Withheld from Working More?

Withholding Taxes and the Labor Supply of Married Women

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Abstract

The impact of withholding taxes on labor supply has so far been neglected in the analysis of the optimal design of income taxation systems. We investigate their importance in the context of married couples in Germany. In a first step, we document with the help of a survey that less than 20 % of the interviewed married individuals understand that withholding taxes are tax prepayments which are fully credited against the final income tax and, therefore, do not determine the income tax burden. Making use of a reform that decreased the withholding tax burden for some married women more than for others, while inducing no differences in income taxes, allows us to then estimate the elasticity of labor income with respect to the withholding tax. In line with our survey findings, we show that women adjust their labor supply following a change in withholding taxes. Importantly, the German institutional setting allows couples to partially redistribute the withholding tax burden from one partner to the other, and the majority shifts parts of the withholding tax burden from the husband to the wife. Our results suggest that the increased withholding tax burden of married women in Germany contributes to their low labor supply. The finding also highlights that governments should be aware that overwithholding results in an overestimation of the actual income tax and thus distorts labor supply incentives.

JEL Classification: H21, H31, J16, J20, K34

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

1 Introduction

Most countries use third-party withholding to collect income taxes during the year. Typically, employers withhold monthly prepayments to income taxes which are then fully credited against the final income tax liabilities of their employees. This provides governments with a constant income stream during the year and increases tax compliance (Bagchi and Dušek, 2021; Schepanski and Shearer, 1995; Slemrod, 2019). However, withholding tax rates do not necessarily reflect true effective income tax rates. Often, there is overwithholding as many taxpayers pay higher withholding taxes than actual income taxes (Engström et al., 2015; Gelman et al., 2022; Hauck and Wallossek, 2023; Rees-Jones, 2018). In this case, a lump-sum tax refund is paid to employees by the government after the end of the tax year. Conversely, in the case of underwithholding, employees must make an additional lump-sum tax payment to the government. This interlinkage between withholding taxes and income taxes makes it more complex to understand the taxation of labor income. We show that, as a result, the design of withholding taxes and especially the existence of overwithholding can distort labor supply.

It is difficult to separately identify the effects of withholding taxes, as they are typically a function of the income tax. Therefore, it is usually not possible to use reforms of the income tax system to draw conclusions regarding the role of withholding taxes. However, the German income tax system offers an institutional setting that allows investigating the effects of a reform of withholding taxes on labor supply. 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 subject to, on average, higher withholding tax rates than married men. This is a result of the German withholding tax system that allows couples to shift parts of the withholding tax liability from one partner to the other by choosing certain withholding tax classes (*"Lohnsteuerklassen"*). As a consequence of the choice of withholding tax classes, couples with identical income profiles can be subject to different withholding tax rates. Importantly, the decision on withholding tax classes does not affect the final income 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

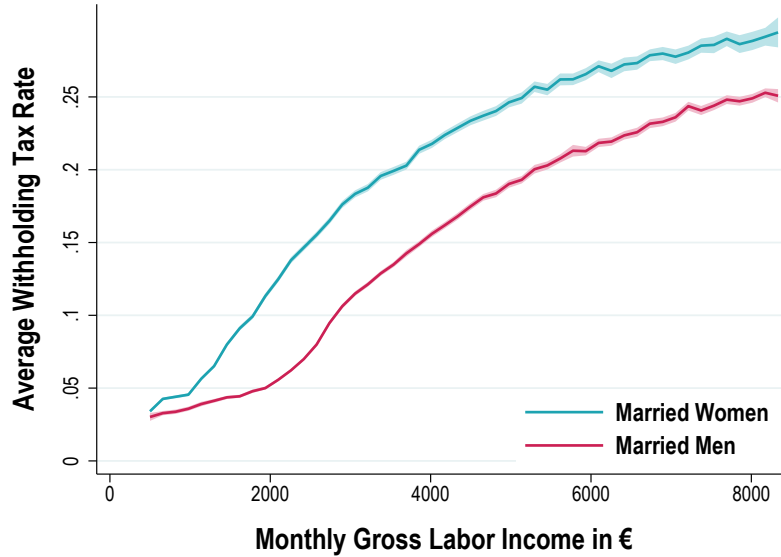secondary wage earner and hence face, on average, a higher withholding tax rate conditional on labor income.

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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 for annual labor income levels of up to 100,000 €. Calculations are based on a 10 % sample of income tax returns in 2010. The figure illustrates that through the choice of withholding tax classes (*"Lohnsteuerklassen"*), married couples shift a substantial share of the withholding tax liability from men to women (RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2010).

Given a fixed income tax schedule, these differences in withholding tax rates should have no real effects.[1] If individuals react strongly to withholding taxes, this suggests that withholding taxes are misunderstood and used as a proxy for income taxes. This could be due to the larger salience of withholding taxes compared to income taxes. While withholding taxes are directly observed on the monthly payslip, the actual income taxes can only be inferred after receiving the final income tax statement.[2] Withholding taxes could therefore constitute a central cornerstone in understanding how people learn about the tax rates they face.

An additional motivation to study the effect of withholding taxes on labor supply is based on joint taxation. The underlying rationale of joint taxation is based on the idea that married

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[1]This holds in a unitary household model and in the absence of interest rates and liquidity constraints. Shapiro and Slemrod (1995) find that the financial situation of households is not correlated with the propensity to consume withholding tax savings.

[2]Moreover, we find with the help of a survey that in only 37 % of interviewed married couples who file a joint tax declaration both spouses take part in preparing the tax declaration. This indicates that many individuals do not invest much time in understanding the final income tax statement.

households act as one economic unit like in unitary household models, and are, consequently, taxed jointly. Thereby, governments set the identical economic incentives for both partners irrespective of their individual wage income and governments remain impartial about the distribution of labor supply within the household. Consequently, in joint taxation systems, the government also does not have to take a stance on how the marriage bonus induced by joint taxation should be distributed within the household, as it is paid out to the household as a whole.

However, withholding taxes are inherently individual taxes as they are deducted from the individual payslip. Therefore, in countries with tax withholding and joint taxation, policymakers cannot remain impartial when deciding how the marriage bonus should be distributed among the spouses throughout the year. Also, governments are forced to decide on the individual marginal and average withholding tax rates. Interestingly, implemented solutions vary substantially between countries. We illustrate this by comparing the German implementation of individualized withholding taxes with the systems in France and the US, the other two large OECD countries with joint taxation. The gap in average tax rates presented in Figure 1 reflects the consequence of the implemented withholding tax system for married individuals in Germany. If individuals use payslips or monthly transfers to infer their net income, the gender gap in withholding taxes might contribute to a systematic gendered misperception about the returns to labor. Women might overestimate their individual income tax burden, which can decrease their incentives to work and potentially also affect their bargaining power within couples.

In this paper, we investigate empirically whether withholding taxes impact labor income. The German institutional context provides us with a unique opportunity to causally study the effects of withholding taxes. Germany offers different withholding tax schedules for couples so that households with an identical income structure and income tax burden can be subject to very different withholding tax liabilities. However, the choice of withholding tax schedules is not random as households self-select into them. Accordingly, the differing levels of withholding taxes stemming from the different schedules cannot be exploited for a causal analysis. We circumvent this problem by analyzing a tax reform in 2010 that cut withholding taxes for married women differently across withholding tax schedules. Applying a Difference-in-Differences setup with continuous treatment intensity, we are able to investigate how married

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women react to a cut in withholding taxes while keeping income tax payments constant. The reform arises from a nuanced technical aspect of automatic health care cost deductions, which was approved by the German parliament within the broader context of an extensive income tax reform. Notably, this change was not brought up for public deliberation in parliamentary sessions, nor does any newspaper coverage regarding the withholding tax reform exist. Hence, we expect no anticipation effect and any change in labor income can be traced back to the cut in withholding taxes.

We conduct the analysis using administrative tax records from the universe of observations from German Taxpayer Panel (TPP) which contains extensive information on the population of taxpayers in Germany for the years 2001 to 2018 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2018). For married women, we estimate an elasticity of labor income with respect to the marginal net-of-withholding tax rate of about 0.1 using a static Diff-in-Diff. Estimating an event-study Diff-in-Diff, we find that the treatment effect increases monotonically over time. We attribute this change in the size of the treatment effect over time to the way taxpayers learn about their tax rates. We argue that employees use the information on withholding taxes from their monthly payslips to learn about their income taxes which takes time as they first have to realize that their monthly net wage has changed and then recognize the persistence of this change. Moreover, it might also take time to adapt one's labor supply, possibly after negotiations with one's employer or a change of employer.

With the help of a simple 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 base their labor supply decisions on withholding taxes. 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. For example, individuals might not have full access to the income of the partner or the tax refund. In these cases, withholding taxes are not neutral. Lastly, households might also react to withholding taxes when they discount future payments due to borrowing constraints or the increased net value of income as it can directly be invested.

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While the last channel is well established in the literature (Falk et al., 2018), the evidence on the knowledge about the complexity of the tax system and on the organization of household finances is much scarcer. We therefore conducted a pre-registered online survey among approximately 500 married German individuals.

First, we find that more than 80 % of the surveyed married and employed individuals wrongly think that the choice of withholding tax classes affects the final income tax burden. This suggests that individuals with the same income tax burden, but with differing withholding tax rates, might perceive their income tax burden differently and consequently make different labor supply decisions.

Second, we investigate the impact of the system of withholding tax classes on the organization of household finances in Germany. As seen in Figure 1, couples often choose withholding tax classes 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 classes 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. As much as 47 % of those couples that choose a setting where some of the withholding tax liability is shifted from the husband to the wife do not have a shared bank account and among them 72 % let the tax refund be transferred to the bank account of the husband.

The fact that individuals react to withholding taxes implies that governments should be careful when designing withholding tax schedules. This is in particular relevant for countries with joint taxation systems. As soon as countries try to set withholding tax rates for married couples they have to decide what the individual marginal and average withholding tax rates are that each spouse faces and thereby make a decision on the division of joint taxation benefits within the couple by which they influence work incentives. We show that different implementations can result in substantially different withholding tax rates for primary and secondary earners. Based on our empirical findings, it becomes evident that the design of withholding tax systems cannot be inherently incentive-neutral. Instead, it requires a deliberate decision on how to influence the work incentives of both primary and secondary earners. This is especially relevant as it

shows that the withholding tax system can be used to increase the labor market participation of secondary earners.

The rest of the paper is structured as follows: Section 2 discusses the related literature. Section 3 presents in detail the withholding tax system. Building on the core features of withholding taxes, Section 4 presents a toy model that derives potential mechanisms that are then investigated with the help of a survey in Section 5. Thereafter, Section 6 presents the causal analysis of the effects of withholding taxes and Section 8 discusses the policy implications for the optimal design of withholding taxes. Section 9 concludes.

2 Related Literature.

Behavioral Public Finance. The link between withholding tax and income tax increases the complexity for taxpayers, which is further exacerbated by the possibility to choose between different withholding tax schedules. The oftentimes intricate design of withholding taxes may impact the taxpayers' decision-making processes, adding an additional layer of consideration to their financial decisions. This is closely related to the literature studying the interaction between inattention, tax complexity and behavioral responses to taxation. It is well documented, mostly with surveys, that an overwhelming majority of taxpayers do not understand how income taxation works. For example, many individuals do not know which tax rates apply to them personally (Blaufus et al., 2015; Chetty, Friedman, and Saez, 2013; Enrick, 1963, 1964; Fujii and Hawley, 1988; Lardeux, 2022; Stantcheva, 2021; Wagstaff, 1965) and they do not understand the difference between marginal and average tax rates (Gideon, 2017; Liebman and Zeckhauser, 2004; Rees-Jones and Taubinsky, 2020).

Consequently, in the theoretic literature on behavioral public finance, the view is established that the complexity of income tax systems matters for labor supply responses and thereby for the optimal design of taxation systems (Bernheim and Taubinsky, 2018; Gabaix, 2019; Liebman and Zeckhauser, 2004; McCaffery and Slemrod, 2006; Moore and Slemrod, 2021). These findings can be replicated in experiments. In recent years, it has been shown repeatedly in controlled environments that limited understanding of tax systems has consequences on decision making (Abeler and Jäger, 2015; Rees-Jones and Taubinsky, 2020; Stantcheva, 2021).

However, the literature on real world consequences of limited understanding of tax systems is scarce. Chetty, Friedman, and Saez (2013) show that the reaction to the EITC depends on the knowledge of the individuals. Feldman, Katuščák, and Kawano (2016) and Liebman and Zeckhauser (2004) provide evidence that the behavioral reaction to reforms is in line with a limited understanding of the difference between marginal and average tax rates. **leite_evidence_2022**; Lardeux (2022) show that due to misunderstanding people bunch at wrong income tax kinks.

Our paper contributes to this literature on behavioral public finance by, first, documenting a striking misunderstanding of the German withholding and income tax system and, second, by measuring the behavioral reaction to a reform in withholding taxes.

Effects of withholding taxes. Two other studies have investigated the effects of withholding taxes in Germany. Becker, Fooken, and Steinhoff (2019) replicate the German withholding tax system in the lab and find that people describing themselves as money-motivated significantly reduce their effort when facing constant income tax rates but higher withholding tax rates. Also, Koch (2024) finds in a before-and-after comparison of the default allocation of German withholding tax schedules that individuals irrationally react to their withholding tax liability.

We also contribute to a broader literature studying the effects of withholding taxes. Withholding taxes have been extensively studied for their effect on individual saving and consumption decisions. Messacar (2018) finds that in Canada withholding tax rates impact saving decisions. Also, Feldman (2010) and Shapiro and Slemrod (1995) find that a decrease in US withholding tax rates increases consumption and decreases savings. The behavioral reaction is particularly surprising, as the US withholding tax system allows households to alter their withholding taxes at any time to better reflect their income tax rate, which would have allowed them to increase consumption during the year.[3]

Interestingly, despite the ability to adjust withholding taxes, most US households continue to be overwithheld so that approximately 30 % of the withheld taxes are returned as a tax

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[3]Adapting the withholding tax can come at a cost, as underwithheld households have to pay interest on the underwithheld amount.

refund (see Gelman et al., 2022).[4] Consequently, there are numerous attempts in the literature to rationalize why households are subject to overwithholding even though they could avoid it. It has been shown that active overwithholding decisions could be a tool of households to deal with limited self-control (Neumark, 1995; Thaler, 1994) and income uncertainty (Gelman et al., 2022; Highfill, Thorson, and W. V. Weber, 1998). However, another possible explanation is insufficient awareness. Indeed, Jones (2012) shows that the lack of withholding tax adjustments by taxpayers to reduce the high level of overwithholding can largely be explained by inertia.

We contribute to the literature by supporting the idea that behavioral factors play a crucial role in understanding the role of withholding taxes. For example, if households struggle understanding tax systems due to their complexity and therefore are not aware of the link between income and withholding taxes, it can explain why households do not adjust their tax withholding. Also, if withholding taxes are used as a proxy for income taxes, as our results suggest, this can explain the large reactions in savings and consumption to a reform in withholding taxes.

Joint taxation. 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, in which marginal and average tax rates of secondary earners are increased, while those of primary earners are decreased compared to separate taxation (Bick and Fuchs-Schündeln, 2017, 2018; LaLumia, 2008; Selin, 2014).

Our results imply that the design of withholding tax regimes impacts the labor supply of women and can therefore partly explain the low labor supply of women. In addition, we present the trade-off between different withholding tax regimes and thereby contribute to the question of how an optimal withholding tax schedule should be designed when also taking into account potential negative effects on the labor supply of women.

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[4]Research has indeed shown that taxpayers like getting tax refunds and thus change tax filing behavior discontinuously at the point of exact withholding (Engström et al., 2015; Rees-Jones, 2018).

3 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. Finally, we shed more light on the understanding of withholding taxes among married couples in Germany by presenting the results of our survey.

3.1 Income Taxation of Married Couples

In Germany, married couples have two distinct options for handling their income tax filings. They can opt to file their income taxes separately, treating their finances as if they were still single individuals, or they can choose to file jointly. Opting for the latter option enables couples to take advantage of potential tax benefits associated with joint taxation.[5] 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 burden is then doubled. Due to the progressivity of the German income tax system, this creates joint taxation benefits when the spouses in a couple would have faced differing marginal income tax rates under separate taxation. Put differently, for a fixed household income, a couple receives more joint taxation benefits the more unequal the intrahousehold distribution of income.

We illustrate this feature in Figure 2, where we plot the joint taxation benefit of a couple with an household income of 80,000 € against the female share in the household income. If both spouses contribute equally to the household income, there are no benefits from joint taxation. If, however, one partner for example contributes 80 % to the household income, opting for joint taxation will save the couple around 2,000 € in yearly income taxes.

