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Institut für Wirtschaftspolitik und Quantitative
Wirtschaftsforschung

Diskussionspapier
Discussion Papers

No. 08/2015

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ISSN 1867-6707

Tax Planning of Married Couples in East and West Germany

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July 2015

Abstract: This study evaluates the tax planning behavior of married couples with regard to the allocation of tax schedules between spouses in the context of the German income tax splitting. The focus lies on the disparities between East and West German couples since they experienced different political regimes until 1990. The analysis utilizes administrative data on German income tax returns for the year 2004 (FAST 2004). The result of an alternative specific conditional logit estimation indicates that East German couples are substantially more likely to choose equal tax schedules than West Germans (between 17.8 and 19.3 percentage points). East German couples are less likely to allocate the advantageous tax bracket to the husband instead of the wife, even when controlling for income and socioeconomic factors. The conclusion of this analysis is that the tax planning behavior of married couples is influenced by the differences in the socialization of people, caused by the fact that before 1990, East Germany had different tax institutions and political regimes compared to West Germany.

Keywords: Income Tax Splitting; Household Decision; East and West Germany

JEL Classification: H24; H31

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1 Introduction

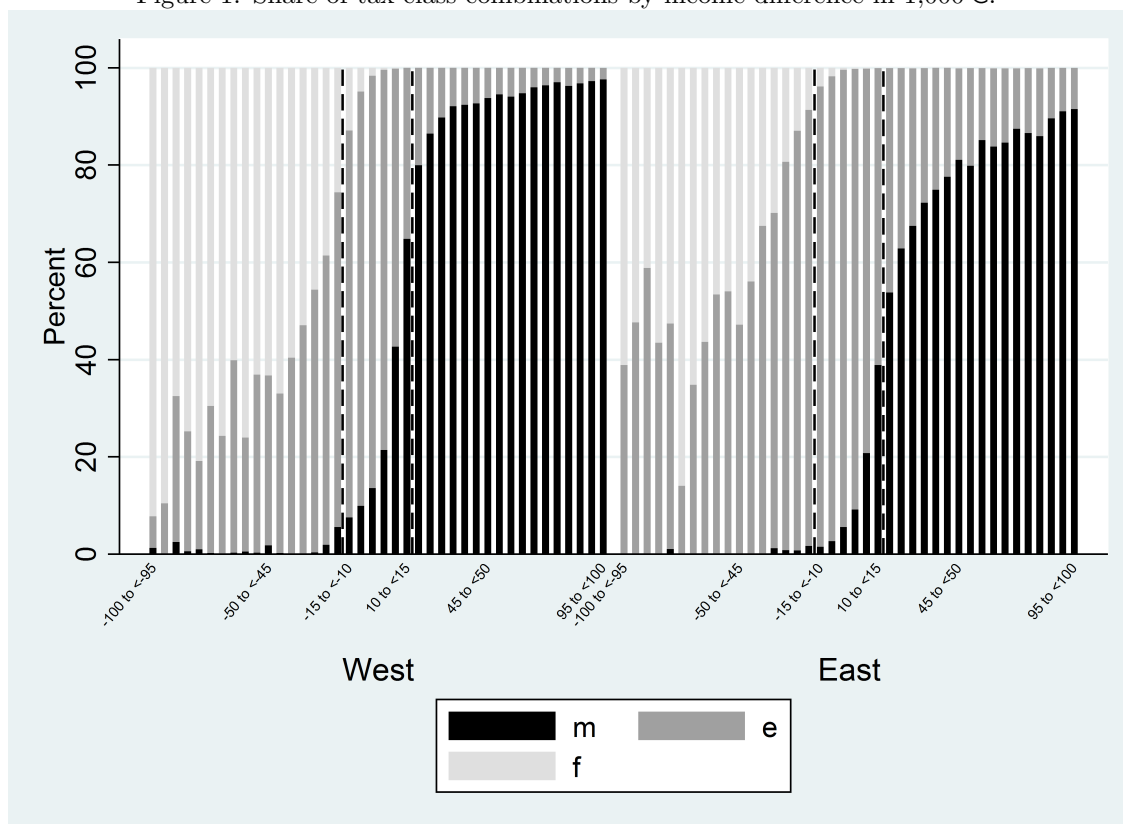
In rational choice theory, we would expect that couples always choose the tax plan that maximizes their aggregate income, under the assumption that the marriage is regarded as one decision unit. What we see in reality is that there are deviations or anomalies¹ in the tax planning behavior of married couples. Figure 1 shows tax choices of married couples in East and West Germany. If all couples chose income maximizing tax classes, the area on the left hand side would be completely filled out with light grey, the area in the middle with medium grey, and the area on the right hand side with dark grey. The figure illustrates that about 20% of West German couples and about 40% of East German couples do not choose the income maximizing tax class combination.

German income tax splitting is convenient to investigate the question, whether anomalies in tax planning behavior exist and how they could be explained. First, German married couples can decide how they allocate tax schedules within the couple. Second, until 1990, there were two different political regimes in place in East and West Germany, handling tax regulations in a complete different manner. After 1990, East Germany implemented the same (tax) laws as West Germany. Third, these different political regimes have a long persisting influence on the individuals. Since East Germans experienced two different kinds of political systems since World War II, East German married couples are a good reference group for West German couples.

There is evidence that East and West Germans have different perceptions on institutions (Alesina and Fuchs-Schündeln, 2007; Rainer and Siedler, 2009), behave differently regarding cooperation and solidarity (Ockenfels and Weimann, 1999), and have different gender role attitudes (Bauernschuster and Siedler, 2010). Alesina and Fuchs-Schündeln (2007) use survey data from 1997 and 2002 to study if East Germans favor state interventions more than West Germans. They find that East Germans have higher preferences for redistribution than West Germans, which they explain by the different forms of government in East and West Germany before 1990. They state that the Eastern German communism in the former German Democratic Republic (GDR) indoctrinated people or just accustomed them to a high level of state interventions. Alesina and Fuchs-Schündeln (2007) also argue that there might be an indirect effect due to poorness caused by communism in East Germany before 1990. They predict that it will last about one to two generations (20–40 years) until the differences between East and West Germans diminish. Using survey data from 1991, 1994 and 2002, Rainer and Siedler (2009) focus on the question, if a political regime has an influence on social trust and institutional trust of individuals. Their findings are that East

¹For other anomalies in consumer behavior see Kahneman, Knetsch, and Thaler (1991).

Figure 1: Share of tax class combinations by income difference in 1,000 €.



Notes: Own calculations with data from the German income tax statistics of 2004. The figure displays the shares of chosen tax class combinations for the range of income differences from -100,000 € to 100,000 €, in steps of 5,000 € for East and West German couples. *m* is the male favoring combination, *e* the egalitarian combination, and *f* the female favoring combination. The area in the middle, between the dashed lines, represents the range of income differences, where it is total net income maximizing to choose *e* (we further refer to the case of total net income maximization as the optimal choice). Left from this area, it is optimal to choose *f*; right from this area, it is optimal to choose *m*. Within the areas on the right hand side and on the left hand side of the area in the middle, it is never optimal to choose *e*, because the income difference is too large (appendix 2 explains this topic in more detail).

Germans had lower social trust than West Germans shortly after the collapse of the GDR and that this difference did not change after reunification. Institutional trust was lower too, but it increased until 2002. Nevertheless, West Germans had still higher institutional trust in 2002 than East Germans.

Another example for different behavior of East and West Germans is shown in a study by Ockenfels and Weimann (1999), which is based on laboratory experiments with East and West Germans. They conduct a dictator game and a solidarity game and find that East Germans give less to others than West Germans. This result suggests that East Germans are less likely to share than West Germans. The authors state that the average belief of East Germans on what the others

will give, equals the real average giving, which is the same for West Germans. Hence, it might be just a different perception of how the others act that is influenced by different economic and social experiences in East and West Germany. Results regarding the different gender role attitudes of East and West Germans by Bauernschuster and Rainer (2010) are related to the studies mentioned above. They find that East Germans have a more nontraditional and egalitarian view of working mothers and the role of wives in the family compared to West Germans. The authors explain this result by social norms that occurred during the time of different political regimes in Germany. In the GDR, full time working women were supported by a wide spread, governmental provided, child care, whereas the West German government incentivized maternal leave and part time work of mothers.

