber, ...weniger netto von Ihrem Arbeitgeber, ...gleich viel netto von Ihrem Arbeitgeber, Weiß nicht)

Page Break

D9 Nehmen Sie nun an, Sie wären in Steuerklasse 4. Was stimmt? Wenn Sie nun von 4 in 5 wechseln, dann bekommen Sie persönlich monatlich...

(...mehr netto von Ihrem Arbeitgeber, ...weniger netto von Ihrem Arbeitgeber, ...gleich viel netto von Ihrem Arbeitgeber, Weiß nicht)

Page Break

D10 Bitte nehmen Sie sich ausreichend Zeit, um die folgende Information zu verstehen. In der Tabelle sehen Sie beispielhaft die Lohnsteuer abhängig von den Steuerklassen für ein Paar, bei dem beide Partner brutto 3500 € monatlich verdienen.

	Monatliche Lohnsteuer Partner A	Monatliche Lohnsteuer Partner B
Partner A in Steuerklasse 3 Partner B in Steuerklasse 5	350 €	1 000 €
Partner A in Steuerklasse 4 Partner B in Steuerklasse 4	700 €	700 €
Partner A in Steuerklasse 5 Partner B in Steuerklasse 3	1 000 €	350 €

Sie können sehen, dass die Wahl der Steuerklassen die zu zahlende Lohnsteuer stark beeinflusst. Sind beide Partner in der Steuerklasse 4, so zahlen beide Partner jeweils 700 € Lohnsteuern. Ist ein Partner stattdessen in Steuerklasse 3, so zahlt sie/er 350 € Lohnsteuern. In Steuerklasse 5 werden 1000 € Lohnsteuern fällig. Wie Sie sehen: Ihre individuell gezahlte Lohnsteuer hängt stark von der gewählten Steuerklasse ab. Aber auch die Lohnsteuer Ihres Partners wird stark durch die Steuerklassenwahl beeinflusst. Waren Ihnen die folgenden Informationen schon bekannt? Bitte antworten Sie ehrlich. Denken Sie daran, dass Ihre Auszahlung in dieser Umfrage nicht von Ihren Antworten auf die Fragen abhängt. (Ja, Nein, Ich verstehe die Aussage nicht)

(Ich wusste, dass die Wahl der Steuerklasse die eigene Lohnsteuer beeinflusst, Ich wusste, dass die Wahl der Steuerklasse die Lohnsteuer meines Partners beeinflusst, Ich wusste, dass es Steuerklassenkombinationen gibt, bei der einer der beiden Partner deutlich mehr und der andere Partner deutlich weniger Lohnsteuern zahlt – selbst wenn beide Partner gleich viel verdienen)

Page Break

D11 Bitte nehmen Sie sich ausreichend Zeit, um auch die folgende Information zu verstehen. Die finale Steuerlast eines Paares wird durch die Einkommensteuer bestimmt. In der Tabelle können Sie sehen, dass Steuerklassen keine Auswirkungen auf die Einkommensteuer, und somit auf die finale Steuerlast eines Ehepaares, haben. Nur die Lohnsteuer wird durch die Steuerklassenwahl beeinflusst:

	Monatliche Lohnsteuer Partner A	Monatliche Lohnsteuer Partner B	Gemeinsame jährliche Einkommensteuerlast
Partner A in Steuerklasse 3 Partner B in Steuerklasse 5	350 €	1 000 €	16 300 €
Partner A in Steuerklasse 4 Partner B in Steuerklasse 4	700 €	700 €	16 300 €
Partner A in Steuerklasse 5 Partner B in Steuerklasse 3	1 000 €	350 €	16 300 €

Die monatlich von Ihnen als Paar gezahlte Lohnsteuer wird am Jahresende mit der Einkommensteuer verrechnet. Wenn also Ihre gezahlte Lohnsteuer höher ist als die zu zahlende Einkom-

mensteuer, bekommen Sie am Jahresende eine Steuerrückzahlung. Und, andersherum, wenn Sie mehr Einkommensteuer zahlen müssen als Sie Lohnsteuer gezahlt haben, müssen Sie eine Steuernachzahlung leisten. Für das Paar in dem Beispiel bedeutet dies, dass es unabhängig von der gewählten Steuerklasse jährlich immer 16 300 € Einkommensteuern zahlt. Steuerklassen haben also keine Auswirkungen auf die finale Steuerlast eines Ehepaares, sondern nur auf die Lohnsteuer. Waren Ihnen die folgenden Informationen schon bekannt? Bitte antworten Sie ehrlich. Denken Sie daran, dass Ihre Auszahlung in dieser Umfrage nicht von Ihren Antworten auf die Fragen abhängt. (Ja, Nein, Ich verstehe die Aussage nicht)