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 shown that this phenomenon is one key policy that explains the low

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[5]In fact, for the vast majority of couples, choosing joint taxation is at least weakly better than choosing separate taxation. Only couples in which one partner has a significant amount of income replacement payments 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").
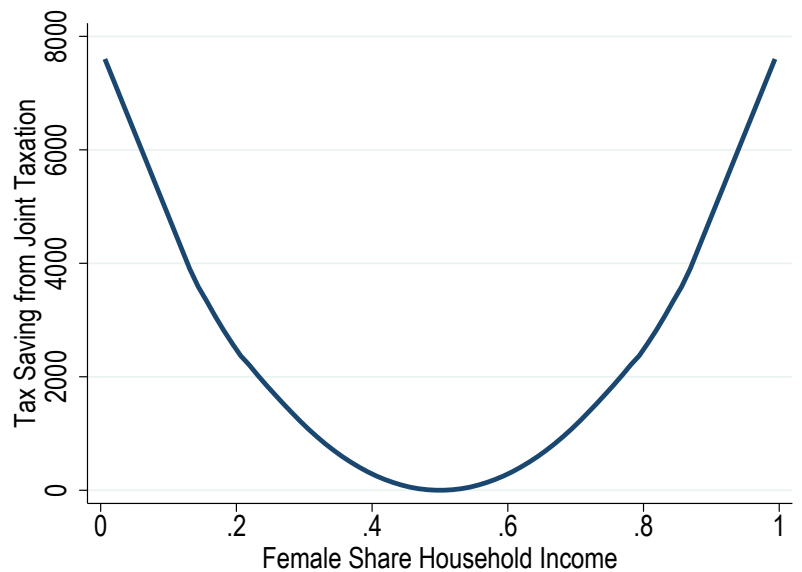
Figure 2: Joint Tax Benefits for a Joint Income of 80,000 €

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 for a household with a joint income of 80,000 €. In this example, we assume that both spouses contribute to public health care, to the public pension system, and claim no further deductions.

labor market participation of women. We illustrate how the marginal tax rate depends on partner income in the German joint taxation system in Figure D.1.

3.2 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.[6] These withholding tax schedules

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[6]In our analysis, we leave out the fourth, least commonly chosen withholding tax schedule. This withholding tax schedule is called "IV with factor" and 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 8 where we discuss different implementations of withholding tax schedules that account for joint taxation benefits. There are no official statistics on the use of "IV with factor" and we do not observe the choice in the data. Official government agencies estimate, however, that even 10 years after its introduction less than 1 % of the couples are using this schedule (*Kleine Anfrage Bundestag* 2019).

assign each partner a certain withholding tax class, which determines the personal withholding tax payments.

Symmetric schedule. After marriage, each couple in which both spouses receive labor income gets assigned the same "default" withholding tax schedule, which we will call the symmetric schedule. This withholding tax schedule is symmetric since it assigns each spouse the same withholding tax class "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, for a couple without joint taxation benefits, the withholding tax would be the same as the income tax. If a couple realizes joint taxation benefits, the paid withholding tax of both spouses will exceed their 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 benefits of 288 € 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 "default" symmetric schedule to a withholding tax schedule that aims at reducing the monthly withholding tax payments to account for the joint taxation benefits.[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 she 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, Färber, and Späth, 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

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[7]Switching away from the symmetric schedule requires the stated consent of both spouses. For switching back, however, unilateral action suffices. The only exception are couples in which only one spouse earns labor income. Those couples are automatically assigned the men-/women-favoring withholding tax schedule.

[8]These terms are not official but our own creations. In particular, the law does not explicitly refer to genders.
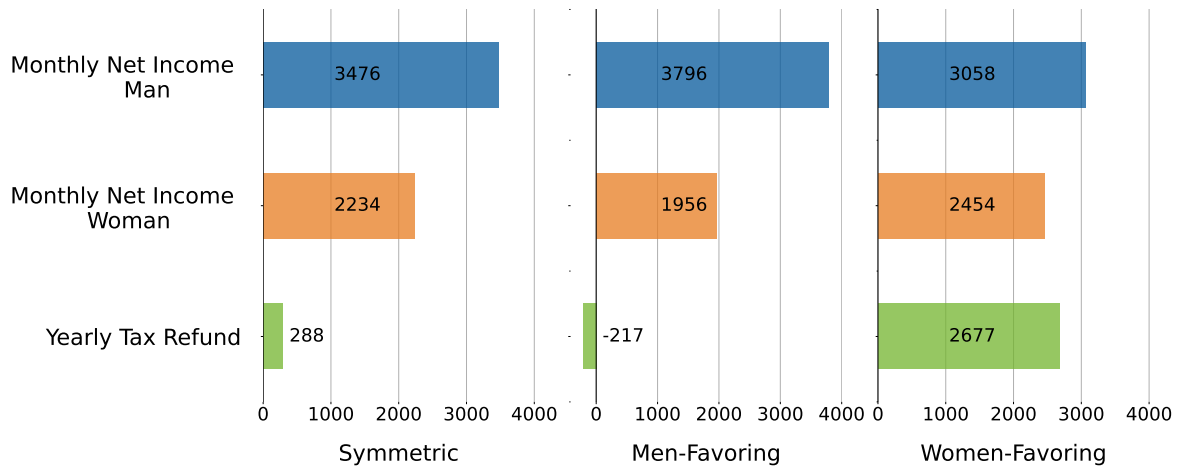
Figure 3: Example illustrating the different withholding tax schedules

withholding tax class is higher than in the default withholding tax schedule 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 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, this misallocation of favorable and unfavorable withholding tax classes rarely happens.

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 H.1).

Choice of the different schedules. The right-hand side of Figure 4 shows the frequency with which the different withholding tax schedules are chosen and which withholding tax class they 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.

While the different choices of withholding tax schedules that we have discussed here have strong effects on the amounts of withholding tax payments, they do not affect the final income tax burden of the couple. Couples cannot decrease their final income tax burden by choosing a certain withholding tax schedule, but can only change the timing of the income tax payments throughout the year.[9]

4 Theoretic Model

In this section, 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

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[9]Of course, taking into account discount rates and liquidity constraints, couples can have benefits from delaying their income tax payments.
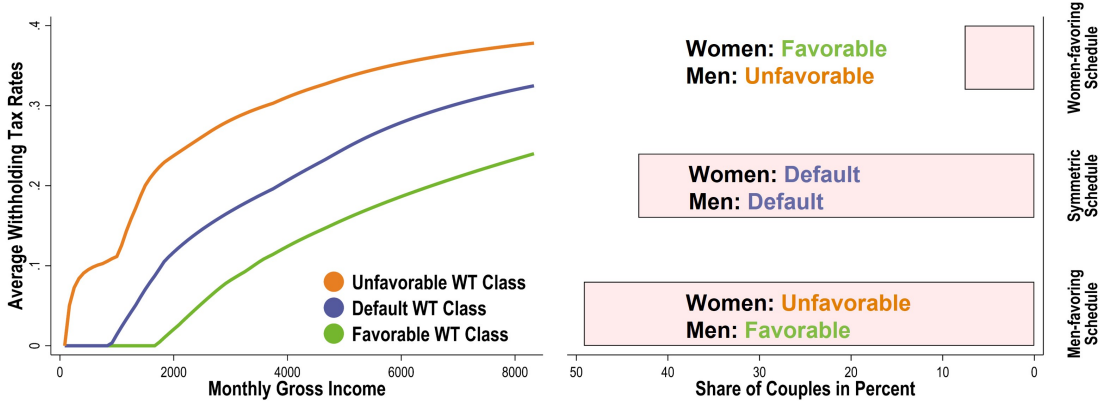
Figure 4: Illustration of different withholding tax schedules

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 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, for the year 2010 the possible withholding tax schedules and their frequency are shown 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.

withholding taxes are only irrelevant for labor supply decisions if individuals fully internalize tax refunds and are indifferent to the timing of cash flows.

4.1 Tax Refund

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

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

(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

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

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 2 to investigate how the introduction of different behavioral factors that influence the perception of future tax refunds can impact labor supply decisions. We model these factors as a weight that individuals assign to the tax refund.

4.2 Determinants of the Relevance of the Tax Refund

The weight hinges on three behavioral parameters that jointly determine the relevance of the tax refund, and thus of withholding taxes, for the individuals' decisions. These three parameters are summarized in Table 1 and discussed in the following.

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 typically paid out to a single bank account. 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

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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 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. [10] If $\gamma < 1$, the individual receives a smaller share of the tax refund and ends up with a tax burden 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 burden lower than implied by the income tax.

Time discounting: δ. The parameter δ captures the degree to which the tax refund after the tax year is discounted. If $\delta = 1$, 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 δ 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 δ 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.

Adding the three parameters α, γ and δ as weights to the tax refund in Equation 2, the individual tax liability is now given as follows

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

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[10]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 $\gamma = 1$.

4.3 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 δ, we follow Jakobsen and Søgaard (2022) in specifying the following quasi-linear utility function with respect to consumption c_{it} and taxable income z_{it}

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

that each individual maximizes subject to the following budget constraint

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

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 3 gets plugged into the budget constraint given by Equation 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

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

Table 1: 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
δ	Discount factor	Lower discount factor increases effects of withholding tax change

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

4.4 Interpretation

Equation 6 illustrates how the withholding tax affects labor supply. The main finding is that the labor supply depends on the weight that an individual assigns to the tax refund. Assuming a positive tax refund, labor supply is impacted positively by 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 (δ). Intuitively, all factors that reduce the weight an individual assigns to the tax refund increase the relevance of withholding taxes for her 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 discounting factor δ, 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, we know from other settings that the institutional knowledge of individuals is limited (Chetty, Friedman, and Saez, 2013; Gideon, 2017; Rees-Jones and Taubinsky, 2020) and that households do not fully pool resources (see Almås, Attanasio, and Carneiro, 2023, for a recent survey of the literature). We corroborate the two latter findings empirically by presenting survey evidence that suggests that the two parameters, α and γ, are likely also different from 1.

5 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.

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 our survey in Appendix B: Section B.1 includes information on the implementation and our sample restrictions, Section B.2 provides more-in-depth analyses, Section B.3 displays additional descriptive figures, and Section F displays the original survey questionnaire in German and a translation into English. We have pre-registered our survey at the Open Science Foundation.
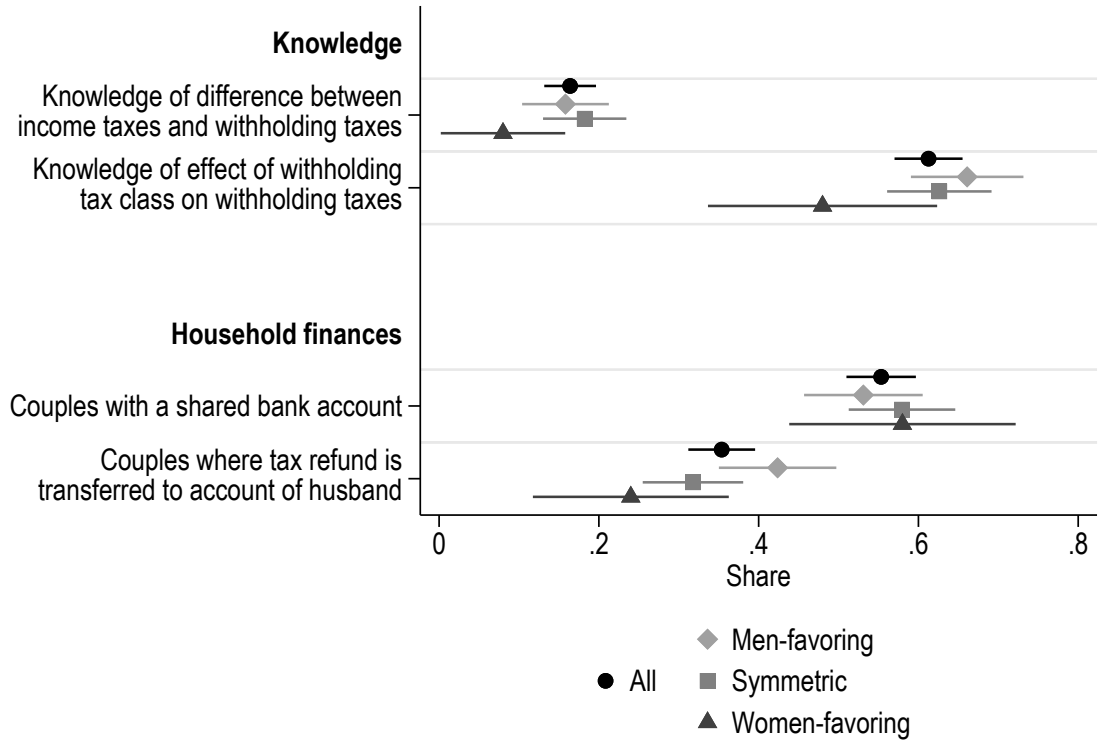
Figure 5: Survey on potential channels for the effect of withholding taxes

Notes: The Figure displays the Survey responses. Individuals who did not know their withholding tax class (n=65) are not included in the figure.

5.1 Understanding of Withholding Taxes.

In our model in Section 4, 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 burden.

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 burden of the couple. We give them five answer options: the three withholding tax schedules, that it does not matter, and that they do not know the answer.[11] As discussed in Section 3.2, irrespective of the choice of the withholding tax schedule, the final income tax burden of the couple is the same.

Row 1 of Figure 5 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 burden at the beginning of our survey. Respondents in the men-favoring and symmetric withholding tax schedules have a better knowledge than respondents in the women-favoring schedule but the knowledge is very limited across all schedules. In Appendix Figure B.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 %).[12]

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 row 2 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 B.3 documents, homogeneous with respect to gender, withholding tax class, age except for the youngest cohort, and to whether the individual files taxes herself.[13]

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[11]See Question D7 in Appendix Section F for the exact wording of the question.

[12]In Appendix Section B.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.

[13]After explaining the institutional setting, we also ask people to self-report whether they had understood the system correctly before (see Table B.1). 54 % of the individuals claim that they had understood that the

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 burden. 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 missing 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 Organization of Household Finances.

In the model, the parameter η identifies the share of the tax refund 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 households consisting of married couples act as unitary households. If this assumption does not hold, the choice of withholding tax schedule might have impacts on the eventual intra-household distribution of labor income and by that on the size of each spouse's budget and on their within-household bargaining power. To gain insights into such impacts we have to gain knowledge about potential money transfers between spouses as well as the division of tax refunds. Sophisticated couples could make transfers from the spouse in the favorable withholding tax class to the spouse in the unfavorable withholding tax class and thereby undo the shift of withholding

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choice of the withholding tax schedule does not impact the final income tax burden, while 95 % claim that they knew that the choice of withholding tax classes impacts their withholding taxes.

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.[14]

Bank accounts. We test the basic assumption of the joint organization of household finances tentatively by interpreting the absence of a shared bank account as an indication of a lack of a joint organization of household finances. 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 shifting some part of the withholding tax liability from one partner to the other 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. In addition, even if married couples have a shared bank account they might not use it to re-distribute labor income from one spouse to the other.

As shown in the lower part of Figure 5, 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 interesting 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 they are not commonly used to strategically counteract this distortion.

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 5 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.

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

Consequently, we anticipate that the relative intra-household earnings will be skewed in favor of the husband for the majority of couples under the men-favoring schedule. Moreover, the disposable net income of married women is reduced. This could lead them to overestimate their individual income tax burden, which may negatively impact their bargaining power within the household and diminish their perceived work incentives.

Taken together, these findings provide suggestive evidence that not all households fully pool their resources. Hence, this suggests that the share of a couple's tax refund that the individual expects (parameter η in the model in Section 4) might be impacted by the withholding tax rate.

6 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 6.1. 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 class. In Section 6.2 we present the data we use to analyse the reform, section 6.3 presents the empirical strategy, discusses the identifying assumptions and implied sample selection.

6.1 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 deductability of the mandatory health care insurance contributions. Before 2010, contributions to health care insurance were only taken into account for the calculation of the withholding tax for the symmetric and favorable tax classes but not for the unfavorable withholding tax class. This changed in

2010, resulting in a substantial decrease in the withholding tax burden for individuals in the unfavorable withholding tax class.

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. Conditional on income, this reduction in the income tax burden was independent of the withholding tax schedule. Moreover, as the contributions to health care 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 deductability 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 6 shows how annual withholding taxes changed from 2009 to 2010 by withholding tax class and annual gross labor income. For spouses in the favorable withholding tax class, the reform decreased the withholding tax liability by up to around 800 €. However, there was almost no change, and if then a slight increase, in withholding taxes for annual gross labor incomes lower than 32,000 €. For the default withholding tax class, the reform decreased the withholding tax liability by up to around 1,200 € with a substantially smaller cut for lower incomes. In contrast, women in the unfavorable withholding tax class profited from a cut by up to approximately 3,000 € with even a considerable reduction in withholding taxes for low incomes. In other years, such substantial year-to-year changes have not occurred. Figure H.2 shows this for the years between 2006 and 2016 and for an annual individual income of 25,000 €, an income which is fairly common in the unfavorable tax class.[15] The described reform is the only substantial reform in withholding taxes during our sample period.

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[15]The pattern is essentially the same for annual individual incomes of 15,000 €, 30,000 €, 50,000 €, and 70,000 €.