This brief overview on previous studies illustrates that the former different political regimes continue to have an effect on positions in East and West Germany, today. The analysis focuses on a special aspect of the German income tax splitting, which allows to observe if people react only to economic incentives or if they achieve some other objectives in their decisions. Differences in the handling of income tax splitting by East and West Germans can provide evidence on how to adjust family taxation. This is important for policy makers, because family taxation is not just an instrument to generate tax revenue, but to a large extent an instrument of family politics. This aspect is also reflected in the ongoing discussion in Germany whether income tax splitting should be abolished or not. There are different arguments for the cancellation. The most important ones seem to be the disincentive for women to participate in the labor market and the disincentive to work full-time instead of part-time, respectively, because a higher “secondary” income reduces the tax advantage of a married couple.² This effect is strengthened in Germany by the possibility to choose different payroll tax schedules for the spouses. When spouses have different tax schedules, one schedule includes very high marginal tax rates compared to individual taxation and the other schedule includes low marginal tax rates compared to individual taxation. Accordingly, an incentive arises to allocate the tax bracket with the higher relative tax burden to the lower income and the bracket with the lower average tax burden to the higher income. Since married women have a lower income than their husbands in most cases, this institution discourages higher labor market participation of married women.

The main contribution of this paper is to test, if East and West German married couples’ tax planning behavior differs significantly. The fact that anomalies in the planning behavior exist, provides an option to investigate divergences between East and West Germans in this context.

²Selin (2014) finds that the switch in the Swedish tax system from joint to individual taxation of spouses in 1971, increased the labor market participation of married women significantly.

The use of the official income tax statistics can produce new insights in the field of tax planning, because it provides data from the reactions of people to real institutions. The paper is organized as follows. Section 2 gives an overview on the institutional background. Section 3 presents the theoretical framework and section 4 the empirical approach. Section 5 provides the data description. In section 6, the results are discussed and section 7 concludes.

2 Institutional Background

2.1 Differences Between East and West Germany

The case of the reunified Germany is very special since Germany was divided into two different political and economic regimes for over forty years. Before the separation, the population did not differ systematically between the Eastern and Western part of Germany in terms of economic and socio-demographic parameters (Alesina and Fuchs-Schündeln, 2007; Bauernschuster and Rainer, 2010). At the end of World War II, Germany was divided into four occupation zones. East Germany was administered by the Soviet Union, while West Germany was governed by the Western powers: the United States, Great Britain and France. In 1949, two new German states with very different characteristics were founded and they developed in different directions. In West Germany, the Federal Republic of Germany (FRG) emerged to a democratic society with a free market economy. In East Germany, a socialist regime with a regulated economy, was in place.

West Germany's economy grew very fast in the 50s and 60s of the twentieth century. In East Germany, scarcity and uniformity of goods characterized the economy and in 1961, the GDR eventually cut connections to the West by the construction of the Berlin Wall. The different economic designs were interrelated to different economic inequalities within societies. In East Germany, income was less unequally distributed than in West Germany (Huschka et al., 2009). According to the different political goals, the tax systems increasingly diverged. The GDR supported employees, who worked mainly in publicly owned firms, by low wage taxes (Duda, 2010; Buck, 1996). The differences in the two tax systems were also reflected in the taxation of married couples.

Before 1958, household taxation was in place in West Germany. Under this principle, the incomes of all family members are added and the tax function is applied to its sum. There were some exemptions, but in general, this principle of taxation resulted in a disadvantage for spouses, when both partners received income. Accordingly, in 1958, a reform with the objective to remove the

disadvantage in income taxation for marriages took place in West Germany. The income tax splitting was implemented and is still in place today (Bundesministerium für Familie, Senioren, Frauen und Jugend, 2006). This principle of taxation provides a tax advantage for married couples compared to not married couples, as long as the income tax is progressive and the incomes of the partners are different. Before 1990, individual taxation with deductions for married tax payers³ was applied in East Germany (Kreyenfeld, 2004). After reunification and a period of transition of two years, income tax splitting (joint taxation) was completely in place in East Germany, too.

Family politics differed fundamentally in the two German states. The FRG privileged one-earner-couples and set incentives for mothers to stay at home, which should, among others, increase fertility. One important instrument for this policy was the income tax splitting for married couples. The GDR had a different approach. There, political instruments were used to integrate women into the labor market and to support working mothers.⁴ Accordingly, there were financial incentives to get married and have children, but no tax incentives for one-earner-couples (Kreyenfeld, 2004). After the reunification of Germany in 1990, East Germans faced the same institutions like West Germans. This historical setting allows us to look at two groups that experienced different political regimes and have different knowledge and customization with income tax splitting, but the same language and nation. The next subsection gives a short overview on Germany’s income tax splitting in 2004, because this is our year of investigation.

2.2 Income Tax Schedules for Spouses in Germany

The German income tax law treats married couples differently from singles. It provides a special tax schedule that assesses the incomes of the two spouses jointly and includes tax advantages for married couples compared to a non-married couple⁵. This so called “Ehegattensplitting” treats a married couple as one tax unit. Equation 1 shows the comparison between the tax burden of a married couple and a not married couple in a progressive tax system:

$$2 * T(0.5 * Y_C) \leq T(Y_M) + T(Y_F), \quad (1)$$

³In special cases it was possible to declare the income jointly for spouses (Duda, 2010), but in principle the spouses were taxed individually.

⁴Since 1961, the “right and duty” to work was implemented in the East German constitution. Women were expected to fulfill this duty in East Germany like men (Kreyenfeld, 2004).

⁵Married couples have the option to assess separately (§26 I EStG 2004 – The German Income Tax Act), but in standard cases it is more profitable to assess jointly.

with $Y_M + Y_F = Y_C$ and Y as taxable income, subscripts M for male, F for female and C for couple, and $T(Y)$ as tax function. The terms on the right hand side represent the tax burden of two singles, which is simply the sum of their respective tax dues. On the left hand side, the tax burden of a married couple is calculated by applying the tax function to half of the sum of the spouses' incomes and then by doubling this amount. Since the German income tax is progressive, the married couple receives a tax advantage ("splitting advantage")⁶ from joint taxation, as long as the partners have different amounts of income. If both earnings are the same, there is no tax advantage compared to not married persons.

Equation 1 refers to yearly incomes, but this analysis focuses on another specific characteristic of the German tax law for married couples: the different payroll taxes (pre-tax payments) of husband and wife on a monthly basis. The reason for a different treatment of the monthly pre-tax payments by the spouses is the yearly splitting advantage. Income taxes are withheld from earnings of employees⁷ on a monthly basis and they are separately taken from each partner. If the spouses had unequal earnings and these were not be considered by the financial authorities, then the one with the higher earning pays more taxes than necessary according to the yearly tax burden. To prevent this case, the law provides special payroll tax classifications ("Steuerklassen") for spouses. They can choose between three tax class combinations and change their decision only once a year. The choice is always dependent on the choice of the other partner: If one decides to have class 3, the other has to choose class 5 and vice versa, and if one has class 4 the other also has to choose 4. These schedules differ in terms of the number of tax credits they include and the application of the tax function⁸:

$$\begin{aligned} T_3 &= 2 * T(0.5 * Y_I) \\ T_4 &= T(Y_I) \\ T_5 &= 2 * (T(1,25 * Y_I) - T(0.75 * Y_I)), \end{aligned}$$

where the subscripts 3, 4, 5 indicate the tax class. Y_I is the individual taxable income of the spouse who receives the respective tax schedule. The basic tax-free allowance is incorporated in the tax formula⁹. For class 4, the standard formula is applied to the taxable income. The spouse who receives class 3 gets double basic tax-free allowance and the person with class 5 none.