(Ich wusste, dass die gezahlte Lohnsteuer nicht die finale Steuerlast beeinflusst, Ich wusste, dass die Steuerklassenwahl nicht die finale Steuerlast beeinflusst)

Page Break

D12 Stellen Sie sich vor, dass Sie 40.000 € und Ihr Ehepartner 70.000 € brutto pro Jahr verdienen und dass Sie eine gemeinsame Steuererklärung machen. Bei welcher Steuerklassenkombination tragen Sie als Paar zusammen die geringste jährliche finale Steuerlast (entspricht der Einkommensteuer)? Alle drei genannten Steuerklassenkombinationen existieren.

(Ich in Steuerklasse 5 und mein Partner in Steuerklasse 3, Ich in Steuerklasse 4 und mein Partner in Steuerklasse 4, Ich in Steuerklasse 3 und mein Partner in Steuerklasse 5, Egal, Weiß nicht)

Page Break

D13a Steuerklassen haben also keine Auswirkungen auf die finale Steuerlast eines Ehepaares, nur auf die Lohnsteuer. Stellen Sie sich mit diesem Wissen nun vor, dass Ihr Arbeitgeber Ihnen eine freie Wahl Ihrer wöchentlichen Arbeitsstunden anbietet: Wie würden Sie sich entscheiden?

(Ich würde meine Arbeitsstunden erhöhen, Ich würde meine Arbeitsstunden verringern, Ich würde meine Arbeitsstunden unverändert lassen, Weiß nicht)

D13b Steuerklassen haben keine Auswirkungen auf die finale Steuerlast eines Ehepaares, nur auf die Lohnsteuer. Stellen Sie sich mit diesem Wissen nun vor, dass Ihr Arbeitgeber Ihnen in der Vergangenheit eine freie Wahl Ihrer wöchentlichen Arbeitsstunden angeboten hätte. Wie hätten Sie sich entschieden?

(Ich hätte meine Arbeitsstunden erhöht, Ich hätte meine Arbeitsstunden verringert, Ich hätte meine Arbeitsstunden unverändert gelassen, Weiß nicht)

D13c Steuerklassen haben keine Auswirkungen auf die finale Steuerlast eines Ehepaares, nur auf die Lohnsteuer. Wie wirkt sich dieses Wissen auf Ihre bevorzugte Steuerklassenwahl aus?

(Ich würde meine Steuerklasse gerne ändern, Ich würde meine Steuerklasse gerne beibehalten, Weiß nicht)

D14 Beeinflussen Steuerklassen folgende staatliche Leistungen? (Ja, Nein, Weiß nicht)

(Rente, Arbeitslosengeld II/Hartz IV, Arbeitslosengeld I, Elterngeld, Wohngeld, Kurzarbeitergeld)

Page Break

D15 Die nächste Frage betrifft folgendes Problem: In Umfragen wie unserer gibt es manchmal Teilnehmerinnen und Teilnehmer, die die Fragestellungen nicht sorgfältig durchlesen, sondern sich nur schnell durch die Umfrage klicken. Dies führt zu vielen zufälligen Antworten, die die Qualität der Forschungsvorhaben beeinträchtigen. Bitte wählen Sie "Fast gar nicht interessiert" und "Stark interessiert" als Ihre Antwort auf die kommende Frage, um uns zu zeigen, dass Sie unsere Fragen sorgfältig lesen. Gegeben dieser Information, wie interessiert sind Sie am Thema Steuern?