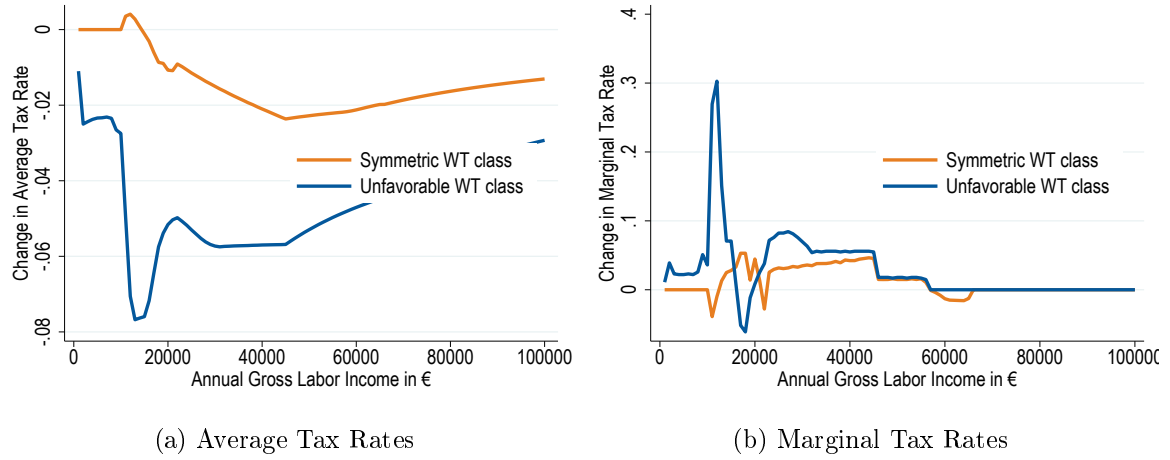|	
(a) Average Tax Rates	(b) Marginal Tax Rates

Figure 6: Reform on Withholding Taxes by Withholding Tax Class between 2009 and 2009

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.

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 the differential impact on different withholding tax classes. In fact, we did not find any discussion about the withholding tax reform anywhere in 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 H.3). 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* 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 that they ended up getting more money after withholding taxes every month, i.e., a higher net income on their payslips.[16]

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[16]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

6.2 Data

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.[17] It includes information on various characteristics such as income, gender, age, number and age of children, withholding tax class and other tax-related information.[18] The TPP consists of a total of around 63 million records for individuals for whom tax information is available for at least two years. Due to its large size, the data is primarily offered as a sample through research data centers. 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. However, due to the late availability, we do not consider those taxpayers in our analysis.

Sample restrictions. In our analysis, we use the administrative tax records from the years 2006 to 2018 and focus on dual-earner married 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 3.2, 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. For the men-favoring and symmetric schedules, we keep couples in which both spouses received labor income in 2009, the year before the aforementioned withholding tax reform was implemented. This restriction ensures that these individuals are actually treated at the time of the reform.

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to the change on their payslip, particularly because tax refunds or additional tax payments occur on the couple level.

[17]RDC of the Federal Statistical Office and Statistical Offices of the Federal States, 2018, DOI:10.21242/73111.2018.00.01.2.1.1

[18]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.

Moreover, we focus on couples in which both spouses are between 20 and 60 years old.[19] To ensure that labor income is the main source of 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 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.

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 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.

Descriptive statistics.   Table 2 displays descriptive statistics of basic socio-demographic characteristics for the balanced sample in the year 2009. The table shows that couples picking the men-favoring schedule have higher male income and lower female income than couples picking the symmetric schedule. Accordingly, for couples in the symmetric schedule, women earn 46 % of household income, while they earn only 29 % in households who picked the men-favoring schedule. This is not surprising as for couples with a man as the main earner, picking the men-favoring choice minimizes the withholding tax liability for the household. The table reveals that households in the two schedules are also different with respect to other observables. Specifically, couples in the men-favoring schedule are more likely to be Catholic and less likely to live in Eastern Germany.

All in all, the descriptives strongly suggest that the two groups are different in observable socio-demographic characteristics. However, using a Difference-in-Differences approach, we do not rely on the two groups having the same observable characteristics.

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[19]We want to abstract from early retirement decisions and thus do not consider income at older ages.

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	5772	5267

Notes: The table displays descriptive statistics for the year 2009 for the balanced panel for couples who picked either the men-favoring or symmetric withholding tax schedule. They are calculated based on the sample restrictions outlined in the main text. Specifically, we focus on households with dual earners in 2009, in which both partners have received no unemployment benefits and short-time work compensations in 2009, are between 20 and 60 years old in 2009, have no income from self-employment of more than 1,000 € in 2009 and whose incomes were stable between 2006 and 2009, i.e., the income for both household members fluctuated by less than 25 % from one year to the other. Eastern Germany comprises the area of the former German Democratic Republic plus West Berlin.

Determinants of schedule choice.   To further clarify which characteristics of a couple are correlated with the choice of the men-favoring schedule compared to the choice of the symmetric schedule, we regress the choice of the withholding tax schedule on various characteristics of the couple. The results in Table 3 show that a few characteristics stand out. First, living in the former East of Germany is associated with a 20 percentage points lower probability of choosing the men-favoring schedule. Since we also control for the female income

share, this cannot be driven by the fact that the earning differences within couples are lower in the East due to the historically higher labor market participation of women. We suspect that more egalitarian gender norms (Boelmann, Raute, and Schönberg, 2021; Campa and Serafinelli, 2019) and lower historical institutional exposure in the East due to the take-over of West German institutions as late as 1990 lead couples to choose the men-favoring schedule less often. Second, we see that the higher the female income share, the less likely the couple chooses the men-favoring schedule. A one percentage point increase in the female income share is associated with a 1.8 percentage point decrease in the choice of the men-favoring schedule. This is intuitive since the more the man earns relative to the woman in a couple, the higher the gains in terms of withholding tax payments from choosing the men-favoring schedule. Finally, having children also significantly increases the likelihood of choosing the men-favoring schedule. The first child increases the likelihood by around 15 percentage points and every further child by another 6 percentage points. This shows that in many couples the man is likely considered the main breadwinner as soon as the couple is having children, mirroring the stylized fact that the birth of the first child is a fundamental event in explaining the persistence gender inequality in earnings (Kleven et al., 2019).

Table 3: 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	11039.0
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, using the balanced sample. Heteroscedasticity-robust standard errors are displayed in brackets. The regression also includes commuting days, commuting distance and a public servant dummy as regressors. As they have no explanatory power and for better readability, we do not display these regressors in this table. The full regression results including all regressors can be found in Table G.2.

Taken together, this evidence illustrates that we should additionally control for some of these characteristics in our analysis. In the next subsection and in Appendix A, we discuss how we do that by controlling for the pre-reform incomes of both spouses and for dummies indicating the parental status and the residence in East Germany using a cell fixed effects approach.

6.3 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.

Descriptive evidence. Figure 7 visually exemplifies for the years 2007, 2010, 2013 and 2016 how the income in the two groups has developed over time along the income distribution relative to the year 2009.[20] Panel (a) displays the pre-reform change in income. It is visible that along the whole income distribution individuals had a substantial increase in income, with a more pronounced change for higher income. The difference between the two groups is different along the income distribution, but consistently smaller than 2 per cent. Panel (b) displays the income change between 2009 and 2010. Almost no change in income relative to 2009 is observable. In Panel (c), the difference between 2009 and 2013 is plotted. While there is almost no change in average income for women in the default withholding tax class, the income increased along the whole income distribution for women in the unfavourable withholding tax class. In 2016 (Panel (d)) also the income of women in the default withholding tax class has increased relative to 2009. However, the gap to women in the default withholding tax class is still substantial.

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[20]The Panels for all years are displayed in Figure C.1 and C.2

(a) 2007 to 2009   (b) 2010 to 2009

(c) 2013 to 2009   (d) 2016 to 2009
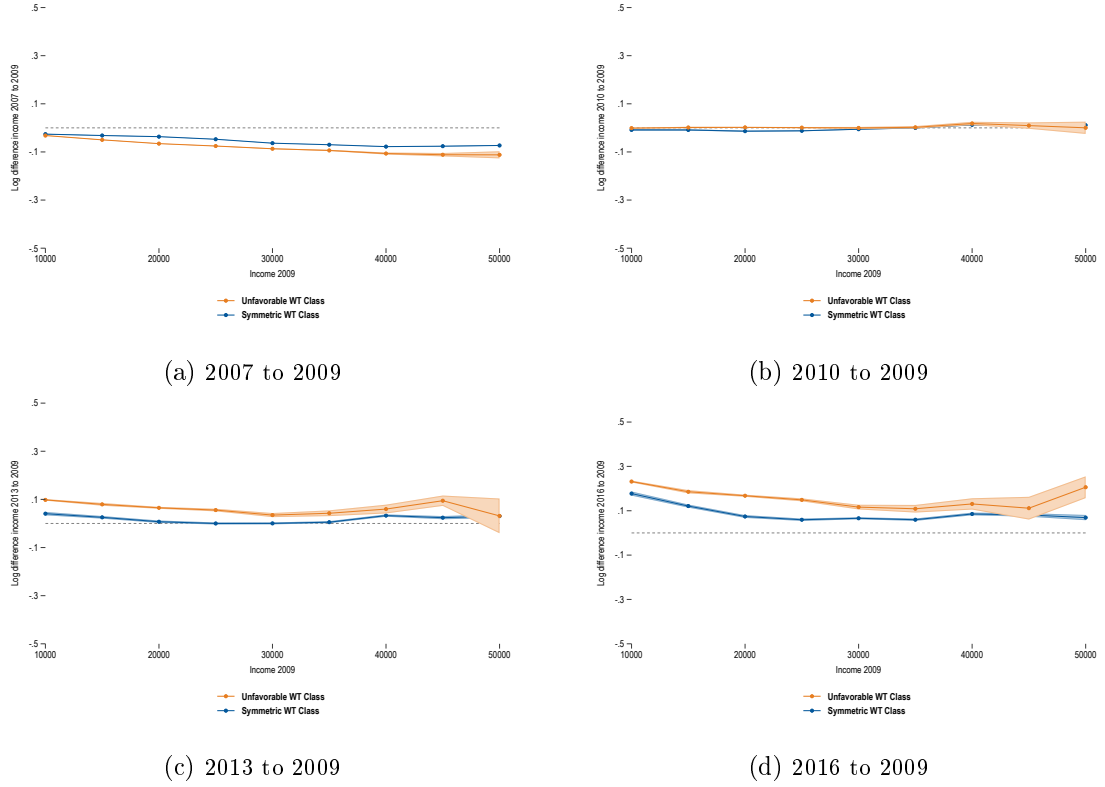
Figure 7: Income growth along the income distribution relative to 2009

Notes: The figure plots the log income difference in year t relative to 2009. Confidence intervals are plotted at the 95 % level.

Treatment intensity. A naive approach would simply compare the evolution of incomes over time between these two groups using a difference-in-differences design. However, as previously shown in Figure 6, individuals' exposure to the reform is not only determined by their withholding tax class but also by their own pre-reform labor income. The latter is problematic since it implies that, 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

32

the marginal net-of-withholding-tax rate of the woman induced by the reform.[21] We construct the treatment variable for each couple by taking the labor income of the woman in 2009 and 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.

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 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.[22] Second, our approach requires the assumption of homogeneous treatment effects as both groups are treated. Hence, we must assume that both groups would react to a reform equally. A natural test for this assumption would be a withholding tax (or income tax) reform that hits both groups equally. Unfortunately, there were no other major reforms in our observed period (see Figure xxx).

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[21]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 Saez, Slemrod, and Giertz (2012) and Jakobsen and Søgaard (2022) for the theoretical motivation).

[22]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 along 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 C. E. Weber (2014)).

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:

$$
(7) \quad ln\left(\frac{y_{i,t}}{y_{i,2009}}\right) = \sum_{t=2006}^{2018} \beta_t \left[ln\left(\frac{1 - \mathrm{MWTR}_{i,2010}}{1 - \mathrm{MWTR}_{i,2009}}\right) * \mathbb{1}(\mathrm{Year}_t) \right] + \eta_i
$$
$$
+ f(y_{i,2009}, y_{-i,2009}, child_{2009}, east_{2009}) \times \theta_t + \delta X_{i,-i,c,2009} + \epsilon_{i,t}
$$

where β measures the percent change in labor income if the marginal net-of-withholding-tax rate of the woman increases by one percent. η_i controls for time-invariant individual fixed effects. Further, $\delta X_{i-,i,c,2009}$ controls for characteristics of the woman i, her partner $-i$ and the couple c as a whole in 2009. For both spouses individually, these include age, age squared, and a dummy for being a public sector worker and for the couple as a whole the number of children and the region of residence.

Cell controls. Finally, we add dense couple-level cell fixed effects $f(y_{i,2009}, y_{-i,2009}, child, east)$ interacted with year dummies θ_t. For this, we bin the incomes of wifes and husbands in 2009 in steps of 5,000 € and interact these bins with each other. In our preferred specification, we additionally interact these cells with indicators for whether a child lived in the household in 2009 and whether the household resided in East 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 pay the same income tax. We also illustrate the mechanics behind these cell controls graphically in Appendix A. Lastly, interacting the income controls with the child and region indicator makes the comparison between groups even cleaner. As Table 3 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.

Reduced form and IV. Equation 7 leads to reduced-form estimates of the typically estimated IV regression. The reform-induced change in the marginal withholding tax rate, which we use as the treatment variable, is not necessarily the actual change in the marginal withholding tax rate. For example, when estimating Equation 7 we relate the change in income between 2009 and 2018 to the reform-induced change in the marginal withholding tax rate between 2009 and 2010. However, the actual marginal withholding tax in 2018 is not only determined by the 2010 reform but also by changes in income as the withholding tax is a function of income. Therefore, the ETI literature typically (see Gruber and Saez, 2002; Jakobsen and Søgaard, 2022; Saez, Slemrod, and Giertz, 2012) instruments the actual change in withholding taxes with the reform-induced change. In our setting, this would imply to instrument the actual change in withholding taxes between year t and 2009 with the predicted change in withholding taxes between 2009 and 2010. This is not our main specification for two reasons: First, in contrast to most previous papers, our setting allows us to observe and estimate pre-trends. Technically, these pre-trends are placebo tests for the reform in pre-treatment years. However, the IV estimates do not have a meaningful interpretation in the pre-reform periods: For example, the reform in 2010 cannot predict the change in marginal tax rates between 2007 and 2009. Second, due to the unique German setting of a continuous marginal tax rate function, the instrument and the instrumented variable are continuous. This complicates the interpretation and requires additional assumptions for identification.

Selection into treatment. A threat to identification is that as a reaction to the reform households might change their withholding tax class. As discussed before, the reform was arguably nonsalient and therefore not anticipatable by taxpayers. However, it could be that individuals changed their withholding tax schedule as a result of the reform. This would alter the treatment intensity they are subject to and thereby bias our results. We depict the share of couples in the three different withholding tax schedules and the transitions between the different withholding tax schedules over time in Figure G.1. Looking at all couples in the

5 % sample of the TPP shows that couples generally stick to the withholding tax schedule they have chosen and that there are only a few couples changing between the withholding tax schedules over time.[23] Also, there is no evidence for an increase in withholding tax schedule changes around the time of the reform. This makes us confident that there was little or no selection into treatment in our setting.

7   Empirical Results

In this section, we present our empirical results showing that individuals react to the size of withholding taxes. We present the event-study Diff-in-Diff estimates, show heterogeneities and discuss the channels of the effect.

7.1   Main Results

First, we present in Figure 8 the results of the dynamic diff-in-diff estimation as laid out in Equation 7. 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 symmetric tax class who were treated differently by the reform. The dependent variable is the log difference in income between year t and 2009. Hence, the coefficents can be interpreted as elasticites of labor income with respect to the withholding tax rate in the respective year.

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[23]Typically, couples pick their withholding tax schedule at their marriage and do not adapt the withholding tax schedule thereafter.
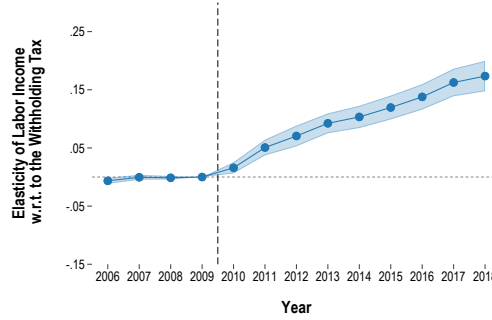
Figure 8: Event-Study Diff-in-Diff Estimates

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 7 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 individual fixed effects and 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 East 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 25 % from one year to the next before 2010 to ensure that no individuals directly hit by the financial crises are part of the sample. This explains the smaller standard errors before the reform.

Interpretation of pre-reform estimates. As discussed in Section 6.3, one implication of the parallel trend assumption is that we should see no economically significant pre-reform effects of the treatment intensity. As the two groups were not treated in these periods, the pre-trends correspond to a placebo test. Implicitly, we assign each women the treatment intensity of the reform between 2009 and 2010 so that no effect should be estimable. The pre-reform estimates in Figure 8 are not statistically significantly different from zero at the 5 % level and also economically insignificant and small compared to the post-reform estimates. The error bands are smaller before the reform compared to after the reform because we exclude households from the analysis in which at least one individual was hit by the financial crisis (see Section 6.3).

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 stabilizes at an elasticity of approximately 0.15. These results imply that a one percent higher marginal net-of-withholding tax rate change in 2010 results in an around 0.15 percent higher labor income 8 years after the reform. More intuitively, the results

indicate that for example a woman whose marginal withholding tax rate was reduced from 30 % to 23 %, so whose marginal net-of-withholding tax rate increased by 10 percent from 70 % to 77 %, increased her labor income by 1.5 percent after the reform.

Magnitude and 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 and so the observed estimates range from about 0.2 to about 0.8. 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 0. However, as we discuss in Section 4, we also expect that information frictions and incomplete pooling of household resources drive labor market responses of individuals.