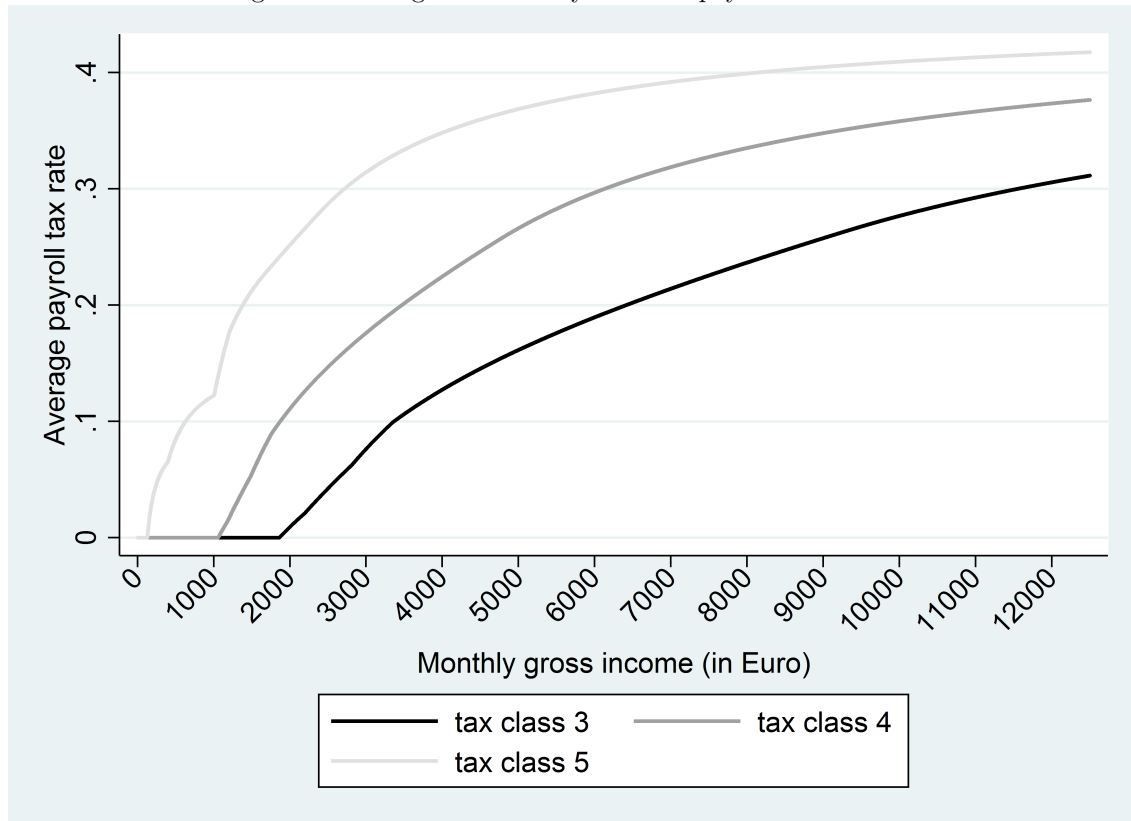
⁶Steiner and Wrohlich (2004) illustrate the splitting advantage for different income distributions within the couple.

⁷This paper deals only with married couples who receive their whole or the majority of their income as employees.

⁸For more details see appendix 1.

⁹In 2004 the basic tax-free allowance was 7,664 €. Details for other allowances are shown in appendix 1.

Figure 2: Average tax rates by different payroll tax classes.



Notes: Own calculations using the program chart (“Programmablaufplan” 2004) by the German Federal Ministry of Finance. Each curve represents the average payroll tax rate for monthly pre-tax payments on wage earnings. The three functions correspond to the three tax schedules the spouses may choose from. These tax functions are based on the German income tax schedule 2004, and include all standard deductions from table 11 in appendix 1.

Hence, the partner with class 3 faces a lower marginal tax rate compared to tax class 4 and the partner with class 5 faces a higher marginal tax rate than with class 4. The different application of tax schedules results in different relative pre-tax payments, emphasized by the average tax rates in figure 2. The relative tax burden at class 5 already increases strongly at very low incomes compared to class 4 and especially to class 3. This difference in tax burdens is mainly driven by the different distribution of tax credits and the difference in marginal tax rates. The two kinks in the average tax rate function at tax class 5 result from a jump of $1.25 * Y_I$ to a higher tax bracket, while $0.75 * Y_I$ remains in a lower tax bracket for a certain range.

3 The Decision Framework

In this analysis, the decision process of a married couple is described by a mixture of the Fehr and Schmidt (1999) model of inequity aversion and an adaption of the discrete choice model on family labor supply decisions by van Soest (1995). We assume that couples have a high income and a low income spouse.¹⁰ Starting from Fehr and Schmidt (1999), the utility of the high income spouse in couple i at tax class combination j is

$$U_{iH}^j = Y_{iH}^j - \beta_{i1}(Y_{iH}^j - Y_{iL}^j). \quad (2)$$

The first term on the right hand side in equation 2 shows that utility increases with the own after tax income. The second term represents the inequity aversion due to the own higher after tax income compared to the spouse. This term decreases utility, depending on the parameter of inequity aversion $1 > \beta_{i1} \geq 0$ and on the amount of the after tax income difference. The utility of the low income spouse is denoted

$$U_{iL}^j = Y_{iL}^j - \alpha_{i1}(Y_{iH}^j - Y_{iL}^j). \quad (3)$$

Again, the own after tax income increases utility. The income difference that results from the higher income of the other spouse decreases utility, depending on the inequity aversion parameter $\alpha_{i1} \geq 0$ and the amount of the income difference.

In the next step we follow van Soest (1995), who assumes that the family utility depends on aggregate after tax income and the husband's and the wife's leisure time. Van Soest (1995) develops a model, where the couple does not decide on a continuous amount of working hours, but on discrete options. We adapt this approach by using a utility function that depends on after tax income of the couple and on the after tax income difference between the spouses. We focus on the choice of different tax schedules, which is a discrete choice between three options. In this kind of partial analysis the labor supply is given and the choice variables are the tax class combinations.

The total utility of the couple is the sum of the two spouse's utilities. We do not use additional weighting parameters, because the consideration of inequity aversion parameters and the income difference account for the relative importance of the respective after tax incomes within the couple.

$$U_i^j = U_{iH}^j + U_{iL}^j = Y_{iH}^j + Y_{iL}^j - (\beta_{i1} + \alpha_{i1})(Y_{iH}^j - Y_{iL}^j) \quad (4)$$

¹⁰If the spouses have identical incomes, it does not matter for the results who is declared as high or low income spouse.

Following van Soest (1995), the couple chooses combination j that generates the largest utility compared to the other tax schedule combinations.

When the couple is not inequity averse ($\beta_{i1} = \alpha_{i1} = 0$), utility maximization is done by choosing combination j that generates the maximum aggregate after tax income $Y_{iH}^j + Y_{iL}^j$. In case that the husband has a sufficiently higher income than his wife, the after tax income maximizing combination would be m and the utility function would determine this choice. If one or both inequity aversion parameters are different from zero ($\beta_{i1} + \alpha_{i1} > 0$), the after tax income difference influences the utility, additionally. In the mentioned case that the husband has sufficiently higher earnings, m would be income maximizing, but the inequity aversion would have a reverse effect on utility. Since m would generate a larger after tax income difference than e , the couple might switch to e , depending on how strong the aggregate inequity aversion of the couple is.