(Überhaupt nicht interessiert, Fast gar nicht interessiert, Etwas interessiert, Stark interessiert, Sehr stark interessiert)

Page Break

D16a Haben Sie als Ehepaar ein gemeinsames Bankkonto? (Ja, Nein, Weiß nicht)

D16b Wohin überweist Ihr Arbeitgeber Ihren monatlichen Lohn? (Auf mein persönliches Bankkonto, Auf das Bankkonto meines Ehepartners, Auf ein Bankkonto, das ich mit meinem Ehepartner teile, Weiß nicht)

D16c Wohin überweist der Arbeitgeber Ihres Ehepartners den monatlichen Lohn? (Auf mein persönliches Bankkonto, Auf das Bankkonto meines Ehepartners, Auf ein Bankkonto, das ich mit meinem Ehepartner teile, Mein Ehepartner ist selbstständig oder arbeitet nicht, Weiß nicht)

Page Break

If D16a == Ja And D16b == Auf mein persönliches Bankkonto

D16d Wie viel Prozent Ihres monatlich von Ihrem Arbeitgeber überwiesenen Lohneinkommens transferieren Sie auf das gemeinsame Konto? (0 % - 20 %, 20 % - 40 %, 40 % - 60 %, 60 % - 80 %, 80 % - 100 %, Weiß nicht)

If D16a == Ja And D16b == Auf das Bankkonto meines Ehepartners

D16e Wie viel Prozent seines monatlich von seinem Arbeitgeber überwiesenen Lohneinkommens transferiert Ihr Ehepartner auf das gemeinsame Konto? (0 % - 20 %, 20 % - 40 %, 40 % - 60 %, 60 % - 80 %, 80 % - 100 %, Weiß nicht)

If D16a == Ja

D16f Haben Sie noch besondere Absprachen für Ihr gemeinsames Konto getroffen? Falls ja, erklären Sie bitte noch genauer, wie Sie Ihr gemeinsames Konto verwalten. Falls Sie keine besonderen Absprachen getroffen haben, lassen Sie das Freifeld gerne einfach frei.

Page Break

D17a Geben Sie und Ihr Partner üblicherweise eine Steuererklärung ab? (Ja. Mein Partner und ich veranlagen gemeinsam, Ja. Mein Partner und ich veranlagen getrennt, Ja. Aber ich weiß nicht, ob wir getrennt oder gemeinsam veranlagen, Nein, Weiß nicht)

Page Break

If D17a == Ja:

D17b Wie machen Sie und Ihr Partner üblicherweise Ihre Steuererklärung? Mehrere Ja-Antworten sind möglich. (Ja, Nein, Weiß nicht)

(Ich mache die Steuererklärung überwiegend alleine, Mein Ehepartner macht die Steuererklärung überwiegend alleine, Wir machen die Steuererklärung gemeinsam, Wir nutzen die Hilfe einer Steuerberaterin/eines Steuerberaters, Wir nutzen die Hilfe eines Steuerprogramms wie etwa WISO, Wir nutzen die Hilfe anderer Personen)

Page Break

If D17a == Ja:

D17c Auf welches Bankkonto werden potentielle Steuererstattungen überwiesen? (Mein Konto, Das Konto meines Ehepartners, Ein gemeinsames Konto, Weiß nicht)

Page Break

If D17a == Nein

D17d Warum geben Sie keine Steuererklärung ab? Mehrere Ja-Antworten sind möglich. (Ja, Nein) (Es ist mir zu viel Arbeit, Ich weiß nicht, wie man das macht, Es lohnt sich für mich kaum, Ich habe Angst, dass ich Steuern nachzahlen muss)

Page Break

D18 Auf einer Skala von 1 bis 7, wie sehr stimmen Sie den folgenden Aussagen zu? 7 bedeutet, dass Sie der entsprechenden Aussage voll zustimmen. 1 bedeutet, dass Sie der entsprechenden Aussage überhaupt nicht zustimmen. (1 Stimme überhaupt nicht zu, 2, 3, 4, 5, 6, 7 Stimme voll zu)

(Der Ehemann sollte zu Hause das letzte Wort haben., Am besten ist es, wenn der Ehemann und die Ehefrau beide gleich viel erwerbstätig sind und sich beide in gleichem Maße um Haushalt und Familie kümmern., Männer sollten sich stärker um die finanzielle Absicherung der Familie kümmern als Frauen.)