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 discussed in the media, it can only have an effect if people realize the cut in withholding taxes independently. For example, individuals might realize that the monthly pay-as-you-go payment changes or they 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 different individuals might be heterogeneous. We also 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 (2022) who study how slowly low-income workers in Germany react to a move of a large notch in the German tax schedule.

Furthermore, it is striking that the treatment effect estimates never become smaller again during our sample period. 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) where we show that the general understanding of withholding taxes is low.

7.2 Heterogeneity

Figure 9 displays the estimated effects for various subgroups. For each subgroup, we estimate the effect in separate regressions, so that women with the respective characteristic in the unfavorable schedule are only compared to women with the same characteristic in the symmetric schedule.

Scope for behavioral changes.   Most strikingly, the effect is the strongest for subgroups who have the 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 working days. If a women is working less than 180 days, we categorize her as a part-time worker. We find that the estimated effect is slightly larger for women working part time (Panel a).[24] In line with this finding, we also observe that the effect is largest for households who have no child below 18 living in the household, but is substantially smaller when the youngest child is in school age (6 to 18) or below 6 (Panel b).[25] Also, we find that relative to the effect observed on the complete sample,

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[24]We only observe working days and working hours for individuals who claim commuter allowance which applies to 70% of the women in the sample.

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

the effect is larger when the women is the secondary earner (Panel c). As secondary earners are more likely to have scope to adapt their labor supply, this again suggests that the scope for behavioral changes is a crucial determinant for observed behavioral effects.[26] 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 (Neisser, 2021).

Proxys for norms. We find suggestive evidence that the effect is driven by households with more conservative gender norms. As it is not possible to link survey data to the TPP, we have to rely on proxies. First, we calculate the age difference between husband and wife. We categorize all couples for which the age gap is larger than 3 years as more conservative (Panel d). We find that the effect is slightly larger for the couples with a larger age gap. Second, we investigate the effect by religious affiliation (Panel e). We observe a larger effect for catholic and protestant households than for other households.[27] Third, we study the effect separately for Western and Eastern Germany (Panel f). As Boelmann, Raute, and Schönberg, 2021 documents, the gap in gender norms between these two regions is still persistent and large. However, we do not find a differential effect.

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[26] For completeness, we also display the coefficient for households where the woman is the primary earner. However, as the pre-trend does not hold, we do not discuss the effect for this specific sub group.

[27] 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.
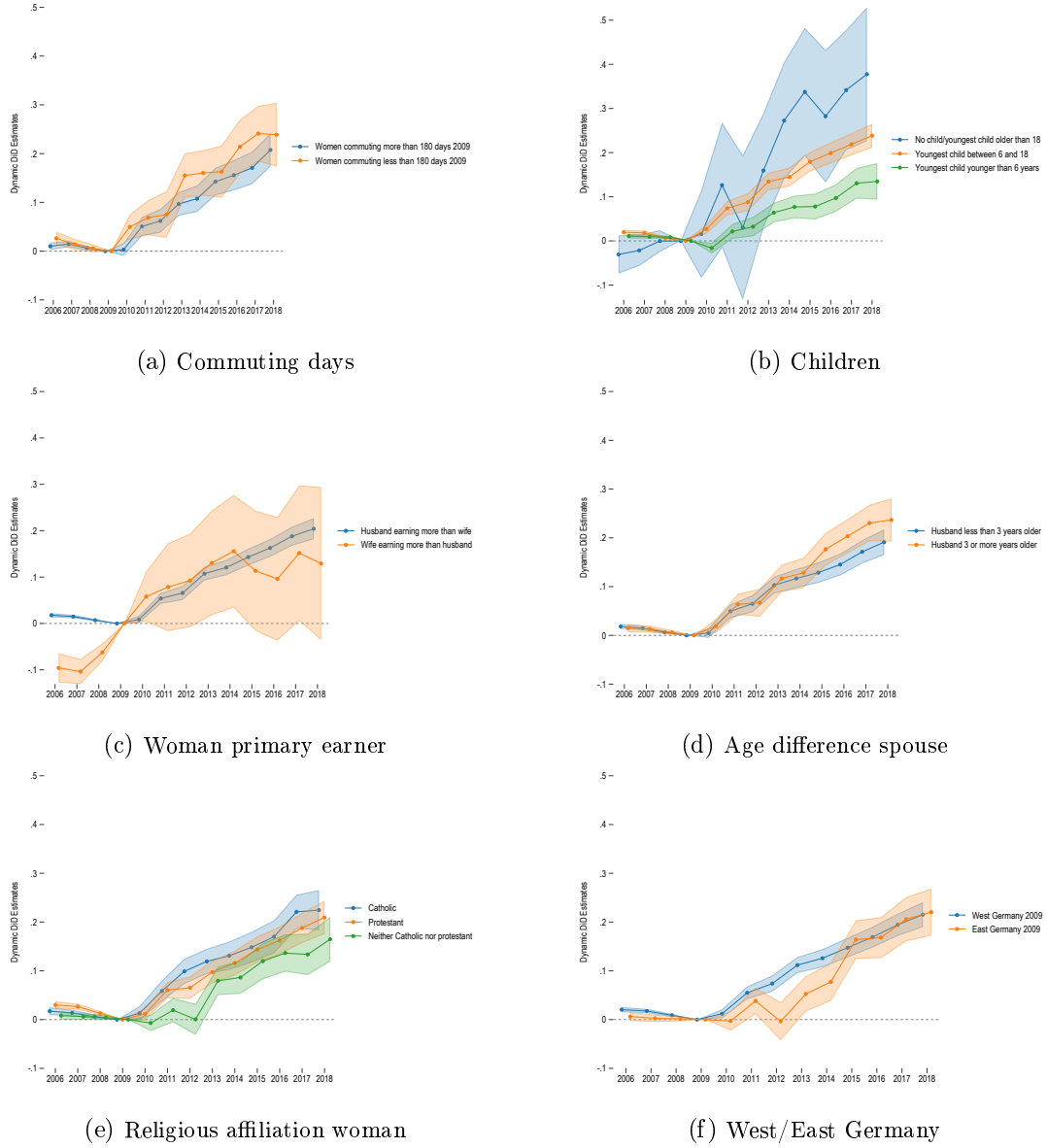
(a) Commuting days

(b) Children

(c) Woman primary earner

(d) Age difference spouse

(e) Religious affiliation woman

(f) West/East Germany

Figure 9: Effect Heterogeneity

Notes: See notes of Figure 8

7.3 Channels

To better understand the behavioral reactions to the withholding tax change, we investigate potential channels that explain how withholding taxes result in increased labor market income. For this analysis, we use the respective variable of interest as outcome y in the baseline regression equation 7. To be consistent with the estimates from Section 7.1, we use the log

difference between year t and 2009 in each outcome variable, so all coefficients are interpretable as elasticities. Figure 11 displays the estimated effects for various channels.

Intensive margin adaptions. We observe that the effect is strongly driven by changes in the intensive margin. While we do not observe working hours, we observe commuting distance and days for individuals claiming commuting allowance (70% of the sample in 2009). We observe that the elasticity in commuting days is approximately 0.05 after 8 years (Panel a).

Commuting distance and job changes. The observed change in income could also be explained by an improved matching quality due to the reform. As the (perceived) payoffs from working have increased, women have the incentive to look for better-paying jobs. In fact, we observe that the commuting distance is constantly increasing (Panel b). As we observe the commuting distance of both partners, we can separate a move from an actual job change. Surprisingly, we observe that the probability for a job change decreases in response to the reform (Panel c).

Household work. To work more, women might use less time for home production. While time use is not directly observable, household-related expenses such as childcare at home, renovating work by professional craftspersons, and care for sick and elderly are deductible from the income tax. Panel (d) plots the treatment effect estimates for the deductions claimed for these expenses. We do not observe an effect of the reform. However, this might be explainable by the large standard errors, as these deductions are not claimed by all households.
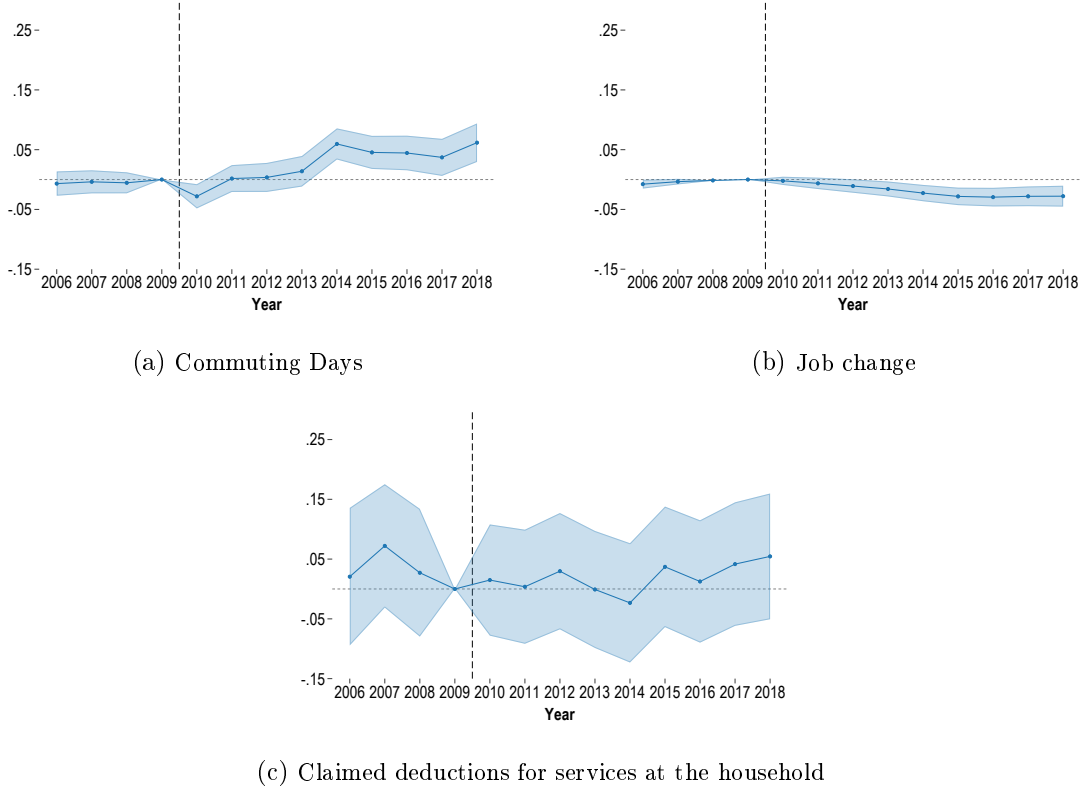
Figure 10: Channels

(a) Commuting Days

(b) Job change

(c) Claimed deductions for services at the household

Figure 11: Channels

Notes: See notes of Figure 8

8 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. 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 discuss potential implementations of withholding taxes for married individuals and their implied trade-offs with respect to overwithholding, intra-household distribution of income and labor supply.

The decision on withholding taxes is of particular relevance in the presence of joint taxation benefits, as it is unclear whether and how the benefits of joint taxation should be distributed among the spouses through the withholding tax system. Not accounting for the 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.

Different withholding tax implementations. Interestingly, while countries with joint taxation indeed have a distinct withholding tax design for married individuals, the design of withholding tax schedules for married individuals differs substantially across countries. These differences are informative about the diverse set of objectives policy makers try to achieve by setting withholding taxes. In the following, we compare the current withholding tax system in Germany with a widely-discussed reform option that decreases overwithholding by adjusting the withholding tax rates of both spouses based on past household incomes. 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, ensuring that the combined withholding tax payments of both spouses equal the expected income tax payment of the couple, based on the incomes in the previous year.[28]

We contrast the different implementations of withholding tax schedules in the German context with those implemented in France and the US. In France, a withholding tax system in which the withholding tax rate is calculated based on the household income two years before was introduced in 2018. The tax authority calculates the expected effective average income tax rate paid by the couple based on past income and then sets this rate as a common withholding tax rate for both spouses.[29]

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[28]In 2010, this procedure was introduced in Germany under the name *schedule with a factor* ("IV mit Faktor") as an additional option for married couples. However, only around 40,000 couples (less than 0.5 % of all income-tax-paying couples) utilized this approach in 2018 (*Kleine Anfrage Bundestag* 2019). In the German coalition agreement of 2021 (*German Coalition Agreement* 2021), the parties agreed to abolish the *system with a choice* and to replace it with the *schedule with a factor*.

[29]As an alternative to the described system, households can also opt into a system where the withholding tax rate is higher for the primary wage earner than for the secondary wage earner. Here, marginal and average withholding taxes are still identical.

In the US, all working individuals are asked to submit a W-4 form to their employer to decide on their amount of withholding. When a household is underwithheld, it is fined so that households have an incentive to match their withholding to the expected income tax (also see Gelman et al. (2022) and Jones (2012)). The withholding tax system for couples was changed in 2017. Since then, the most prominently presented option for couples is a system where for both spouses the withholding tax is determined along the favorable schedule, i.e., under the assumption that the other spouse has no labor income.[30] To avoid overwithholding arising from the fact that both spouses are thus assumed to be the only spouse subject to withholding taxes, couples are then asked to manually adapt the withholding of 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 additional withholding taxes the primary wage earner should pay.[31]

In the absence of year-over-year income changes, the German reform option as well as the implementations in France and the US can completely eliminate overwithholding caused by the presence of joint taxation savings. The same holds true for couples in the withholding tax schedule that minimizes a couple's withholding tax liability in the current withholding tax system in Germany as demonstrated before in Figure 3. However, all withholding tax schedules 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 in which both the husband and the wife earn the respective median income of married men and women in Germany.

Average Withholding Tax Rates. We start by evaluating the effects on the 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 12. 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

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

[31]When children are living in the household the child tax credit decreases taxable income. In this case, the tax authorities also recommend that only the withholding tax of the primary wage earner should be decreased.

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.
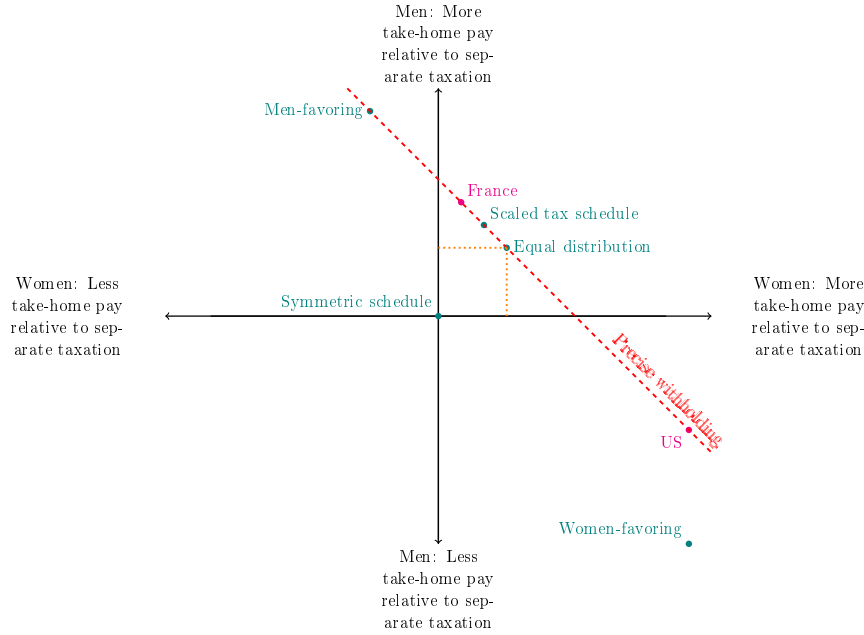

Figure 12: Average withholding tax: Monthly take-home pay of spouses

Notes: The figure illustrates the change in the monthly take-home pay of joint taxation relative to separate taxation for both spouses in different withholding tax schedules. All withholding tax schedules on the red dashed line feature precise withholding, i.e., that the sum of withholding taxes of the two spouses matches the income tax. In withholding tax systems below the red dashed line, households are overwithheld, in tax systems above households 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 before marriage.

The figure shows that in the current withholding tax system in Germany, the example couple can avoid both over- and underwithholding by choosing the men-favoring schedule. Choosing either the symmetric or the women-favoring schedule would result in substantial overwithholding of the couple. However, comparing the monthly take-home pay under the men-favoring schedule to both those implied by the German reform option and the French implementation highlights how unequal it distributes the joint taxation benefit among the spouses. While under the men-favoring schedule the husband receives all of the joint taxation benefits and an additional transfer from his wife, the other two implementations result in a much more equal

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distribution of the joint taxation benefit. In the German reform option, which scales down the individual withholding tax rates with a common factor, each spouse receives a share of the joint taxation benefit equal to their share of income taxes within the couple in absence of joint taxation benefits. In the French approach, which sets the average income tax rate paid by the couple as a common withholding tax rate for both spouses, each spouse receives a share of the joint taxation benefit equal to their gross income share within the couple.[32] Interestingly, the implementation in the US mirrors the men-favoring schedule, but instead assigns all the joint taxation benefits and a transfer from the husband to the wife.