4 Estimation Approach

The main approach is to use the discrete choice model developed by McFadden (1984) to transfer the theory from section 3 into an estimation model. The utility generated by combination j for couple i is not directly observable. The theory suggests that a couple always chooses the combination, which maximizes their aggregate utility. Accordingly, the observable outcome variable is the combination that is actually chosen. This outcome variable is categorical with three unordered alternatives: combinations m , e , or f . This setting corresponds to McFadden's multinomial choice model with the latent variable utility (McFadden 1984). Equation 4 suggests that there is a purely economic argument to choose one of the three tax class combinations: the aggregate couple's after tax income. In addition, equation 4 considers that couples might not only decide by taking purely economic arguments into account, but also with some degree of inequity aversion. This decision process can result in a choice that does not maximize the after tax family income.

In the introduction we motivated the analysis with behavioral differences between East and West Germans. This aspect is considered in the estimation approach by adding a dummy for East German couples. This approach allows to estimate the differences in the probabilities to choose one of the three combinations between East and West German couples, while controlling for economic incentives. We do not interact the multinomial choice model fully with the East dummy, because this method does not allow to give intuitive interpretations of the coefficients of such interaction terms (Greene 2010). Instead, our second step is to simplify the three alternative choices to a binary choice, which can be estimated by a logit model. In such a model, we can interact the

East dummy with all variables and receive some further knowledge on different behavior of East and West German couples. To account for further differences between couples, we include several control variables in the estimation.

From equation 4 we can derive the latent variable model

$$U^* = \beta_0 + \beta_1(Y_{iH}^j + Y_{iL}^j) + \beta_2(Y_{iH}^j - Y_{iL}^j) - \epsilon, \quad (5)$$

with U^* as unobservable utility and $\frac{\beta_2}{\beta_1} = -(\beta_{i1} + \alpha_{i1})$ as aggregate inequity aversion parameter and ϵ as the error term. The response probability for couple i and combination j is (McFadden 1984)

$$P_{ij} = P(y_j = 1|x_i), \quad (6)$$

where y_j is a dummy variable that is 1 if combination j is chosen and 0 otherwise and x_i is a vector of control variables. With this approach, we can test empirically if the probability to choose one of the three alternatives differs between East and West Germans, when controlling for economic incentives and socio-demographic characteristics. Hence, the null-hypothesis to test is

$$\frac{\Delta P(y = j|x)}{\Delta East} = 0. \quad (7)$$

The outcome variable of the decision process is a categorical variable with three non-ordered characteristics: the schedule combinations m , f , and e . To a certain extent, the choice of these combinations can be explained by economic incentives. These incentives are represented by the alternative specific amounts of net incomes of husband and wife. These variables capture the implicit price when selecting one of the possible combinations. Depending on the incomes, one alternative can result in a higher disposable income within the year than another combination. By consideration of the net incomes of husband and wife, we can control for the after-tax income difference between the spouses.

In addition, it is possible that other case specific economic incentives exist. For instance, drawing income substitutes might influence the decision on the schedules, because most transfer payments are calculated with the previous yearly net income, which is influenced by the tax bracket. Another indicator for tax planning that is not directly linked to the earned net income is costs of tax consulting. People who pay a tax adviser might have more complicated cases or special objectives that cannot be directly observed. To control for age, the cohort dummy variables are included.

Since couples, where the wife has a higher income than the husband, may differ in unobservable characteristics (Bertrand et al. 2015), a dummy to capture this case is included. Other personal characteristics are if the couple has children and if the couple is affiliated to the Christian Church. These variables capture attitudes on family and gender roles.

Since two variables are alternative specific and the others are case specific, in this analysis an alternative specific logit model is used (Cameron and Trivedi, 2009). Following the decision model presented in section 3, the probability for couple i to choose alternative j is

$$P(y_i = j | (Y_{iH}^j + Y_{iL}^j), (Y_{iH}^j - Y_{iL}^j), x_i) = \frac{e^{\beta_1(Y_{iH}^j + Y_{iL}^j) + \beta_2(Y_{iH}^j - Y_{iL}^j) + x_i' \gamma_j}}{\sum_{l=1}^3 e^{\beta_1(Y_{iH}^l + Y_{iL}^l) + \beta_2(Y_{iH}^l - Y_{iL}^l) + x_i' \gamma_l}}, \quad (8)$$

with $j = m, f, e$ denoting the three alternatives, and x_i' as the vector of case specific variables, including an East dummy. γ_j is a vector of alternative specific coefficients. Since the outcome variable can take on three values that are not in a particular order, the definition of a base category is needed. Combination e is provided by default by the tax authorities, which means that the tax class combination changes only if both spouses decide in agreement. Accordingly, it is intuitive to choose e as the base category and calculate the coefficients of the other categories against this one. The variable of main interest is the *East* dummy variable that equals 1, if the couple lives in East Germany and 0, if the couple lives in West Germany. This dummy variable captures the systematic differences between East and West German couples. Hence, if the coefficient of this dummy is significantly different from zero, this can be interpreted as a difference in the probability to choose a special tax class combination, which cannot be solely explained by economic incentives or socio-demographic characteristics.

The binary logit model is a more general application of the previously presented alternative specific conditional (asc) logit model. It condenses the decision problem into a choice of two alternatives: to choose the egalitarian alternative e or to choose different tax brackets, i.e. m or f . This simplification of the model helps to get further insights into differences between East and West German couples, because marginal effects of the logit model are easier to interpret than marginal effects of the asc logit model. Since the binary logit model does not include case specific variables, gross total income and gross income difference are included in the estimation. In this specification, we can not control for the alternative specific “price” directly, but we leave the other case specific economic incentives unchanged. Hence, the other control variables are the same as in the asc logit estimation. The probability for couple i to choose equal tax classes is now

$$P(y_i = 1 | x_i) = \frac{1}{1 + e^{-x_i' \gamma}},$$

with $y_i = 0$ denoting unequal tax schedules and $y_i = 1$ denoting equal tax schedules.

5 Data Description

The respective models are estimated using a stratified 10%-sample, drawn from the German income tax statistics for the year 2004 (“Faktisch anonymisierte Lohn- und Einkommensteuerstatistik” – FAST 2004). The sample is drawn from the population of all filed tax returns for the year 2004 in Germany. Table 1 shows the distribution of tax classes in the original sample for East and West Germans. Tax payers with tax class 3, 4, or 5 represent 43% of the observations in the West German subsample and 39% in the East German subsample. Married couples, where both spouses have income from non-self-employed work ($e, m/f$) represent 15% of the West German subsample and 20% of the East German subsample.

Table 1: Overall shares of tax classes in East and West Germany

Tax class	West	East
1	46%	51%
2	2%	2%
3	26%	16%
44 (e)	5%	14%
35/53 (m/f)	10%	6%
4	1%	2%
5	1%	1%
Without	9%	8%
Sum	100%	100%

Notes: Observations with combination e, m , or f include two working partners, the other observations include one working person. The first digit is the tax class of the husband and the second digit denotes the tax class of the wife.

In the following analysis, we use the observations with combination $e/m/f$; accordingly, one observation corresponds to one married couple. The hypothetical tax payments for all three tax class combinations for each spouse are calculated by using the algorithm from the program chart published by the German Federal Ministry of Finance¹¹ for 2004. These calculated tax payments allow to identify the net incomes for all three alternatives for each spouse. This implemented

¹¹This algorithm (“Programmablaufplan”) is published every year for the mechanical calculation of monthly tax payments.

algorithm does not fit for every case, since there are some issues that are not included in the data set.¹² To get a sample with a better fit, outliers are excluded. Accordingly, the upper and lower 5% of the density function of the difference between the actual and predicted tax payment are dropped. Afterwards, about 77% of the male income tax payments are predicted with a lower deviation than 5% from the actual tax payment and about 82% of female tax payments are predicted with a lower deviation than 5%.¹³ The sample now consists of 263,453 observations. Table 2 displays descriptive statistics of the sample and table 3 explains the variable definitions.

Table 3: Definitions and explanations of the variables.