Page Break

D19 Wie alt sind Sie? (Jünger als 20, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-60, 61 oder älter)

D20 Was ist Ihr höchster schulischer/akademischer Bildungsabschluss? (Ohne allgemeinen Schulabschluss, Hauptschulabschluss, Mittlere Reife, Fachhochschul- oder Hochschulreife (Abitur), Bachelor, Master/Diplom/Staatsexamen, Promotion)

D21 Haben Sie mindestens ein minderjähriges Kind? (Ja, Nein, Keine Angabe)

Page Break

D22 Haben Sie häufiger das Gefühl, dass das Geld vor der Überweisung des nächsten Gehalts knapp wird? (Ja, Nein, Diese Frage möchte ich nicht beantworten)

Page Break

D23 Wie hoch ist Ihr Bruttoeinkommen aus Lohnarbeit pro Jahr? Für die Beantwortung dieser Frage können Sie gerne in Ihren Unterlagen nachschauen.

(Ich habe kein Lohneinkommen, 1 € - 10.000 €, 10.001 € - 20.000 €, 20.001 € - 30.000 €, 30.001 € - 40.000 €, 40.001 € - 50.000 €, 50.001 € - 60.000 €, 60.001 € - 70.000 €, 70.001 € - 80.000 €, 80.001 € - 90.000 €, 90.001 € - 100.000 €, 100.001 € - 110.000 €, 110.001 € - 120.000 €, Über 120.000 €, Weiß nicht / Keine Angabe)

D24a Wie hoch ist das Bruttoeinkommen Ihres Ehepartners aus Lohnarbeit pro Jahr? Für die Beantwortung dieser Frage können Sie gerne in Ihren Unterlagen nachschauen oder Ihren Ehepartner fragen.

(Mein Ehepartner arbeitet nicht, Mein Ehepartner ist selbstständig, 1 € - 10.000 €, 10.001 € - 20.000 €, 20.001 € - 30.000 €, 30.001 € - 40.000 €, 40.001 € - 50.000 €, 50.001 € - 60.000 €, 60.001 € - 70.000 €, 70.001 € - 80.000 €, 80.001 € - 90.000 €, 90.001 € - 100.000 €, 100.001 € - 110.000 €, 110.001 € - 120.000 €, Über 120.000 €, Weiß nicht / Keine Angabe)

If D24a == Mein Ehepartner ist selbstständig

D24b Wie viel verdient Ihr Ehepartner in selbstständiger Arbeit pro Jahr brutto? Für die Beantwortung dieser Frage können Sie gerne in Ihren Unterlagen nachschauen oder Ihren Ehepartner fragen.

(1 € - 10.000 €, 10.001 € - 20.000 €, 20.001 € - 30.000 €, 30.001 € - 40.000 €, 40.001 € - 50.000 €, 50.001 € - 60.000 €, 60.001 € - 70.000 €, 70.001 € - 80.000 €, 80.001 € - 90.000 €, 90.001 € - 100.000 €, 100.001 € - 110.000 €, 110.001 € - 120.000 €, Über 120.000 €, Weiß nicht / Keine Angabe)

Page Break

D25 Wie hoch ist Ihre durchschnittliche wöchentliche Arbeitszeit in Stunden?

D26 Wie hoch ist die durchschnittliche wöchentliche Arbeitszeit Ihres Ehepartners in Stunden?

Page Break

A27 Haben Sie irgendwelche Anmerkungen zur Umfrage oder zu dem Thema Lohnsteuerklassen?

I.2 English Version

Hello and welcome!

We are researchers at the Universities of Bonn and Gothenburg and would like to thank you in advance for taking part in our survey and for thereby supporting our research! Your responses to the survey will not affect your personal payout. We would therefore like to ask you to answer all questions without using any tools (internet research, etc.).

Who is responsible for the study?

Contact details

What is the purpose of the study?

The purpose of the study is to examine economic behavior. As is usual with economic studies, there is no comprehensive explanation of the research background beforehand.

What happens to my data?

Of course, all employees and scientists involved work in accordance with the provisions of the General Data Protection Regulation, the Federal Data Protection Act and the relevant state data protection laws. The data is stored on a server of the University of Bonn within the EU. Your data will be anonymized after the payment has been made and then statistically evaluated. No conclusions can be drawn about you from the results.

What rights do I have?