Marginal Withholding Tax Rates. Since the presence of joint taxation benefits results in different marginal income tax rates for the spouses compared to individual taxation, a decision has to be made to which extent the individual marginal withholding tax rates should reflect the couple's marginal income tax rate. This is of particular importance for secondary earners as the couple's marginal income tax rate is typically higher than their marginal income tax rate under individual taxation. Previous research (e.g., Bick and Fuchs-Schündeln, 2017) has argued that this higher marginal burden caused by joint taxation can lower the work incentives of secondary earners. With the help of the withholding tax system, policymakers can, however, decide the extent to which the individual marginal withholding tax rates reflect the couple's marginal income tax rate and can thereby in light of our previous findings potentially attenuate the negative work incentives for secondary earners.

In Figure 13, we illustrate the effects on the marginal withholding tax rates by comparing how they differ from the couple's marginal income tax rate. Withholding tax schedules in the upper-left quadrant result 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.

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[32]While the illustrations in Figure 12 allow us to compare the effects that the different withholding tax schedules have on the monthly take-home pay, the fact that couples in the current withholding tax system can choose between different schedules makes it impossible to gauge from this figure the effect that a reform of the withholding tax system would have. Therefore, to assess the consequences of a reform of the current system in Germany, we compare the effects on the monthly take-home pay for all married primary and secondary earners along the income distribution in the Appendix D taking into account the current choice of withholding tax schedule and the income of the spouse.
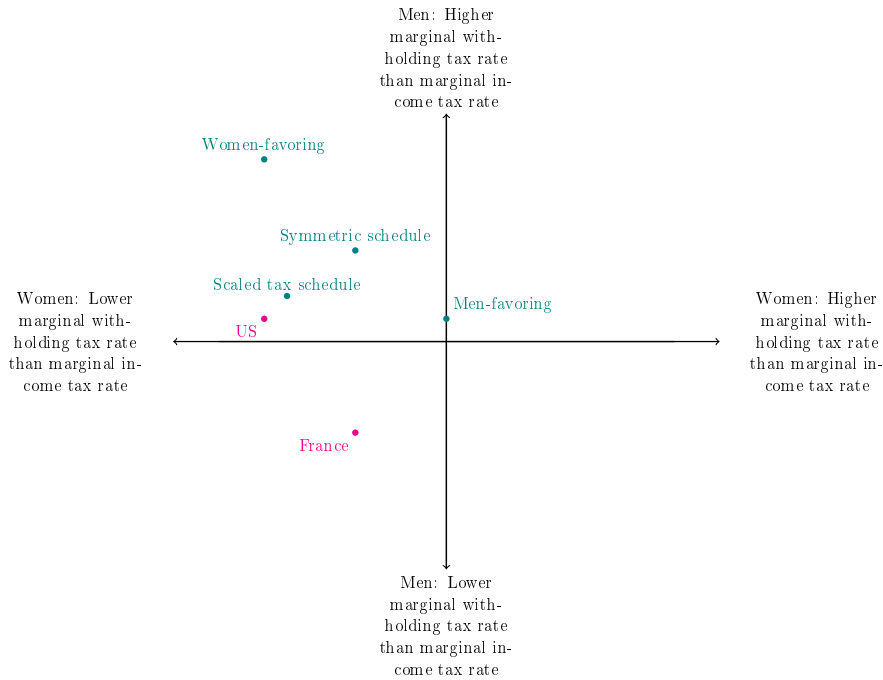
Men: Higher
marginal with-
holding tax rate
than marginal in-
come tax rate

Women-favoring

Symmetric schedule

Scaled tax schedule

Women: Lower
marginal with-
holding tax rate
than marginal in-
come tax rate

US

Men-favoring

Women: Higher
marginal with-
holding tax rate
than marginal in-
come tax rate

France

Men: Lower
marginal with-
holding tax rate
than marginal in-
come tax rate

Figure 13: Marginal withholding tax: Difference to marginal income tax rate of the couple

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 shows that among all withholding tax schedules only the men-favoring schedule comes close to correctly displaying the marginal income tax rate of the example couple in the spouses' marginal withholding tax rates. In general, it holds that a couple that chooses the withholding-tax-minimizing schedule in the current withholding tax system faces marginal withholding tax rates that are very close to the couple's marginal income tax rate.[33]

The two other schedules in the current withholding tax system and the German reform option result in higher marginal withholding tax rates for the man and lower marginal withholding tax rates for the woman compared to the marginal income tax rate of the couple. The French implementation results in lower marginal withholding tax rates compared to the couple's marginal income tax rates for both spouses.[34] It is important to note that among all the discussed withholding tax options, this system has the unique feature that it has the same

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[33]As married couples in Germany typically choose the withholding-tax-minimizing schedule, their marginal withholding tax rates are very close to the couple's marginal income tax rate. We illustrate this in Figure D.2.

[34]We show the effects on the marginal withholding tax rate for all married primary and secondary earners along the income distribution in the Appendix D (see Footnote 32).

marginal withholding tax rate for both partners. This means that the French withholding tax system is the only one that correctly reflects that the marginal working incentives are identical for both partners in joint taxation systems. The implementation in the US results in 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 12 and 13 illustrate the trade-offs that policymakers are facing when designing withholding tax systems for married couples in the presence of joint taxation benefits. Figure 12 shows that all withholding tax schedules that account for the joint taxation benefits are able to eliminate overwithholding, but differ in how they distribute the benefits among the primary and secondary earner. The German reform option and the French implementation result in a much more equal distribution of the joint taxation benefit than the current withholding tax system in Germany. The implementation in the US results in an unequal distribution of the joint taxation benefit similar to the one in the current withhholding tax system in Germany, with the difference that it favors the wife instead of the husband.

Focusing on the marginal work incentives in Figure 13 shows that "average" couples choosing the withholding-tax-minimizing schedule in the current withholding tax system face the "correct" marginal work incentives as the marginal withholding tax is very similar to the example couple's marginal income tax. In contrast, the other options might deceive the individuals about their marginal work incentives as the marginal withholding tax does not equal the couple's marginal income tax.

Nevertheless, given the finding in our paper that individuals react to withholding taxes, deceiving secondary earners by lowering their marginal withholding tax rates below the couple's marginal income tax rates could circumvent the negative work incentives of joint taxation for secondary earners and thus potentially increase female labor supply.

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9 Conclusion

In this study, we show that withholding taxes can affect labor income. For married women in Germany, we estimate an elasticity of labor income after eight years with respect to the marginal net-of-withholding tax rate of about 0.15 using an event-study Diff-in-Diff approach.

Our estimate can be compared to estimates from the literature on the elasticity of taxable income (ETI). As Neisser (2021) shows in a meta-analysis, estimates for the ETI with respect to the income tax range from about 0.2 to about 0.8. This means that our findings are in line with our expectations. On the one hand, motivated by our survey findings, we expect some effect due to individuals' lack of understanding and inattentiveness to the tax system that might make them use their withholding tax liability as proxy for their income tax burden. On the other hand, individuals' reactions should be somewhat less strong than their reactions to income taxes because, in absence of liquidity constraints, fully-informed households should not react to withholding taxes.

The fact that individuals react to withholding taxes implies that governments should be careful when designing withholding tax schedules. Typically, taxpayers receive large refunds when filing income tax returns as the withholding tax does not take into account special deductions. For example, in the US, nearly a third of the amount of all personal income tax payments is returned as tax refunds (Gelman et al., 2022). According to the Federal Statistical Office of Germany, about 88 % of all taxpayers filing their income taxes in Germany received tax refunds for the tax year of 2018 which amounted to 1,072 € per person on average. Our results suggest that these large paybacks go hand in hand with taxpayers overestimating their actual income tax burden, as their withholding tax is much higher than the actual income tax. Hence, governments should redesign their withholding tax systems to better reflect the actual income taxes.

A common source of overwithholding are joint taxation benefits of married couples. We investigate how different withholding tax systems that account for joint taxation benefits affect the marginal and average withholding tax rates of primary and secondary earners. We show that as soon as countries try to reduce overwithholding they have to decide what the individual marginal and average withholding tax rates are that each spouse faces and thereby have to make a decision on how the joint taxation benefit is divided among spouses. We

show that different implementations result in significantly different withholding tax rates for primary and secondary earners. Given our empirical results, countries can therefore affect the labor market participation of secondary earners by choosing between different withholding tax systems.

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Appendix A   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 East Germany by adding couple-level fixed effects to our regression. We motivate the underlying reason for this in the following.

To begin, 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 A.1, which displays the percent changes in the annual withholding taxes 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.[35]

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[35] As we show in Figure B.1, our survey reveals that couples in the men-favoring schedule hold more traditional gender norms than those in the symmetric schedule. Comparing only couples with a similar within-
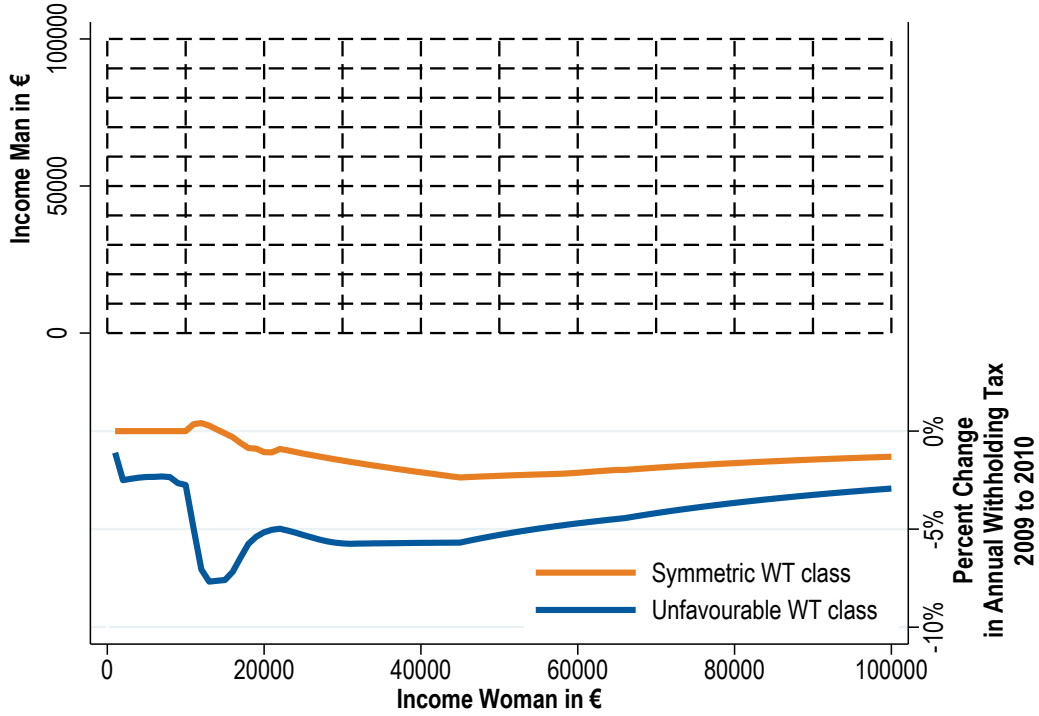
Figure A.1: Illustration of Income Cell Approach

Notes: This figure illustrates the idea behind using income cell fixed effects. The lower part of the figure displays the percent change in withholding taxes induced by the reform in 2010. It is therefore a relative representation of Figure 6. 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.

In order to address these above-outlined channels, we follow an empirical approach brought forward recently by Carbonnier et al. (2022) that is based on dividing observations into cells to exploit variation in treatment within each cell. In our preferred specification, we classify each individual into one of 400 cells based on own and spousal pre-reform labor income in 2009 and dummies indicating parenthood and residence in East 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 3. Thereby, we ensure that the compared individuals are more similar in observable characteristics. The cells are created by interacting evenly spaced bins of 10,000 € of both own and partner income. Each of the 100 cells is then interacted with dummies for parenthood and residence in East Germany. By adding the resulting couple-

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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.

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 A.1. Along the x-axis, the cells help to control for own pre-reform labor income so that differences in 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 women earning 30,000 € with a partner earning 20,000 € has very different work and tax incentives compared to the same women with a spouse 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 A.1.
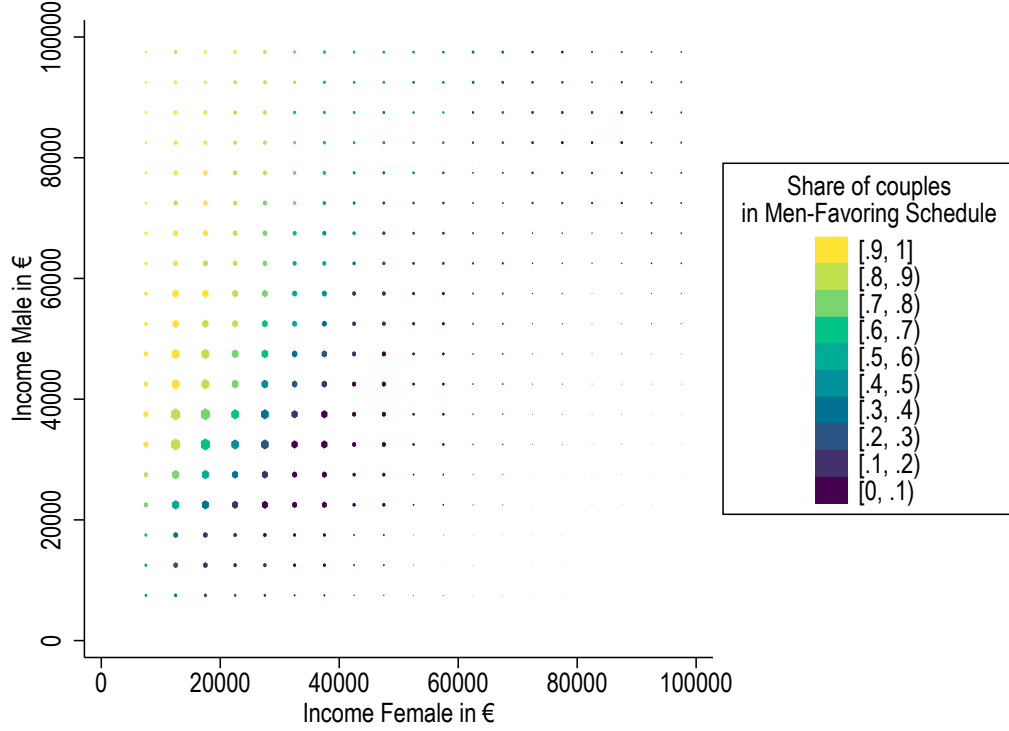
Figure A.2: Heatplot: Number of Observations and Share of Couples in Men-favoring Schedule

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 € woman and man income. For example, the cell at the top right corner contains women and men with an income between 95,000 € and 100,000 €. Incomes below 5000 € are not displayed as they are not part of our analysis. The size of each bin represents the number of observations in our sample. 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 withholding tax schedule at the time of the reform. It measures how much variation between the two withholding tax classes can be exploited for each cell.

The variation that we can exploit by the bin approach is illustrated in Figure A.2. 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 being in the men-favoring or symmetric withholding tax schedule. The size of each bin represents the number of observations, meaning that bins 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 bins there is a considerable amount of variation in the choice of withholding tax schedules.

Appendix B   Additional Details about the Survey

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

B.1   Implementation

We pre-registered our survey with the Open Science Foundation 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.[36] Furthermore, we restrict the sample to respondents with employed spouses. This makes sure that we can elicit information on wage transfers from and between both spouses and makes the sample more comparable to the sample for our main analysis with observational data.[37] Our final sample then consists of 506 respondents (258 men, 248 women).

The survey questions can be divided broadly into four main categories. Foremost, 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 B.1 documents descriptive statistics of the survey answers.

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

[37] 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.

Table B.1: Survey Descriptives

	N	Mean	SD	Min	Max
Demographics					
Women	506	0.49	0.50	0.00	1.00
Age	506	39.39	8.67	22.00	57.00
At least one child	500	0.61	0.49	0.00	1.00
High school degree	506	0.79	0.41	0.00	1.00
Work Related Variables					
Income	443	46896	23532	5000	100000
Income partner	438	43790	23904	5000	100000
Working hours	506	34.45	9.74	5.00	65.00
Working hours partner	506	34.08	10.53	0.00	70.00
Gender Norms					
Husband should have last word at home	506	1.89	1.43	1.00	7.00
Both partners should work the same	506	2.63	1.71	1.00	7.00
Husband responsible for financial security	506	2.80	1.86	1.00	7.00
Gender norm index	506	0.00	1.00	-1.13	3.58
Household Finances					
Men-favoring schedule	506	0.35	0.48	0.00	1.00
Tax consultant decided on withholding tax class	506	0.09	0.28	0.00	1.00
Shared bank account	506	0.55	0.50	0.00	1.00
Joint tax declaration of couple	501	0.96	0.19	0.00	1.00
Husband's wage transferred to joint bank account	506	0.27	0.45	0.00	1.00
Tax refund on shared bank account	506	0.44	0.50	0.00	1.00
Feel financial constraint at end of month	483	0.44	0.50	0.00	1.00
Tests of Knowledge					
Correct identification of existing wt schedules	506	0.39	0.49	0.00	1.00
Understood difference IT/WT before survey	506	0.16	0.37	0.00	1.00
Understood impact WT Schedule on WT	506	0.61	0.49	0.00	1.00
Withholding tax impacts unemployment benefits	506	0.30	0.46	0.00	1.00
Withholding tax impacts parental leave benefits	506	0.43	0.50	0.00	1.00
Self-reported Knowledge					
Difference IT/WT before survey	506	0.54	0.50	0.00	1.00
- Among those who failed knowledge test	423	0.52	0.50	0.00	1.00
Impact WT Schedule on WT	506	0.95	0.22	0.00	1.00
- Among those who failed knowledge test	196	0.91	0.29	0.00	1.00
Overall Sample Size	506				

Notes: The Table displays descriptive statistics for the answers to the survey (see Appendix F for the full questionnaire). Income and working hours were asked in brackets and the respective mean was assigned to every individual. 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.