Variable	
Equal	Equal denotes the share of couples who choose combination e . There is a striking difference between East and West German couples: 72.5% of East Germans and only 34.4% of West Germans choose the egalitarian combination.
Optimal	Optimal equals 1 if the couple chooses the net income maximizing combination and 0 otherwise. 21.3% of West Germans and 39.2% of East Germans do not choose optimally. This case was shown by figure 1.
Total gross income	Total gross income of couples in East and West Germany differs too. West German couples have on average a 9,011 € higher total gross income than East German couples. A comparison of the kernel densities of income difference and total gross income between East and West Germany is shown in figure 3. For the income difference there is more probability mass around zero for the East German density function and more mass in the positive range (where the husband has the higher income) for East and West Germans. The kernel densities of total gross income show a similar picture: West Germans have higher total incomes. Accordingly, the main disparity between East and West German couples, regarding household earnings, is the allocation of earned incomes between the spouses.
Total net income at j	Total net income at j shows the sum of the couple's after-tax income. For West Germans after-tax income is on average largest at m and for East Germans at e . The lowest after-tax income is on average generated by f for both subsamples.
Gross income difference	Gross income difference is the yearly gross high income minus the yearly gross low income. The difference in East Germany is about two thirds of the difference in West Germany.
Income difference at j	Income difference at j denotes the after-tax income difference within a couple at combination j . Since the German income tax system is progressive, this variable value is always lower than the gross income difference. For East and West Germans the average difference is largest at combination m and lowest at combination f . The jumps between the values are larger for West German couples.

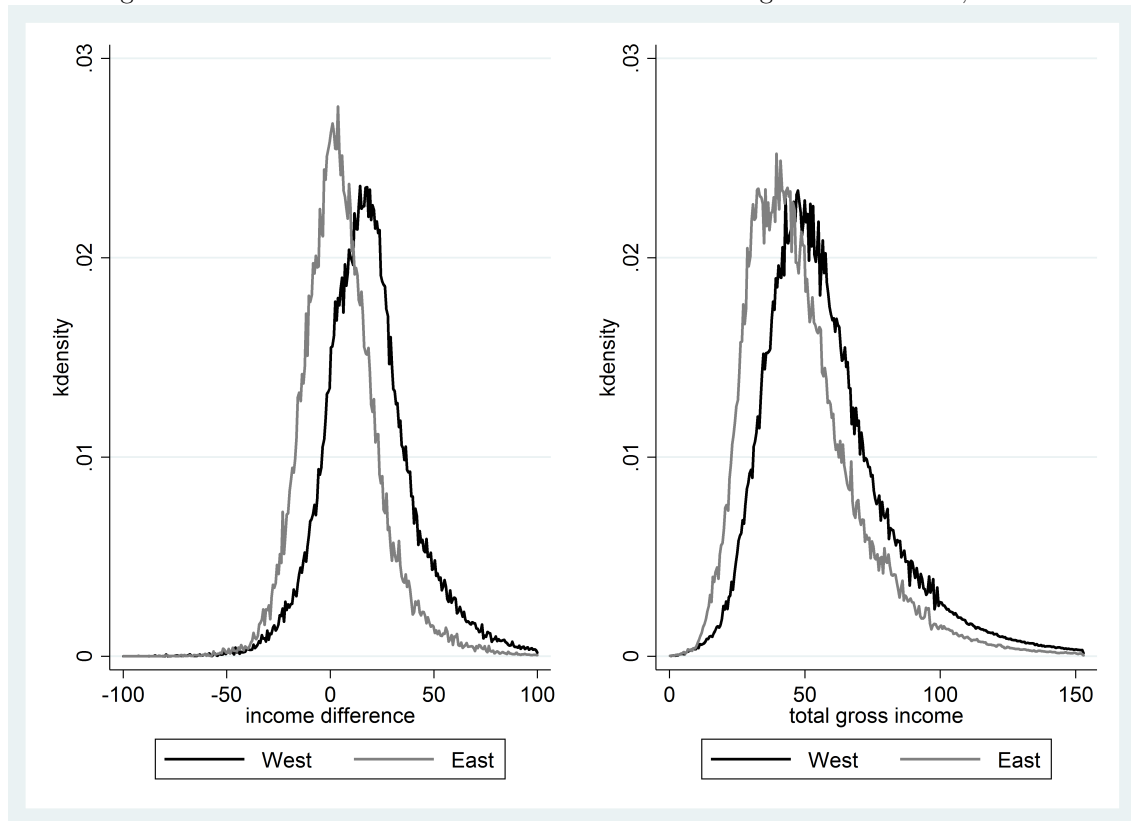
¹²One problem is that real pre-tax payments depend on the monthly income. If monthly income fluctuates, it is not possible to precisely predict the tax payment since only yearly incomes are available.

¹³Accordingly, there is a measurement error in the hypothetical net incomes. Since we found no correlation with personal characteristics, we will assume it to be random.

Table 3: Definitions and explanations of the variables.

Variable	
Share income substitutes high/low	Share income substitutes high is the sum of unemployment benefits, parental leave allowance, sickness benefits, “bad weather” payments, etc. of the high income earner related to the individual gross income. The definition of share income substitutes low is correspondingly for the low income earner.
Costs of tax consulting	Costs of tax consulting is the amount paid to a tax adviser by the couple.
Wife higher income	Wife higher income equals 1 if the wife is the high earner. The share in East Germany is 40.5%, which is more than double of the share of 16.2% in West Germany.
Cohorts	Younger than 35 denotes a dummy variable that is 1 if the husband is younger than 35 years, between 35 and 44 is age 35 to 44, and older than 54 denotes a dummy variable that is 1, if the husband is older than 54 years. These cohorts are defined according to the age of the husband at reunification. Age male and female are highly correlated and accordingly, only the husband’s age is used. Younger than 35 means that the husband was 20 years or younger at reunification. Older than 44 means that the husband was 30 years or older at reunification. The youngest cohort had relatively few experiences with tax institutions in the GDR, the middle cohort had more experience, and in the oldest cohort people lived the largest part of their lives in the GDR and might be influenced by its institutions more than persons from other generations. The shares do not deviate strongly between the subsamples.
Children dummy	The children dummy variable is 1 if the couple has children. Only children that are relevant for tax issues, mainly for child allowances, are displayed in the data. Accordingly, only information on children who are younger than 27 years are available.
Number of children	Number of children contains the number of children (0–4 or more). The number of children is very similar, around one, and the share of East German couples, who have children is five percentage points higher than the share of West German couples.
Religious affiliation	Religious affiliation is a dummy variable that is 1 if the husband is either member of the Evangelic or the Catholic Church and zero otherwise. The religious affiliation of husband and wife is equal for 82% of the couples in this sample. We observe a big difference in this variable: 69% of West German husbands are affiliated to the Christian Church, whereas only 18.9% of the East German husbands are members of the Christian Church. This disparity can be attributed to the anti-clerical policy in the former GDR.

Figure 3: Kernel densities of income difference and total gross income in 1,000 €.



Notes: Own calculations with data from the German income tax statistics of 2004. Income difference is positive, when the husband is the high income earner and negative, when the wife is the high income earner.

Table 3: Definitions and explanations of the variables.

Variable	
Price/Additional payment	Price and additional payment are not included in the estimation model, because they are implicitly captured by the alternative specific after-tax incomes of the couple. Price denotes the amount of money a couple forgoes when it does not choose the total net income maximizing tax class combination. This price is on average 190 € larger for East German couples. Additional payment denotes the difference between pre-tax payments and fixed tax due when the income tax return is done. On average couples get repayments by the financial authorities. These repayments are on average 351 € larger for East German couples.

Before we continue with the estimation model, we take a closer look at the choices made by East and West German married couples. The presented shares of *e*-choosers are very persistent over the East and West German federal states as figure 4 shows. Just the two biggest city states, Berlin and Hamburg, deviate to a certain extent from their subgroup-states. Both states have a larger,

Table 2: Descriptive statistics.