You have the right to receive information about the data stored about you (Art. 15 DS-GVO). If incorrect personal data is processed, you have the right to rectification (Art. 16 DS-GVO). If the legal requirements are met, you can request the deletion or restriction of processing and object to the processing (Art. 17, 18 and 21 DS-GVO). You have the right to lodge a complaint with the competent supervisory authority for data protection. You can revoke the consent given here at any time with effect for the future. However, if your data has already been anonymized, it can no longer be assigned to you. We can therefore not “remove" your information from the result.

Declaration of consent

I hereby consent to the processing of my personal data for the research project. I can revoke my consent at any time. I have taken note of the information on the use of my data and my rights in the data protection declaration.

I agree. (Yes, No)

Page break

Screening

S1 Do you currently have wage income? (Yes, No)

S2 Are you married? (Yes, No)

Page break

A1a What is your gender? (Female, Male, Diverse)

A1b What is the gender of your spouse? (Female, Male, Diverse, I have no spouse, No answer)

Page break

A2 The next question concerns the following problem: In surveys like ours, there are sometimes participants who do not read the questions carefully, but just click through the survey quickly. This leads to a lot of random answers, which affects the quality of the research projects. Please choose "Very interested" and "Not at all interested" as your answer to the upcoming question to show us that you are reading our questions carefully. Given this information, how interested are you in taxes?

(Not at all interested, Slightly interested, Somewhat interested, Interested, Very interested)

Page break

A3 Imagine that your employer offered you a free choice of your weekly working hours: How would you decide? (I would increase my hours, I would decrease my hours, I would keep my hours the same, Don't know)

Page break

D4 What is your current withholding tax class? (1, 2, 3, 4, 4 with factor, 5, 6, Don't know)

D5 Who decided on the withholding tax class? (Me, My Spouse, My Spouse and I Together, An Accountant, Another Person, Nobody, Don't Know)

Page break

E_Text We now want to find out more about your general understanding of withholding tax classes, so the following questions are not about your own withholding tax class.

Page break

D6 Do the following withholding tax class combinations exist (your spouse named first, you named second)? (Yes, No, Don't know)

(4/4, 5/4, 3/5, 5/5, 4/1, 3/3, 4/5, 5/3, 1/4)

If D4 == "4 with factor":

(4/4, 5/4 , 3/5 , 5/5 , 4/1 , 3/3 , 4/5 , 5/3 , 1/4, 4 with factor/3, 4 with factor/4 with factor , 3/4 with factor, 5/4 with factor, 4 with factor/5)

Page break

D7 Imagine that you earn €60,000 and your spouse €30,000 gross per year and that you file a joint tax return. In which withholding tax class combination do you as a couple have the lowest final annual tax liability (corresponds to income tax)? All three withholding tax class combinations mentioned exist.

(I in withholding tax class 5 and my partner in withholding tax class 3, I in withholding tax class 4 and my partner in withholding tax class 4, I in withholding tax class 3 and my partner in withholding tax class 5, Doesn't matter, Don't know)

Page break

D8 Now suppose you were in withholding tax class 4. Which is correct? If you now switch from 4 to 3, you will personally receive monthly...

(...more net from your employer, ...less net from your employer, ...same amount net from your employer, don't know)

Page break

D9 Now suppose you were in withholding tax class 4. Which is correct? If you now switch from 4 to 5, you will personally receive monthly...

(...more net from your employer, ...less net from your employer, ...same amount net from your employer, don't know)

Page break

D10 Please take enough time to understand the following information. The table shows an example of the withholding tax depending on the withholding tax classes for a couple where both partners earn a gross monthly income of €3,500.

	Monthly Withholding Tax Partner A	Monthly Withholding Tax Partner B
Partner A in Tax Class 3 Partner B in Tax Class 5	350 €	1 000 €
Partner A in Tax Class 4 Partner B in Tax Class 4	700 €	700 €
Partner A in Tax Class 5 Partner B in Tax Class 3	1 000 €	350 €

You can see that the choice of withholding tax class greatly affects the withholding tax you pay. If both partners are in withholding tax class 4, both partners each pay €700 in withholding tax. If a partner is in withholding tax class 3 instead, she/he pays €350 in withholding tax. In withholding tax class 5, €1,000 in withholding tax is due. As you can see, the withholding tax you pay depends heavily on the withholding tax class you choose. But your partner's withholding tax is also strongly influenced by the choice of withholding tax class. Did you already know the following information? Please answer honestly. Remember that your payout in this survey is not dependent on your answers to the questions. (Yes, No, I don't understand the statement)