B.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.[38]

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 B.2, women less often than men know that withholding taxes do not have an influence on the final income tax burden. 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 burden 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.

Household finances. To investigate the organization of household finances, we broadly classify couples into three groups with respect to their usage of bank accounts and the destinations of the wage payments from their monthly payslips: (i) Couples without a shared bank

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[38]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 F for the exact wording of the question.

account, (ii) couples with a shared bank account who get both their wages directly transferred to that account, and (iii) couples with a shared bank account where both spouses get their wages directly transferred to their own bank account. These categorizations are of particular relevance for couples that picked the men-favoring or women-favoring schedule because in these schedules the intra-household distribution of labor income is distorted as the withholding tax liability is partly shifted from one spouse to the other. As we focus on couples in the men-favoring schedule in our main analysis with administrative data, we also concentrate on these here. Furthermore, we investigate onto which bank account tax refunds are transferred as they might be used to counter the distortion of the distribution of labor income.

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 remains largely unchanged as this couple is less likely to have established a compensatory sharing rule. We find that 47 % of the respondents in the men-favoring schedule do not have a shared bank account.[39] Strikingly, of those without a shared bank account, 81 % of the couples in the men-favoring withholding tax schedule let their tax refunds be transferred to the husband's bank account. This compares to 65 % of the couples in the symmetric schedule. Thus, it can be concluded that the distortions of the intra-household distribution of labor income induced by the shifting of the withholding tax liability from husbands to wives in the men-favoring withholding tax schedule are not only not diminished by the distribution of tax refunds but even aggravated.

On the other hand, 32 % of all couples in the men-favoring withholding tax schedule have a shared bank account on which both spouses get their wages directly transferred to.[40] For these households, the above-described distortion of the relative intra-household distribution of labor income appears rather unproblematic.[41] This is particularly the case because we find that almost all of these couples get their tax refund onto the shared bank account and none onto the husband's bank account. When all of a couple's labor income including any tax refund is transferred to a shared account, the choice of the men-favoring schedule likely does not

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[39] When considering couples irrespective of their withholding tax schedules, 45 % of the respondents state to not have a shared bank account.

[40] This compares to about 21 % of the couples in the symmetric withholding tax schedule. This indicates that couples in the men-favoring withholding tax schedule use shared bank accounts as a device to compensate to a limited extent.

[41] This also applies to another 3 % of the couples in the men-favoring schedule where the husband's wage income gets directly transferred to either his wife's account or the shared account and the wife's wage income gets directly transferred to her own account.

directly impact the consumption opportunities of women, as they can probably use the money on the shared bank account for their private consumption. However, the bargaining power within the household might still be impacted if the transfer of the withholding tax liability, induced by the men-favoring schedule, is not understood and the shifted labor income is thus mentally attributed to the husband instead of the wife.

For the 16 % of the couples in the men-favoring withholding tax schedule that have a shared bank account but receive their wage incomes to each spouse's personal bank account, it is less clear if households are compensated for the redistributive effect of the men-favoring withholding tax schedule.[42] In these cases, the money from the respective personal bank account can be seen as typically designated for the account holder's individual consumption while both partners transfer a share of their personal income to the shared bank account. We further examine in an exploratory fashion whether women are in these cases compensated for the higher withholding taxes they have to pay. Couples that take into account the redistributional consequences of the men-favoring schedule should have established a transfer rule that requires the husband to transfer a larger part of his income to the shared bank account than his wife.

We find that only 38 % of all couples in the men-favoring schedule that have a shared bank account but receive their wage incomes to each spouse's personal bank account make use of such a transfer rule. This means that even among couples in the men-favoring schedule with a shared bank account, 21 % do not seem to account for the distortion effects of being in the men-favoring schedule. Thus, we can monitor a counteracting strategy for only 42 % of all couples in the men-favoring schedule (those with a shared bank account who either already get their wages directly transferred accordingly or do compensatory payments from the husband to the wife afterward).

Gender norms. As Buettner, Erbe, and Grimm (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

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[42]This applies even more to another 2 % of the couples in the men-favoring schedule where the husband's wage income gets directly transferred to his own account while the wife's wage income gets directly transferred to either the husband's account or the shared account.

when the wife outearns the husband.[43] This phenomenon could be attributed to a gender norm that prescribes the husband to be the main breadwinner (Bertrand, Kamenica, and Pan, 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.[44] From the answers to these questions, we create a standardized index of the traditionality of gender norms where a 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 B.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.

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[43]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.

[44]See Question D18 in Appendix Section F 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).
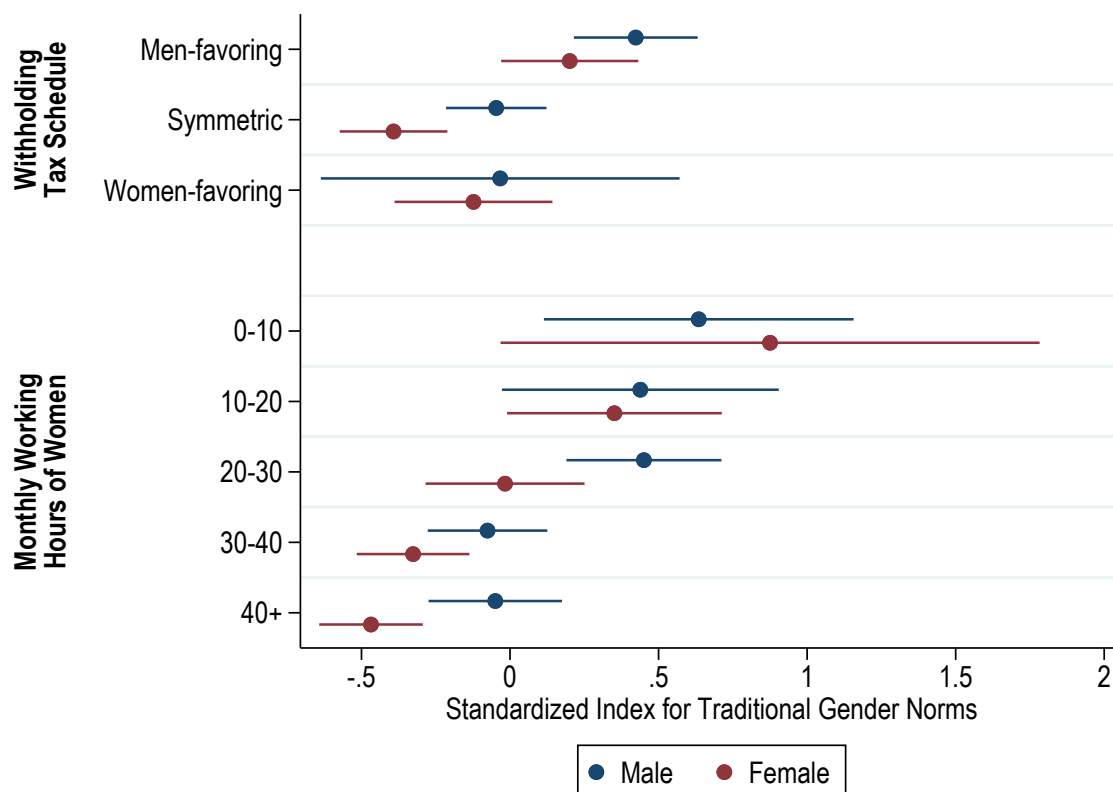
Figure B.1: Gender Norms Index by Gender

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.

Information treatment. We also implemented an information treatment. Our idea was to explain the German withholding tax system, in particular the relationship between the choice of withholding tax classes for monthly take-home pay and the irrelevance of the withholding tax choice for the income tax. We then assessed whether people with these new information at hand want to change their withholding tax classes and adapt their working hours.[45] As Table B.2 documents out of the 506 interviewed individuals, 83 already knew before our provided explanation that the choice of the withholding tax schedule is irrelevant for the income tax. After the explanation of the withholding tax system, we asked again about the optimal withholding tax choice. Among the 423 individuals that could have learned about the

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[45]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.

system with the help of our explanation, only 42 % (179 individuals) learned that 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.

Table B.2: Information Treatment

	N	Mean	SD	Min	Max
Information Treatment					
Correct answer after information treatment	506	0.51	0.50	0.00	1.00
- Among those who were wrong before	423	0.42	0.49	0.00	1.00
+ Information Treatment					
Would change working hours now	171	0.04	0.20	0.00	1.00
Would have changed working hours in the past	171	0	0	0	1
Would change withholding tax class	164	0	0	0	1
- Information Treatment					
Would change working hours now	232	0.12	0.32	0.00	1.00
Would have changed working hours in the past	232	0.20	0.40	0.00	1.00
Would change withholding tax class	164	0.05	0.22	0.00	1.00
Overall Sample Size	506				

Notes: The Table displays the answers to the information treatment. The outcomes for the information treatment are reported for the individuals who have learned and who did not answer "do not know" to the respective questions before or after the treatment.
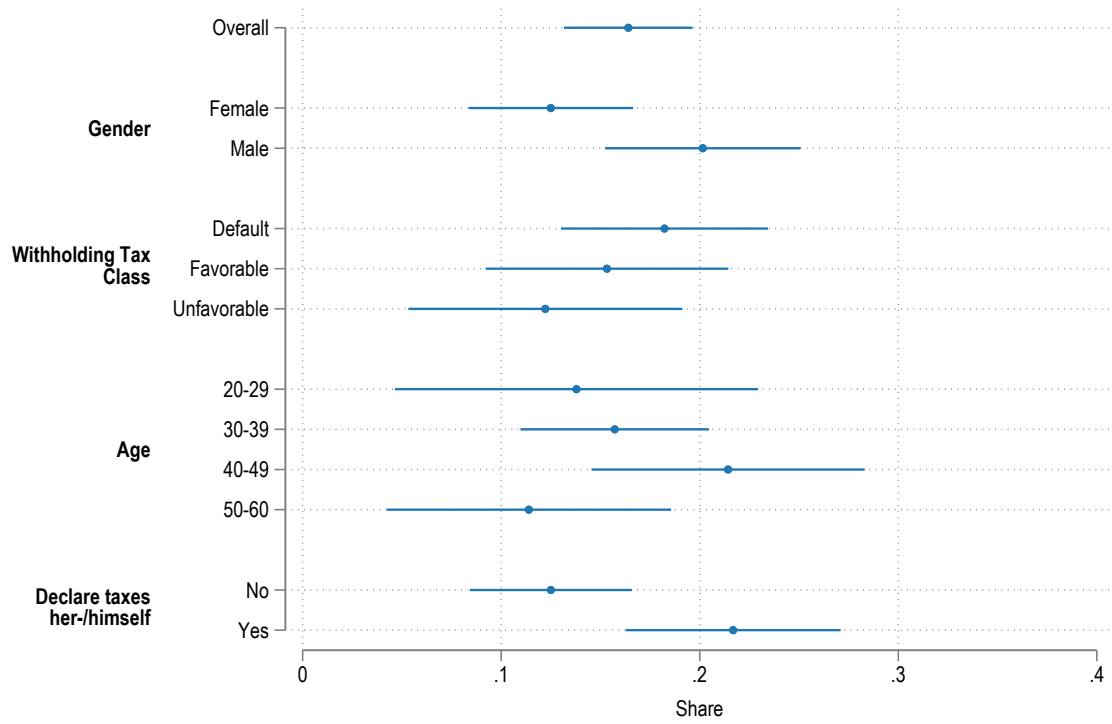
B.3 Survey Figures

Figure B.2: Knowledge of Interlinkage between Withholding Tax and Final Income Tax Burden 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 burden 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 F for the exact wording of the question.
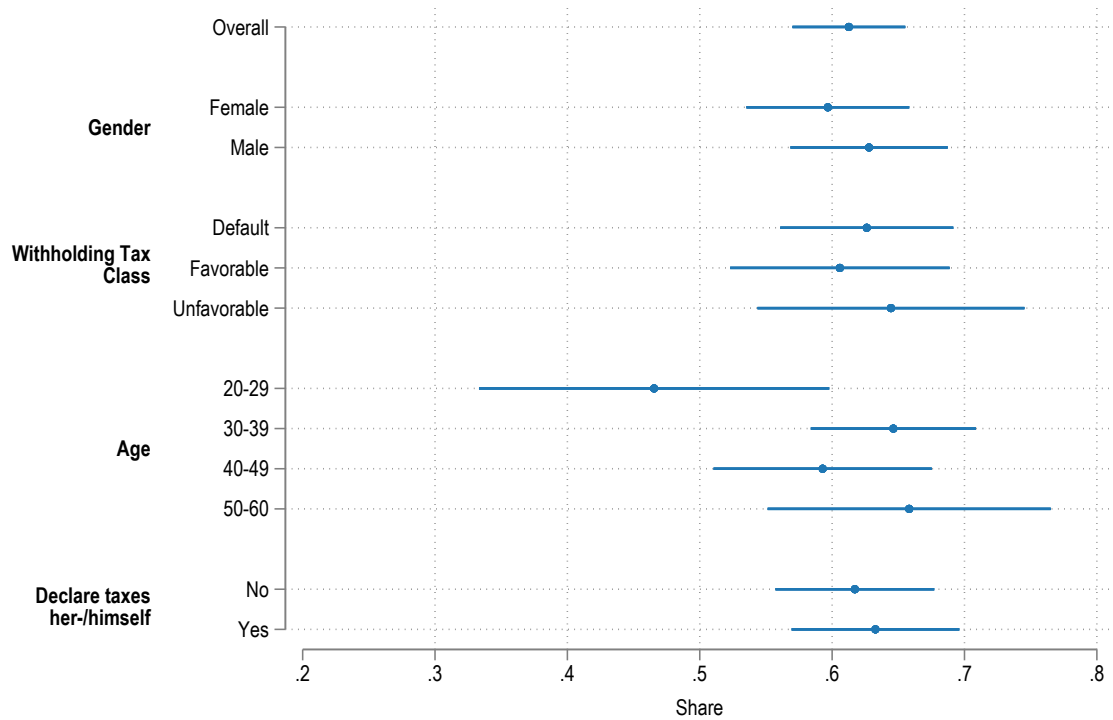
Figure B.3: Knowledge of Interlinkage between Withholding Tax Classes and Monthly Payslip

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 F for the exact wording of the questions.

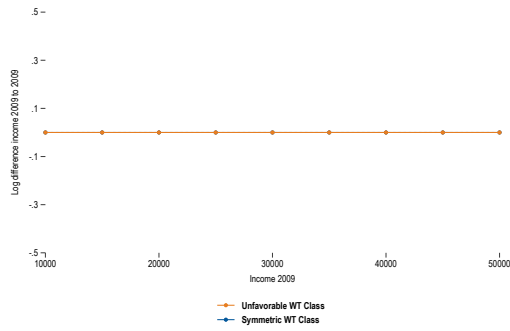# Appendix C   Additional Regression Results related to Section 7

In this Section we present additional results analysing the effects of the reform 2010.
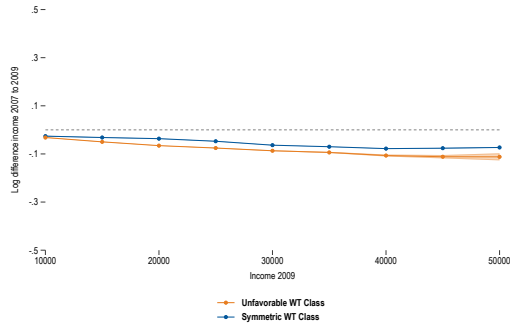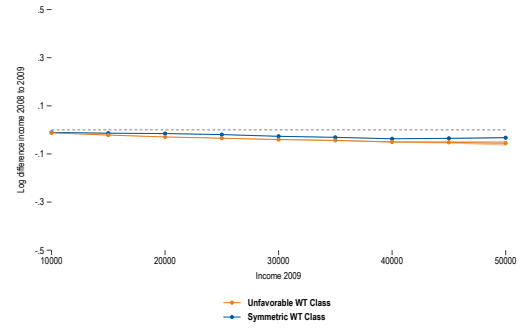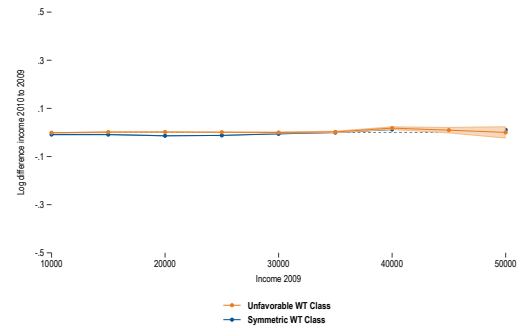
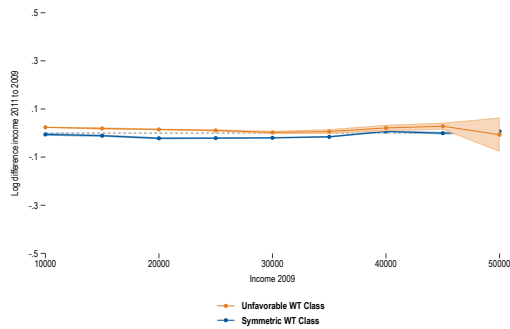(a) 2007 to 2009   (b) 2008 to 2009