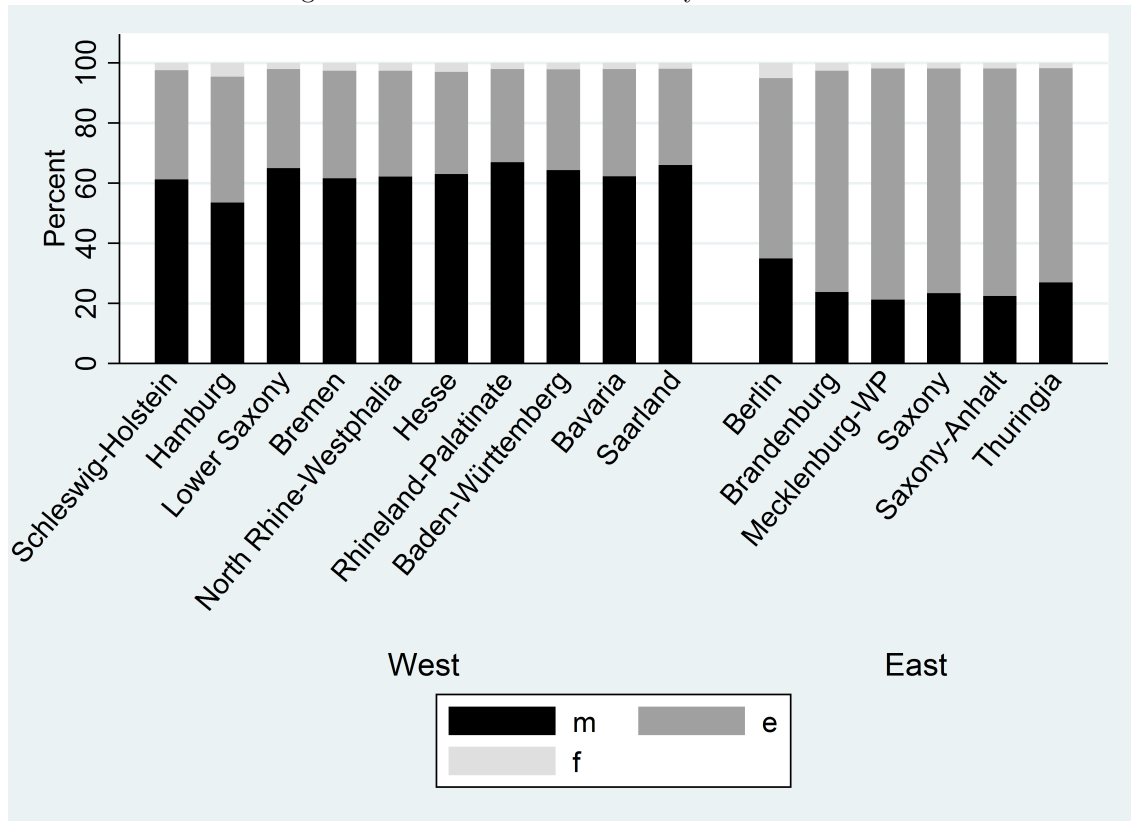
	West (206,020 obs)			East (57,433 obs)		
	mean	(sd)	median	mean	(sd)	median
Equal	0.344	(0.475)	0	0.725	(0.447)	1
Optimal choice	0.787	(0.410)	1	0.608	(0.488)	1
Total gross income in 1,000 €	57.699	(22.731)	53.675	48.688	(21.124)	44.726
Total net income at m in 1,000 €	49.054	(15.055)	46.910	42.410	(14.753)	40.362
Total net income at e in 1,000 €	47.787	(14.085)	46.075	43.008	(13.802)	41.191
Total net income at f in 1,000 €	44.546	(14.481)	42.744	41.271	(13.889)	39.664
Gross income difference in 1,000 €	22.667	(18.726)	18.652	14.490	(13.673)	11.009
Income difference at m in 1,000 €	20.131	(14.756)	19.144	11.507	(12.352)	10.483
Income difference at e in 1,000 €	14.597	(11.109)	12.611	9.806	(8.546)	7.695
Income difference at f in 1,000 €	9.824	(11.266)	9.123	8.504	(9.846)	8.206
Share of income substitutes high	< 0.001	(0.004)	0	< 0.001	(0.002)	0
Share of income substitutes low	< 0.001	(0.010)	0	< 0.001	(0.010)	0
Costs of tax consulting in 1,000 €	0.051	(0.183)	0	0.029	(0.142)	0
Wife higher income	0.162	(0.369)	0	0.405	(0.491)	0
Younger than 35	0.086	(0.280)	0	0.061	(0.239)	0
Between 35 and 44	0.220	(0.414)	0	0.278	(0.448)	0
Older than 44	0.694	(0.461)	1	0.662	(0.473)	1
Children dummy	0.604	(0.489)	1	0.654	(0.476)	1
Number of children	0.998	(0.975)	1	1.003	(0.901)	1
Religious affiliation	0.690	(0.462)	1	0.189	(0.392)	0
Price in 1,000 €	0.254	(0.757)	0	0.444	(0.898)	0
Additional payment in 1,000 €	-0.600	(1.823)	-0.412	-0.951	(1.469)	-0.738

Note: East and West Germans are allocated by place of residence.

but still very small part of f -choosers. Hamburg has a slightly higher share of e -choosers than the other Western states and Berlin (including East and West Berlin) has a slightly lower share of e -choosers than the other East states. According to figure 4, it is strongly persistent over the federal states that West Germans allocate the “better”¹⁴ tax class more often to the husband and East Germans decide more often to have an equal tax treatment for the spouses. The further analysis will test if there are significant and robust differences in the choice of tax schedules between East and West German couples.

¹⁴The term “better” is used for the tax class with the lower relative tax liability, hence class 3.

Figure 4: Tax class combinations by federal states.



Notes: Own calculations with data from the German income tax statistics of 2004. m denotes couples who choose the male favoring tax class combination, e denotes couples who choose equal tax classes, and f represents the share of couples who chose the female favoring combination.

6 Results

Results from the asc logit model are presented in subsection 6.1, which focuses on the probabilities of East and West German couples to choose one of the three tax class combinations. In the following subsection 6.2 a logit estimation checks the previous results and provides further information on the different behavior of East and West German couples.

6.1 Different choosing probabilities

Table 4 displays five specifications of the asc logit model. The baseline estimation in column 1 includes the alternative specific variables total net income and net income difference. In addition to the East dummy, we control for income substitutes, cost of tax consulting, and the wife having the higher income. The other specifications add number of children, religious affiliation, and age

group or age dummies. Squared terms of the alternative specific variables and the age group are also included.

The coefficient of total net income is positive and significant at the 1%-level for all specifications. This result denotes that an alternative is more likely to be chosen, if the corresponding total after-tax income, all else equal, is larger for this alternative. The explanation is very intuitive: if it pays more to choose a special combination, then it is more likely that it is selected. The positive sign of the quadratic term shows that this effect increases at large net incomes, but the effect is economically very low. A larger after-tax income difference decreases the probability that this combination is chosen. This effect is again stronger, the larger the income difference gets. These results correspond to the model in section 3. A rough estimation of the aggregate inequity aversion parameter gives $\frac{\beta_2}{\beta_1} \approx -0.3$, hence $\beta_{i1} + \alpha_{i1} \approx 0.3$.¹⁵ In this model it is not possible to estimate these coefficients with a model that is completely interacted with the East dummy. Accordingly, we can not get comparable values for East and West German couples.¹⁶

According to the estimated coefficient of the East dummy, we can reject the null-hypothesis from equation 7 that there is no difference in the tax planning behavior between East and West German married couples. The coefficient is significantly different from zero at the 1%-level for all specifications. This gives evidence that East and West German couples have a systematically different choosing behavior, when it is controlled for economic incentives and for socio-demographic characteristics. The East dummy coefficient is negative, which means that it is less likely for East Germans to choose m or f compared to e . This result confirms the descriptive statistics: East Germans are more likely to choose the egalitarian combination, even when controlling for economic and socio-demographic circumstances. Since this is a non-linear model, it is not possible to interpret the amount of these coefficients directly as probabilities, besides of their significance and their sign. Accordingly, based on this estimation, we calculate the change in predicted choice probabilities for the East dummy.