(I knew that the choice of withholding tax class affects my own withholding tax, I knew that the choice of withholding tax class influences my partner's withholding tax, I knew that there are withholding tax class combinations where one of the two partners pays significantly more and the other partner significantly less pays withholding taxes – even if both partners earn the same amount)

Page break

D11 Please take enough time to understand the following information. The final tax liability of a couple is determined by the income tax. In the table you can see that withholding tax classes have no effect on the income tax and therefore on the final tax liability of a married couple. Only the withholding tax is affected by the withholding tax class selection:

	Monthly Withholding Tax Partner A	Monthly Withholding Tax Partner B	Joint Annual Income Tax Liability
Partner A in Tax Class 3 Partner B in Tax Class 5	350 €	1 000 €	**16 300 €**
Partner A in Tax Class 4 Partner B in Tax Class 4	700 €	700 €	**16 300 €**
Partner A in Tax Class 5 Partner B in Tax Class 3	1 000 €	350 €	**16 300 €**

The withholding tax you pay monthly as a couple is offset against the income tax at the end of the year. So if your paid withholding tax is higher than the income tax to be paid, you will receive a tax refund at the end of the year. And, vice versa, if you have to pay more income tax than you paid withholding tax, you have to make an additional tax payment. For the couple in the example, this means that they always pay €16,300 in income tax annually, regardless of the withholding tax class they choose. Withholding tax classes therefore have no effect on the final tax liability of a married couple, but only on the withholding tax. Did you already know the following information? Please answer honestly. Remember that your payout in this survey is not dependent on your answers to the questions. (Yes, No, I don't understand the statement)

(I knew that the withholding tax paid does not affect the final tax liability, I knew that the choice of withholding tax classes does not affect the final tax liability)

Page break

D12 Imagine that you earn €40,000 and your spouse €70,000 gross per year and that you file a joint tax return. In which withholding tax class combination do you as a couple have the lowest final annual tax liability (corresponds to income tax)? All three withholding tax class combinations mentioned exist.

(I in withholding tax class 5 and my partner in withholding tax class 3, I in withholding tax class 4 and my partner in withholding tax class 4, I in withholding tax class 3 and my partner in withholding tax class 5, Doesn't matter, Don't know)

Page break

D13a Withholding tax classes therefore have no effect on the final tax liability of a married couple, only on the withholding tax. Now, knowing this, imagine that your employer offered you a free choice of your weekly working hours: How would you decide?

(I would increase my hours, I would decrease my hours, I would keep my hours the same, Don't know)

D13b Withholding tax classes have no effect on the final tax liability of a married couple, only on the withholding tax. Now, knowing this, imagine that in the past your employer would have offered you a free choice of your weekly work hours. How would you have decided?

(I would have increased my hours, I would have decreased my hours, I would have left my hours unchanged, Don't know)

D13c Withholding tax classes have no effect on a married couple's final tax liability, only on the withholding tax. How does this knowledge affect your preferred withholding tax class choice?

(I would like to change my withholding tax class, I would like to keep my withholding tax class, Don't know)

D14 Do withholding tax classes affect the following government benefits? (Yes, No, Don't know)

(Pension, unemployment benefit II/Hartz IV, unemployment benefit I, parental benefit, housing benefit, short-time work benefit)

Page break

D15 The next question concerns the following problem: In surveys like ours, there are sometimes participants who do not read the questions carefully, but just click through the survey quickly. This leads to a lot of random answers, which affects the quality of the research projects. Please choose "Slightly interested" and "Very interested" as your answer to the next question to show us that you are reading our questions carefully. Given this information, how interested are you in taxes?