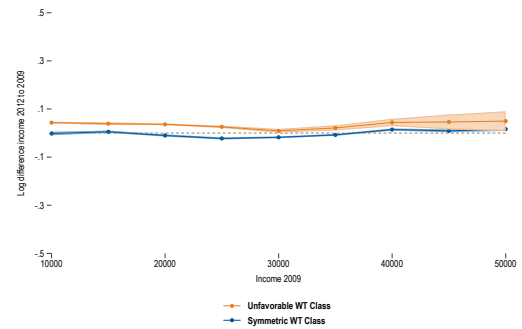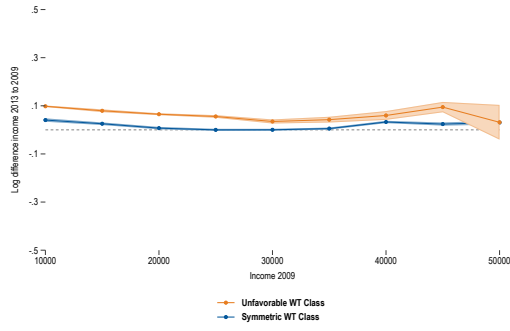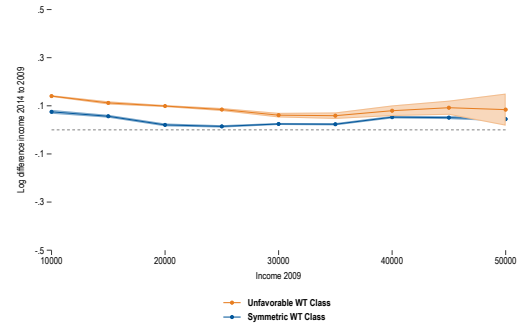(c) 2008 to 2009   (d) 2010 to 2009

(e) 2011 to 2009   (f) 2012 to 2009

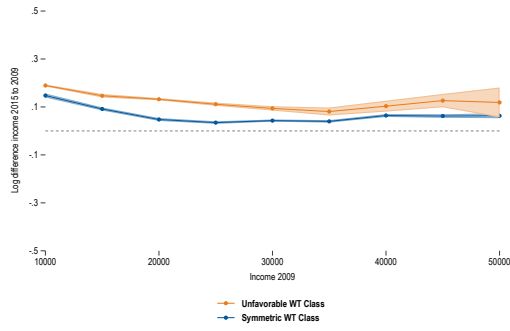Figure C.1: Income growth along the income distribution relative to 2009 (2007 to 2012)

Notes: The figure plots the log income difference in year t relative to 2009 for the years 2007 to 2012. Confidence intervals are plotted at the 95 % level.
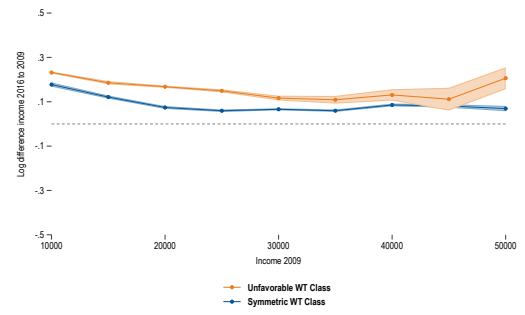
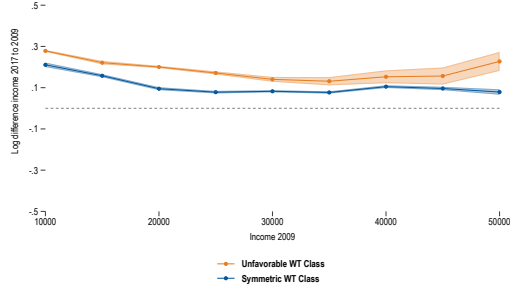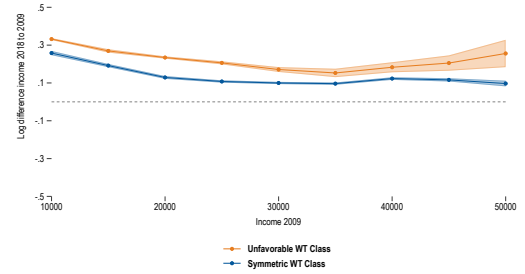(a) 2013 to 2009   (b) 2014 to 2009

(c) 2015 to 2009   (d) 2016 to 2009

(e) 2017 to 2009   (f) 2018 to 2009

Figure C.2: Income growth along the income distribution relative to 2009 (2007 to 2018)

Notes: The figure plots the log income difference in year t relative to 2009 for the years 2013 to 2018. Confidence intervals are plotted at the 95 % level.

Table C.1: Static Diff-in-Diff Results

	Women		Men	
	(1)	(2)	(3)	(4)
DiD Estimate	0.055***	0.048**	0.026**	0.016
	(0.020)	(0.020)	(0.012)	(0.013)
Cell FE		✓		✓
N	212,547	212,547	212,547	212,547
Adj. R-Squared	0.090	0.117	0.073	0.089

Notes: The table displays the results of the static diff-in-diff estimation using the unbalanced sample. All regressions include individual fixed effects and control 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 East Germany, and years. Standard errors are clustered on the individual level. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
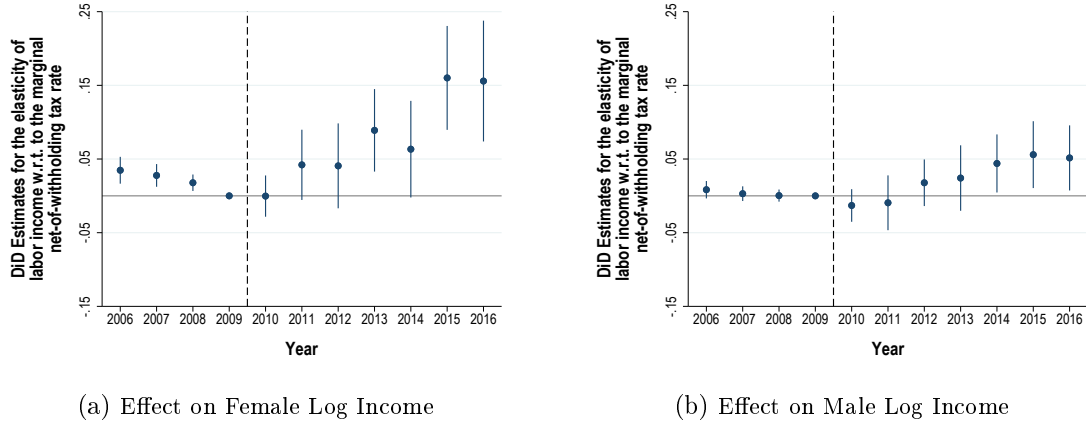

(a) Effect on Female Log Income (b) Effect on Male Log Income

Figure C.3: Event-Study Diff-in-Diff Estimates

Notes: The figure plots the estimates for the elasticity of labor income with respect to the withholding tax estimated based on Equation 7 for women and men using the unbalanced sample. The dependent variable is the log income of the individual, and the independent variable is the treatment intensity. Treatment intensity is defined as the percent change in the marginal net-of-withholding-tax rate of the woman induced by the reform of the withholding tax in 2010. All regressions include individual fixed effects and control 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 East Germany, and years. Confidence intervals are plotted at the 95 % level and based on heteroscedasticity-robust standard errors. Note that the sample excludes households, where at least one member experienced a drop in income by more than 25 % from one year to the next before 2010 to ensure that no individuals directly hit by the financial crises are part of the sample. This explains the smaller standard errors before the reform. The underlying regression coefficients can be found in in columns (2) and (4) of Table C.3.

Table C.2: Event-Study Diff-in-Diff Results

	Women		Men	
	(1)	(2)	(3)	(4)
2006	0.026**	0.018	0.024***	0.027***
	(0.011)	(0.011)	(0.008)	(0.008)
2007	0.016*	0.010	0.007	0.009
	(0.009)	(0.009)	(0.007)	(0.007)
2008	0.011*	0.013*	0.007	0.007
	(0.006)	(0.007)	(0.005)	(0.006)
2009	.	.	.	.
	(.)	(.)	(.)	(.)
2010	0.025**	0.019*	0.009	0.005
	(0.010)	(0.010)	(0.008)	(0.008)
2011	0.058***	0.052***	0.012	0.008
	(0.017)	(0.017)	(0.011)	(0.011)
2012	0.085***	0.069***	0.018	0.015
	(0.022)	(0.022)	(0.013)	(0.014)
2013	0.143***	0.127***	0.025*	0.021
	(0.025)	(0.025)	(0.014)	(0.015)
2014	0.156***	0.133***	0.030**	0.026*
	(0.027)	(0.026)	(0.014)	(0.014)
2015	0.190***	0.168***	0.027*	0.022
	(0.028)	(0.027)	(0.016)	(0.017)
2016	0.223***	0.197***	0.025	0.025
	(0.030)	(0.030)	(0.018)	(0.019)
Cell FE		✓		✓
N	121,429	121,429	121,429	121,429
Adj. R-Squared	0.336	0.375	0.301	0.317

Notes: The table displays the estimates for the elasticity of labor income with respect to the withholding tax estimated based on Equation 7 for women and men using the balanced sample. The dependent variable is the log income of the individual, and the independent variable is the treatment intensity. Treatment intensity is defined as the percent change in the marginal net-of-withholding-tax rate of the woman induced by the reform of the withholding tax in 2010. All regressions include individual fixed effects and control 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 East Germany, and years. Note that the sample excludes households, where at least one member experienced a drop in income by more than 25 % from one year to the next before 2010 to ensure that no individuals directly hit by the financial crises are part of the sample. This explains the smaller standard errors before the reform. Standard errors are clustered on the individual level. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table C.3: Event-Study Diff-in-Diff Results

	Women		Men	
	(1)	(2)	(3)	(4)
2006	0.051***	0.035***	0.011*	0.008
	(0.009)	(0.009)	(0.006)	(0.006)
2007	0.036***	0.028***	0.005	0.003
	(0.008)	(0.008)	(0.005)	(0.005)
2008	0.018***	0.018***	0.002	0.000
	(0.006)	(0.006)	(0.004)	(0.004)
2009	.	.	.	.
	(.)	(.)	(.)	(.)
2010	0.001	-0.000	-0.004	-0.013
	(0.014)	(0.014)	(0.011)	(0.011)
2011	0.041*	0.042*	0.002	-0.009
	(0.023)	(0.024)	(0.019)	(0.019)
2012	0.054*	0.041	0.026	0.018
	(0.029)	(0.029)	(0.016)	(0.016)
2013	0.108***	0.089***	0.033	0.024
	(0.028)	(0.029)	(0.021)	(0.023)
2014	0.097***	0.063*	0.056***	0.044**
	(0.034)	(0.033)	(0.019)	(0.020)
2015	0.184***	0.160***	0.076***	0.056**
	(0.036)	(0.036)	(0.021)	(0.023)
2016	0.176***	0.156***	0.069***	0.051**
	(0.041)	(0.042)	(0.022)	(0.023)
Cell FE		✓		✓
N	212,547	212,547	212,547	212,547
Adj. R-Squared	0.090	0.117	0.073	0.089

Notes: The table displays the estimates for the elasticity of labor income with respect to the withholding tax estimated based on Equation 7 for women and men using the unbalanced sample. The dependent variable is the log income of the individual, and the independent variable is the treatment intensity. Treatment intensity is defined as the percent change in the marginal net-of-withholding-tax rate of the woman induced by the reform of the withholding tax in 2010. All regressions include individual fixed effects and control 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 East Germany, and years. Note that the sample excludes households, where at least one member experienced a drop in income by more than 25 % from one year to the next before 2010 to ensure that no individuals directly hit by the financial crises are part of the sample. This explains the smaller standard errors before the reform. Standard errors are clustered on the individual level. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table C.4: Heterogeneity Analysis: Static Diff-in-Diff Results

	Women (1)	Men (2)
Panel A: East vs. West Germany		
West	0.058***	0.015
	(0.021)	(0.013)
East	-0.032	0.030
	(0.053)	(0.036)
Panel B: Level of Pre-Reform Commuting		
Low Commuting	0.047**	0.011
	(0.023)	(0.016)
High Commuting	0.038	0.013
	(0.036)	(0.021)
Panel C: Parent vs. Non-Parent		
Non-Parent	0.034	0.031
	(0.027)	(0.019)
Parent	0.059**	-0.003
	(0.027)	(0.017)
Panel D: Age of Youngest Child		
Youngest Child below 6	0.107	0.036
	(0.250)	(0.071)
Youngest Child betw. 6 and 18	0.058**	-0.004
	(0.027)	(0.017)
N	212,547	212,547
Adj. R-Squared	0.105	0.084

Notes: The table displays the results of the static diff-in-diff estimation, allowing for treatment heterogeneity by observable characteristics and using the unbalanced sample. All regressions include individual fixed effects and control for potentially time-varying characteristics of the couple. Panel A includes cell fixed effects controlling for binned own and spousal pre-reform labor income interacted with dummies for parenthood, and years. Panel B includes cell fixed effects controlling for binned own and spousal pre-reform labor income interacted with dummies for parenthood, residence in East Germany, and years. Panel C and C include cell fixed effects controlling for binned own and spousal pre-reform labor income interacted with years. Standard errors are clustered on the individual level. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table C.5: Static Diff-in-Diff Results Controlling for Average Tax Rate

	Women		Men	
	(1)	(2)	(3)	(4)
Marginal WT Rate	0.048**	0.038**	0.016	0.017
	(0.020)	(0.019)	(0.013)	(0.013)
Average WT Rate		0.008**		-0.009***
		(0.004)		(0.003)
Cell FE	✓	✓	✓	✓
N	212,547	210,108	212,547	210,108
Adj. R-Squared	0.117	0.151	0.089	0.091

Notes: The table displays the results of the static diff-in-diff estimation while additionally including the change in the average net-of-withholding tax rate as an independent variable. The estimation is performed using the unbalanced sample. All regressions include individual fixed effects and control 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 East Germany, and years. Standard errors are clustered on the individual level. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

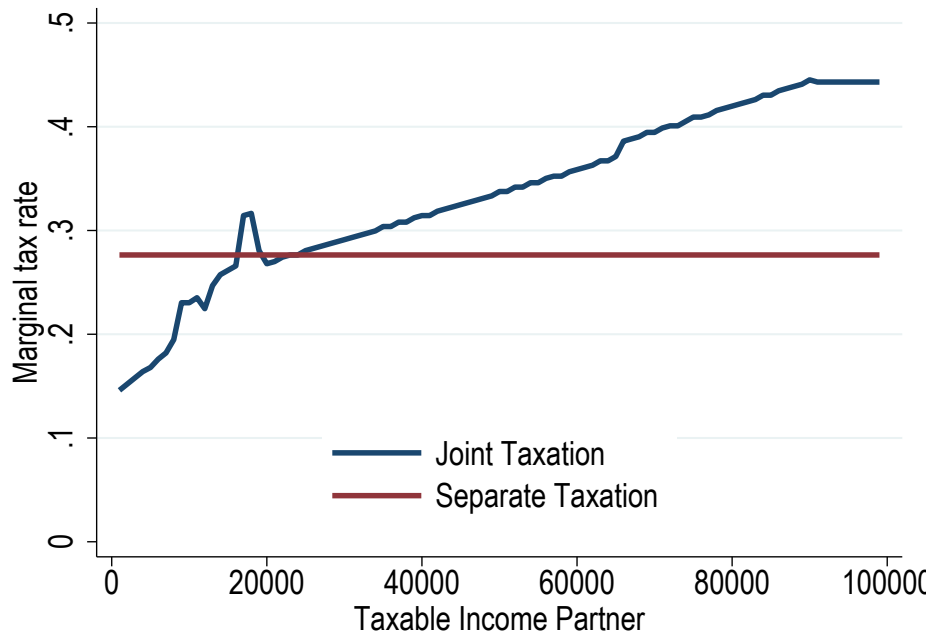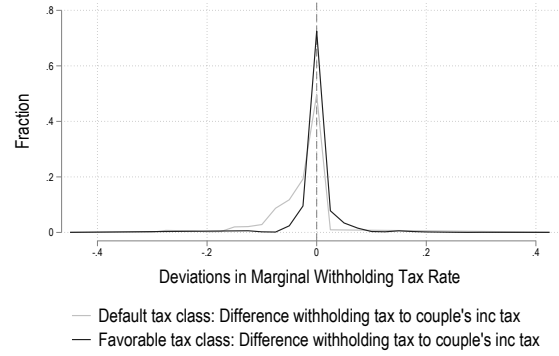# Appendix D   Additional Figures related to Section 8 Policy Implications