Table 5 presents the change in the predicted probability to choose one combination if the East dummy variable switches from 0 to 1. The columns stand for the specifications as in table 4. In the first specification, the East Germans' likelihood to choose the egalitarian combination

¹⁵This is an approximation. β_1 and β_2 are type 1 extreme value distributed, hence it is not precise to conduct a simple division, but we limit the analysis here.

¹⁶Repeating the estimations from table 4 with subsamples for East and West Germans gives a slightly larger aggregate inequity aversion for West Germans and a lower aggregate inequity aversion for East Germans. This result does not correspond to the presented literature that states that East Germans are more inequity averse than West Germans. This dissent can be explained by the divergence in the within-couple income differences in East and West Germany. Since the average value of this variable is lower, the coefficient that is estimated with the East German subsample is not comparable to the coefficient from the estimation with the West German subsample.

Table 4: Alternative specific logit estimations.

Combination	(1)	(2)	(3)	(4)	(5)
Total net income in 1,000 €	0.921*** (134.99)	0.888*** (125.53)	0.887*** (126.06)	1.042*** (53.09)	1.039*** (52.79)
Net income difference in 1,000 €	-0.270*** (-76.62)	-0.254*** (-71.04)	-0.248*** (-66.59)	-0.104*** (-19.22)	-0.105*** (-19.42)
Total net income squared				0.003*** (10.11)	0.003*** (9.58)
Net income difference squared				-0.005*** (-26.35)	-0.005*** (-25.39)
<hr/>					
35					
East	-1.368*** (-71.32)	-1.305*** (-59.33)	-1.301*** (-59.11)	-1.360*** (-60.69)	-1.355*** (-60.52)
Share of income substitutes high	13.80** (2.53)	12.35*** (2.65)	12.94*** (2.62)	12.40*** (2.77)	12.90*** (2.75)
Share of income substitutes low	6.597*** (5.65)	6.113*** (5.70)	5.964*** (5.38)	4.797*** (4.66)	4.742*** (4.41)
Costs of tax consulting in 1,000 €	-0.253*** (-4.69)	-0.382*** (-6.66)	-0.303*** (-5.35)	-0.306*** (-5.47)	-0.230*** (-4.16)
Wife higher income	-4.733*** (-61.47)	-4.478*** (-57.49)	-4.356*** (-54.13)	-2.064*** (-20.45)	-2.080*** (-20.57)
Number of children		0.464*** (42.65)	0.397*** (36.47)	0.434*** (38.65)	0.371*** (34.21)
Religious affiliation		0.341*** (16.82)	0.354*** (17.48)	0.218*** (10.56)	0.235*** (11.42)
Age group		0.083*** (15.49)		0.057 (1.53)	
Between 35 and 44			0.258*** (6.77)		0.275*** (7.16)
Older than 44			0.036 (1.03)		0.126*** (3.59)
Age group squared				0.002 (0.88)	
Constant	2.088*** (73.47)	0.729*** (13.53)	1.287*** (30.14)	0.583*** (4.19)	1.035*** (23.39)
<hr/>					
53					
East	-1.575*** (-27.17)	-1.550*** (-24.20)	-1.539*** (-23.97)	-1.555*** (-22.40)	-1.600*** (-23.36)
Share of income substitutes high	14.68*** (3.04)	12.92*** (2.83)	13.80*** (2.89)	13.86*** (3.26)	14.69*** (3.37)
Share of income substitutes low	-1.417 (-1.10)	-1.298 (-0.98)	-1.536 (-1.15)	-1.316 (-1.06)	-1.609 (-1.30)
Costs of tax consulting	0.238** (2.25)	0.281** (2.09)	0.250** (2.07)	0.242** (2.07)	0.226** (1.97)
Wife higher income	5.800*** (38.74)	5.592*** (37.10)	5.372*** (35.60)	3.225*** (19.53)	3.181*** (19.34)
Number of children		0.186*** (5.65)	0.258*** (7.60)	0.258*** (6.98)	0.277*** (7.70)
Religious affiliation		-0.025 (-0.39)	-0.043 (-0.68)	0.010 (0.15)	-0.015 (-0.22)
Age group		-0.127*** (-8.20)		-0.680*** (-6.95)	
Between 35 and 44			-0.646*** (-6.33)		-0.666*** (-6.09)
Older than 44			-0.631*** (-7.52)		-0.621*** (-6.94)
Age group squared				0.036*** (5.61)	
Constant	-6.501*** (-47.72)	-5.495*** (-32.02)	-5.799*** (-35.97)	-1.616*** (-4.11)	-3.998*** (-23.13)
Observations	789,699	757,785	757,785	757,785	757,785

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Change in the predicted probability to choose combination j for a 0 to 1 switch in *East*.

Combination	(1)	(2)	(3)	(4)	(5)
m	-0.172	-0.157	-0.157	-0.162	-0.161
e	0.193	0.178	0.178	0.182	0.182
f	-0.021	-0.022	-0.021	-0.020	-0.021
Economic variables	yes	yes	yes	yes	yes
Socio-demographic variables	no	yes	yes	yes	yes
Age group	no	yes	no	yes	no
Cohort dummies	no	no	yes	no	yes
Age group squared	no	no	no	yes	no
Alternative specific variables squared	no	no	no	yes	yes

Notes: Based on regressions displayed in table 4, the specifications are identical.

is 19.3 percentage points larger than the West Germans' likelihood. Including socio-demographic variables decreases this difference to 17.8 percentage points. Replacement of the age group variable by cohort dummies in column 3 does not change the probability difference. Adding squared terms in specification 4 and replacing the age group variable by cohort dummy variables in specification 5 results in a small increase to 18.2 percentage points. Following these estimates, the probability for East German couples to choose e is between 17.8 and 19.3 percentage points larger than for West Germans. The main part of the difference between East and West German couples results from the different handling of combination m with -15.7 to -17.2 percentage points. The difference in the choosing probability of f is, depending on the specification, -2.0 to -2.2 percentage points. The regression results confirm the descriptive statistic from figure 1, which suggests that East Germans are also more likely to choose e in the range where it would be more profitable to choose m or f . Hence, West Germans are more likely to allocate the better tax class to the husband, whereas East Germans are more likely to select equal tax classes, all else equal.

6.2 Different influences of socio-demographic characteristics

We first check the previous results with a logit estimation that is compared to an additional basic OLS estimation. In the following, we analyze these models when they are fully interacted with the East dummy to get further information on East-West differences. The logit and OLS specifications in table 6 correspond to columns 2 and 3 in table 5, respectively.¹⁷ The effect of the East dummy is positive and significant at the 1%-level. The average marginal effect (ame) of the East dummy in the logit estimation is 20.4 percentage points, which is very similar to the

¹⁷The alternative specific variables are replaced by case specific variables.

Table 6: Logit and OLS estimations.