(Not at all interested, Slightly interested, Somewhat interested, Interested, Very interested)

Page break

D16a As a married couple, do you have a joint bank account? (yes, no, don't know)

D16b Where does your employer transfer your monthly wages to? (To my personal bank account, To my spouse's bank account, To a bank account I share with my spouse, Don't know)

D16c Where does your spouse's employer transfer the monthly salary to? (To my personal bank account, To my spouse's bank account, To a bank account I share with my spouse, My spouse is self-employed or does not work, Don't know)

Page break

If D16a == Yes And D16b == To my personal bank account

D16d What percentage of your monthly wage income transferred from your employer do you transfer to the joint account? (0% - 20%, 20% - 40%, 40% - 60%, 60% - 80%, 80% - 100%, Don't know)

If D16a == Yes And D16b == To my spouse's bank account

D16e What percentage of his/her monthly wages transferred from his/her employer does your spouse transfer to the joint account? (0% - 20%, 20% - 40%, 40% - 60%, 60% - 80%, 80% - 100%, Don't know)

If D16a == Yes

D16f Have you made any special arrangements for your joint account? If so, please explain in more detail how you manage your joint account. If you have not made any special arrangements, please feel free to leave the free field empty.

Page break

D17a Do you and your partner usually file a tax return? (Yes. My partner and I file taxes jointly, Yes. My partner and I file taxes separately, Yes. But I don't know if we file our taxes separately or jointly, No, Don't know)

Page break

If D17a == Yes:

D17b How do you and your partner usually file your tax return? Several yes answers are possible. (yes, no, don't know)

(I mostly file the tax return alone, my spouse mostly files the tax return alone, we file the tax return together, we use the help of a tax consultant, we use the help of a tax program such as WISO, we use the help of other people)

Page break

If D17a == Yes:

D17c To which bank account are potential tax refunds transferred? (My Account, My Spouse's Account, A Joint Account, Don't Know)

Page break

If D17a == No

D17d Why don't you file a tax return? Several yes answers are possible. (Yes, No) (It's too much work for me, I don't know how to do it, It's hardly worth it for me, I'm afraid I'll have to pay more taxes)

Page break

D18 On a scale from 1 to 7, how much do you agree with the following statements? 7 means that you fully agree with the corresponding statement. 1 means that you completely disagree with the corresponding statement. (1 Strongly Disagree, 2, 3, 4, 5, 6, 7 Strongly Agree)

(The husband should have the last word at home., It is best if the husband and wife both work an equal amount and both take care of the household and family equally., Men should take more care of the financial security of the family than women.)

Page break

D19 How old are you? (Under 20, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-60, 61 or older)

D20 What is your highest school/academic qualification? (Without general school leaving certificate, secondary school leaving certificate, higher secondary school leaving certificate or higher education entrance qualification (Abitur), bachelor, master/diploma/state examination, doctorate)

D21 Do you have at least one minor child? (Yes, No, Not specified)

Page break

D22 Do you often have the feeling that money is running out before you receive your next salary? (Yes, No, I don't want to answer this question)

Page break

D23 What is your gross income from wage labor per year? You are welcome to consult your documents to answer this question.

(I have no wage income, €1 - €10,000, €10,001 - €20,000, €20,001 - €30,000, €30,001 - €40,000, €40,001 - €50,000, €50,001 - €60,000, €60,001 - €70,000, - €80,000, €80,001 - €90,000, €90,001 - €100,000, €100,001 - €110,000, €110,001 - €120,000, over €120,000, don't know / no answer)

D24a What is your spouse's gross income from wage labor per year? To answer this question, you are welcome to consult your records or ask your spouse.

(My spouse does not work, My spouse is self-employed, €1 - €10,000, €10,001 - €20,000, €20,001 - €30,000, €30,001 - €40,000, €40,001 - €50,000, €50,001 - €60,000, €60,001 - €70,000, €70,001 - €80,000, €80,001 - €90,000, €90,001 - €100,000, €100,001 - €110,000, €110,001 - €120,000, over €120,000, don't know / no answer)

If D24a == My spouse is self-employed

D24b How much does your spouse earn gross per year in self-employment? To answer this question, you are welcome to consult your records or ask your spouse.

(€1 - €10,000, €10,001 - €20,000, €20,001 - €30,000, €30,001 - €40,000, €40,001 - €50,000, €50,001 - €60,000, €60,001 - €70,000, €70,001 - €70,001.1 € - 90,000 €, €90,001 - €100,000, €100,001 - €110,000, €110,001 - €120,000, Over €120,000, Don't know / no answer)

Page break

D25 What are your average weekly working hours?

D26 What are the average weekly working hours of your spouse?

Page break

D27 Do you have any comments on the survey or on the subject of withholding tax classes?