Figure D.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.
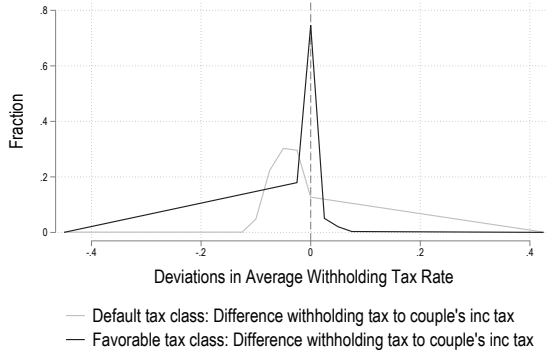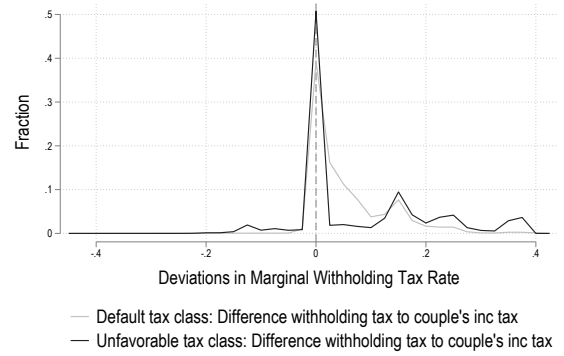
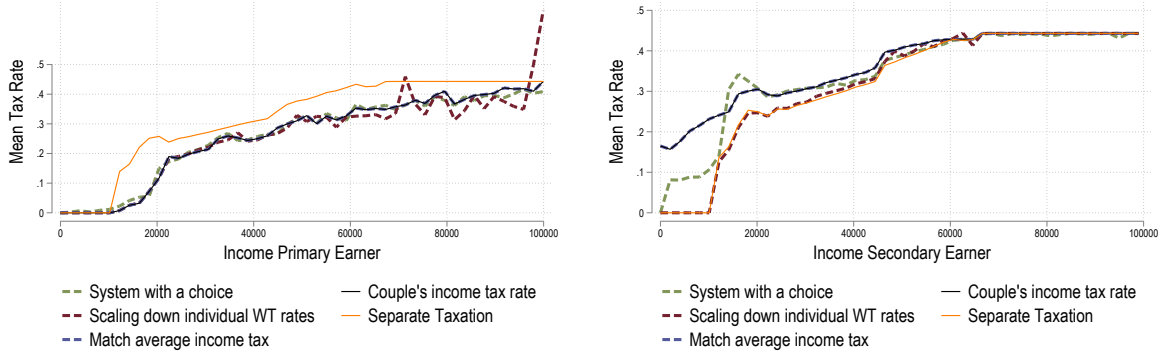(a) Primary Earner: Average Tax Rates   (b) Primary Earner: Marginal Tax Rates
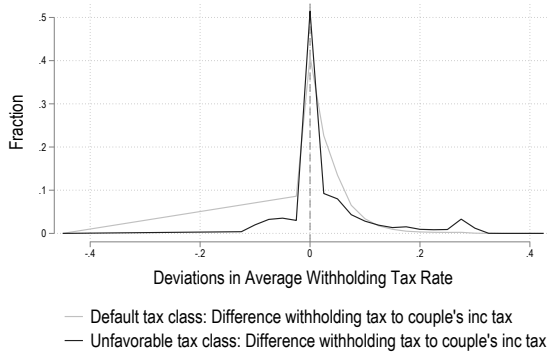
(c) Secondary Earner: Average Tax Rates   (d) Secondary Earner: Marginal Tax Rates

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

Notes: The figures display the deviations in 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. 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 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. To ease the interpretation of the figures, we ignore all non-standard deductions.

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

Figure D.3: 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 E 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 this section, we discuss in detail how we calculate the withholding taxes. The concept of what is included in a withholding tax differs between countries. We decided to take into account all withheld payments that are directly related to taxes. In Subsection E.1, we discuss how we calculate the withholding tax ("Lohnsteuer") in detail, and in Subsection E.2 how we deal with other withheld taxes and social security contributions. In Subscetion E.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.

E.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 after every change in any parameter or function. 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.[46]

E.1.1 Income

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, there is no compensatory mechanism. Due to tax progressivity, the withholding tax liability is thus higher in cases of fluctuating income than in cases of stable income. The tax data does not include monthly variables, as only annual income is observable. Based on the annual income, we calculate the withholding tax liability. If the individual earned the same amount every month, the yearly withholding tax would simply be the monthly withholding tax multiplied by 12. However, if there are fluctuations in the income stream, we underestimate the amount of withholding taxes paid. As thirteenth and sometimes fourteenth salaries, paid out as christmas pay ("Weihnachtsgeld") or holiday pay ("Urlaubsgeld"), are very common in Germany, they most likely constitute the most important sources of measurement error that we have.

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[46]We do not consider whether taxpayers file their income taxes separately or jointly, as this has no impact on the withholding tax.

E.1.2 Withholding Tax Class

We observe every taxpayer's withholding tax class.

E.1.3 Proportional Tax Allowances for Elderly Retired Persons

As we only consider individuals in working age (between 20 and 60), we do not observe individuals that are eligible for proportional tax allowances for elderly retired persons ("Altersentlastungsbeiträge").

E.1.4 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.[47]

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.

No contributions to public pension. Some regularly employed employees are exempt from contributing to all public insurance systems. Most prominently, public servants are

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[47]In fact, the reform we exploit is based on a change in the automatic deduction of payments for health care.

excluded from the public pension system and typically hold private health insurance without contributing to the public health insurance. Also, members of the military, priests, and interns are not obliged to contribute to the public insurance system.

E.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. This is also true in the case of payment from several years work ("Vergütung aus mehrjähriger Tätigkeit").

Individuals have under very special circumstances the possibility to decrease their withholding tax. First, the "Hinzurechnungsbetrag" 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.

E.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 *Lohnsteuer*, 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 burden 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 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 no taxes and are therefore not informative about the misconception of withholding taxes.

E.3   Quality of withholding tax calculations

Figure E.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. Along the whole income distribution, the overall estimate is close to 1. However, the withholding taxes are less precisely estimated for women in the unfavorable withholding tax class. But also for them, the estimate is always larger than 0.9. To be sure that we only include individuals in our analysis where we calculate the withholding tax correctly, we exclude observations where the difference is larger than 10% or larger than 100€ from the analysis.
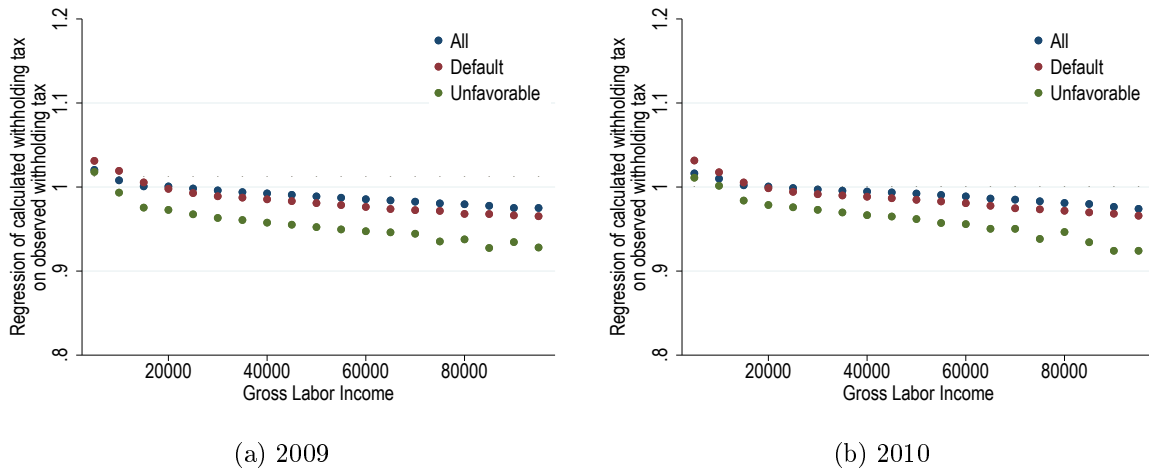
<center>(a) 2009   (b) 2010</center>

<center>Figure E.1: Quality of withholding tax estimation</center>

Notes: The Figure displays the results of a regression of the calculated withholding tax on the actually withheld withholding tax. The assumptions to estimate the withholding tax are discussed in Section E.1 and E.2.

Appendix F   Survey Questions

This section documents the survey questions. Section F.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 F.2 provides a translation into English.

F.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

<center>83</center>

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 Datenschutz-Grundverordnung, 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 Einkommensteuer, 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?

F.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)

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

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

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.

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)

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 bear the lowest final annual tax burden (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)

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)

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)

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

	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 €

You can see that the choice of withholding tax class greatly affects the payroll tax you pay. If both partners are in withholding tax class 4, both partners each pay €700 in payroll tax. If a partner is in withholding tax class 3 instead, she/he pays €350 in payroll tax. In withholding tax class 5, €1,000 in payroll tax is due. As you can see, the payroll tax you pay depends heavily on the withholding tax class you choose. But your partner's payroll 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 payroll tax, I knew that the choice of withholding tax class influences my partner's payroll 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 payroll taxes – even if both partners earn the same amount)

D11 Please take enough time to understand the following information. The final tax burden 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 burden of a married couple. Only the payroll tax is affected by the withholding tax class selection:

	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 €

The payroll tax you pay monthly as a couple is offset against the income tax at the end of the year. So if your paid payroll 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 payroll 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 burden of a married couple, but only on the payroll 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 payroll tax paid does not affect the final tax burden, I knew that the choice of withholding tax classes does not affect the final tax burden)

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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 bear the lowest final annual tax burden (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)

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D13a Withholding tax classes therefore have no effect on the final tax burden of a married couple, only on the payroll 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 burden of a married couple, only on the payroll 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 burden, only on the payroll 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)

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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)

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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)

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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.

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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)

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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.)

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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)

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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

A27 Do you have any comments on the survey or on the subject of withholding tax classes?
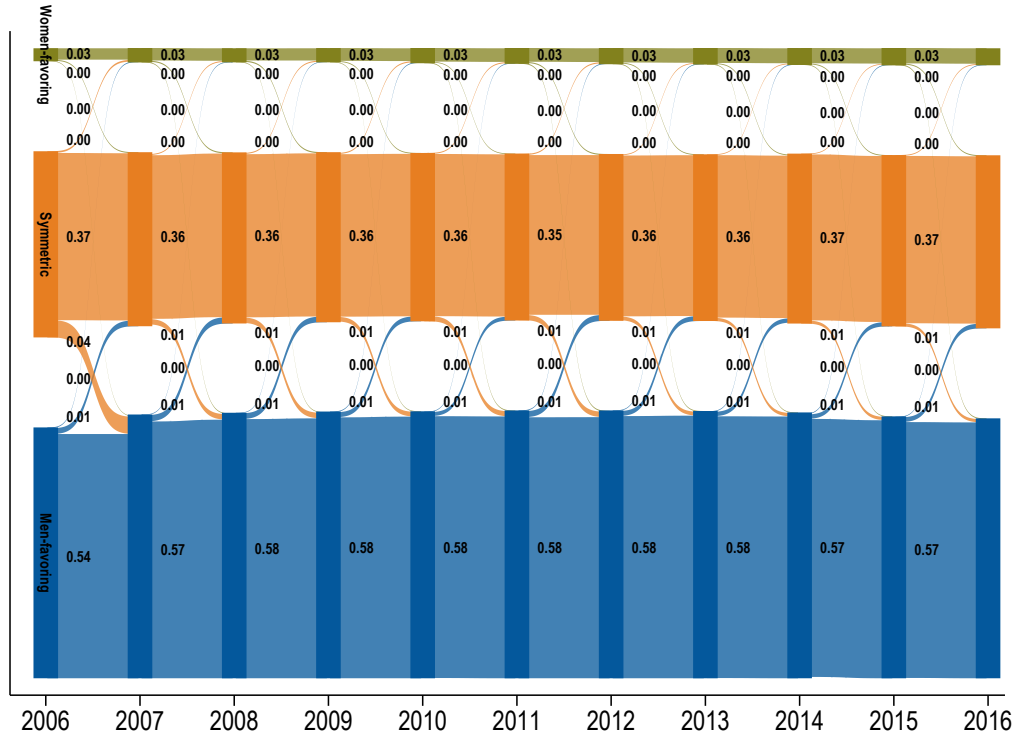
Appendix G   Additional Descriptive Statistics

Figure G.1: 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 graph uses information on all couples in the 5 % sample of the TPP, and no sample restrictions are applied. The figure shows that the choice of withholding tax schedules is relatively stable over time. Only a few couples change between withholding tax schedules and they typically stick with their choice of withholding tax schedules. Note that we only consider direct transitions between withholding tax schedules. 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.

Table G.1: Descriptive Statistics for the Year 2009

	Men-Favoring	Symmetric
Income Wife	19949.01	33411.34
	(8909.25)	(13820.28)
Income Husband	49192.86	39399.81
	(17347.79)	(15881.09)
Female Income Share	0.29	0.46
	(0.09)	(0.11)
Age Wife	46.9	47.1
	(5.83)	(6.44)
Age Husband	49.16	49.11
	(5.98)	(6.41)
Eastern Germany	0.07	0.34
	(0.26)	(0.47)
Has a Child	0.53	0.24
	(0.5)	(0.43)
Number of Children	1.21	0.64
	(0.94)	(0.82)
Catholic Wife	0.39	0.22
	(0.49)	(0.42)
Catholic Husband	0.37	0.2
	(0.48)	(0.4)
Public Servant Wife	0.12	0.14
	(0.32)	(0.34)
Public Servant Husband	0.22	0.18
	(0.42)	(0.38)
N	11366	11867

Notes: The table displays descriptive statistics for the year 2009 for the unbalanced panel for couples who picked either the men-favoring or symmetric withholding tax schedule. They are calculated based on the sample restrictions outlined in Section 6.2. Specifically, we focus on households with dual earners in 2009, in which both partners have received no unemployment benefits and short-time work compensations in 2009, are between 20 and 60 years old in 2009, have no income from self-employment of more than 1,000 € in 2009 and whose incomes were stable between 2006 and 2009, i.e., the income for both household members fluctuated by less than 25 % from one year to the other.

Table G.2: 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)
Income Husband (1000 Euro)	−0.0
	(0.00)
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)
Public Servant Wife	0.031***
	(0.012)
Public Servant Husband	0.008
	(0.01)
Age Wife	0.003**
	(0.001)
Age Husband	0.005***
	(0.001)
Commuting Days Wife (100 days)	−0.005
	(0.004)
Commuting Days Husband (100 days)	−0.0
	(0.004)
Commuting Distance Wife (100 km)	0.009
	(0.027)
Commuting Distance Husband (100 km)	0.012
	(0.017)
Constant	0.891***
	(0.054)
N	11039.0
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, using the balanced sample. Heteroscedasticity-robust standard errors are displayed in brackets.

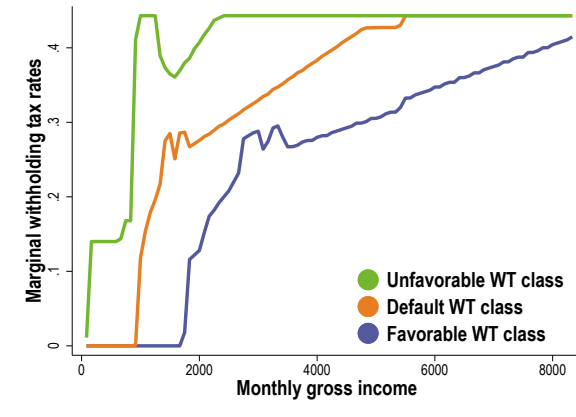# Appendix H   Additional Details on Institutional Setting

Figure H.1: Marginal Withholding Tax Rates 2009

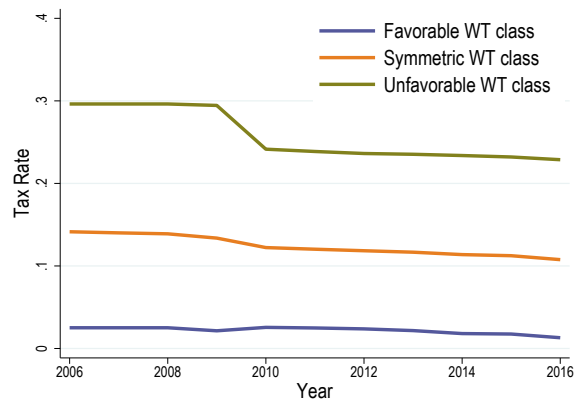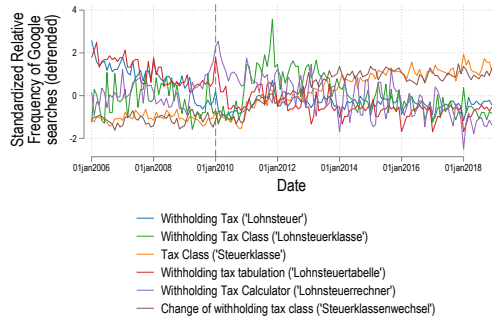*Notes:* The figure plots the marginal withholding tax rates by withholding tax class in 2009.


Figure H.2: 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 2016. 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. The same holds true for all other incomes as well.
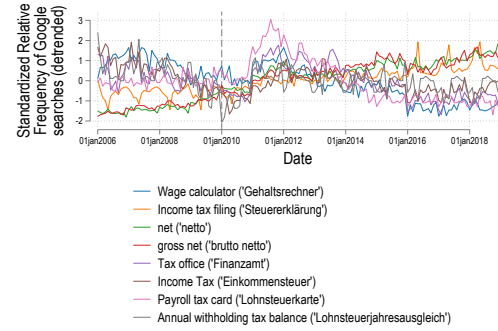
(a) Main search terms   (b) Other search terms

Figure H.3: 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