Equal tax classes	(1) Logit (ame)	(2) Logit (ame)	(3) OLS	(4) OLS
East	0.204*** (0.000)	0.204*** (0.000)	0.242*** (0.000)	0.242*** (0.000)
Total gross income in 1,000 €	0.007*** (0.000)	0.007*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
Gross income difference in 1,000 €	-0.015*** (0.000)	-0.015*** (0.000)	-0.014*** (0.000)	-0.014*** (0.000)
Share of income substitutes high	-1.358** (0.024)	-1.358** (0.025)	-1.007*** (0.000)	-1.008*** (0.000)
Share of income substitutes low	-0.098 (0.254)	-0.093 (0.281)	-0.063 (0.448)	-0.060 (0.477)
Costs of tax consulting in 1,000 €	-0.007 (0.276)	-0.010 (0.117)	0.001 (0.834)	-0.003 (0.656)
Wife higher income	0.256*** (0.000)	0.256*** (0.000)	0.296*** (0.000)	0.296*** (0.000)
Number of children	-0.059*** (0.000)	-0.058*** (0.000)	-0.067*** (0.000)	-0.064*** (0.000)
Religious affiliation	-0.040*** (0.000)	-0.041*** (0.000)	-0.048*** (0.000)	-0.049*** (0.000)
Age group	-0.006*** (0.000)		-0.008*** (0.000)	
Between 35 and 44		-0.012*** (0.005)		-0.026*** (0.000)
Older than 44		-0.024*** (0.000)		-0.033*** (0.000)
Constant	*** (0.000)	*** (0.000)	0.328*** (0.000)	0.285*** (0.000)
N	252,595	252,595	252,595	252,595
R ²			0.472	0.471

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

difference in probabilities to choose e in the asc logit estimation (17.8 for these specifications). The effect in the OLS estimation is with 24.2 percentage points a little bit larger, but in the same magnitude.

Table 7 shows the specifications from table 6 completely interacted with the East dummy. The result of an adjusted Wald test is that the interaction terms and the East dummy are jointly significant different from zero. Accordingly, socio-demographic variables influence the decision behavior of married couples in East and West Germany differently. Since the logit model is a non-linear one, the marginal effects of the interaction terms cannot be interpreted like in an OLS

Table 7: Logit and OLS estimation results with equal as dependent variable.

Equal tax classes	(1) Logit (coef)	(2) Logit (coef)	(3) OLS	(4) OLS
East	0.742*** (0.000)	1.393*** (0.000)	0.257*** (0.000)	0.348*** (0.000)
Total gross income in 1,000 €	0.061*** (0.000)	0.062*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Gross income difference in 1,000 €	-0.130*** (0.000)	-0.130*** (0.000)	-0.014*** (0.000)	-0.014*** (0.000)
Share of income substitutes high	-11.417* (0.070)	-11.311* (0.075)	-0.929*** (0.000)	-0.921*** (0.000)
Share of income substitutes low	-1.921* (0.088)	-1.833 (0.104)	-0.087 (0.339)	-0.088 (0.345)
Costs of tax consulting in 1,000 €	-0.002 (0.970)	-0.046 (0.477)	0.004 (0.515)	-0.001 (0.829)
Number of children	-0.579*** (0.000)	-0.558*** (0.000)	-0.072*** (0.000)	-0.068*** (0.000)
Religious affiliation	-0.332*** (0.000)	-0.337*** (0.000)	-0.043*** (0.000)	-0.043*** (0.000)
Age group	-0.070*** (0.000)		-0.011*** (0.000)	
Between 35 and 44		-0.204*** (0.000)		-0.047*** (0.000)
Older than 44		-0.330*** (0.000)		-0.058*** (0.000)
Wife higher income	1.834*** (0.000)	1.830*** (0.000)	0.309*** (0.000)	0.308*** (0.000)
East*Total gross income in 1,000 €	-0.016*** (0.000)	-0.018*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)
East*Gross income difference in 1,000 €	0.011*** (0.000)	0.012*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
East*Share of income substitutes high	-0.360 (0.970)	-0.266 (0.978)	-0.772 (0.360)	-0.761 (0.370)
East*relEKersatzllow	2.043 (0.145)	1.959 (0.163)	0.118 (0.522)	0.119 (0.520)
East*Share of income substitutes low	-0.278 (0.107)	-0.221 (0.189)	-0.035* (0.062)	-0.027 (0.147)
East*Number of children	0.356*** (0.000)	0.302*** (0.000)	0.039*** (0.000)	0.029*** (0.000)
East*Religious affiliation	-0.038 (0.377)	-0.023 (0.594)	-0.013** (0.034)	-0.010* (0.090)
East*Age group	0.130*** (0.000)		0.022*** (0.000)	
East*Between 35 and 44		0.411*** (0.000)		0.093*** (0.000)
East*Older than 44		0.592*** (0.000)		0.117*** (0.000)
East*Wife higher income	0.276*** (0.000)	0.285*** (0.000)	-0.052*** (0.000)	-0.051*** (0.000)
Constant	-0.762*** (0.000)	-1.125*** (0.000)	0.305*** (0.000)	0.254*** (0.000)
N	252,595	252,595	252,595	252,595
R ²			0.478	0.478

p-values in parentheses

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* *p* < 0.10, ** *p* < 0.05, *** *p* < 0.01

model. These effects show solely the direct derivative of the interaction term, which is

$$\frac{\partial F(u)}{\partial x_1 x_2} = \beta_{12} F'(u),$$

with $F(u)$ as cumulative distribution function and $u = \beta_1 x_1 + \beta_2 x_2 + \beta_{12} x_1 x_2 + \beta X$. According to Norton et al. (2004), the cross partial derivative

$$\frac{\partial^2 F(u)}{\partial x_1 \partial x_2} = \beta_{12} F'(u) + (\beta_1 + \beta_{12} x_2)(\beta_2 + \beta_{12} x_1) F''(u)$$

should be calculated. The problem with this expression is that it is not feasible to derive an intuitive interpretation from this term. Our solution is to use two approaches, which provide a better intuitive interpretation. The first one is to compute the discrete change in the East dummy for both values of certain dummy variables and compare the difference to the OLS coefficient of the respective East interaction term. The second approach is to calculate the average marginal effects of the East dummy at certain values of socio-demographic variables and plot these results.

First, we estimate the effect of a predicted change in the East dummy on the probability to choose equal tax classes, when a socio-demographic variable is zero or one. The difference between these effects shows the diverging influence of the socio-demographic variable on the tax decision between East and West German couples. In table 8, we calculate these differences as

$$ME_{East*x_k} = \left(\frac{\Delta P}{\Delta East} \Big|_{x_k = 1} \right) - \left(\frac{\Delta P}{\Delta East} \Big|_{x_k = 0} \right).$$

Table 8 shows these effects for the cohort dummy variables, the children dummy and the religion dummy and provides the coefficients from the OLS estimation, which are directly interpretable. One problem that is addressed in table 8 is that the calculation of the marginal effects at the observed values includes certain systematic differences in the other variables. To tackle this problem to a certain extent, we additionally calculate the same effects by holding the other variables constant at the median.¹⁸

Table 8 shows that the effect of being an East German couple on the probability to choose equal tax classes is larger in the middle cohort (age 35 to 44) than in the young cohort (younger than 35). This means that the difference between the East and West German middle cohort is between 5.1 and 9.3 percentage points larger than the difference between the young cohorts. This effect is

¹⁸The effect “as observed” means that the average marginal effect for all observations at the observed characteristics is calculated. “At median” means that the marginal effect at the median observation is calculated.

Table 8: Discrete change of *East* at certain values and OLS coefficients of the interaction terms.

$\frac{\Delta P}{\Delta East}$	ME as observed	ME at median	OLS coef
Between 35 and 44=1	0.234***	0.315***	
Between 35 and 44=0	0.183***	0.224***	
<i>Difference</i>	<i>0.051***</i>	<i>0.091***</i>	<i>0.093***</i>
Older than 44=1	0.223***	0.224***	
Older than 44=0	0.141***	0.080***	
<i>Difference</i>	<i>0.082***</i>	<i>0.144***</i>	<i>0.117***</i>
Child=1	0.235***	0.224***	
Child=0	0.149***	0.052***	
<i>Difference</i>	<i>0.100***</i>	<i>0.172***</i>	<i>0.100***</i>
Religious affiliation=1	0.194***	0.224***	
Religious affiliation=0	0.205***	0.208***	
<i>Difference</i>	<i>-0.011**</i>	<i>0.016*</i>	<i>-0.010*</i>

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Based on specifications 2 and 4 in table 7 with number of children replaced by a child dummy variable. Significance of the differences is tested with a Wald test.

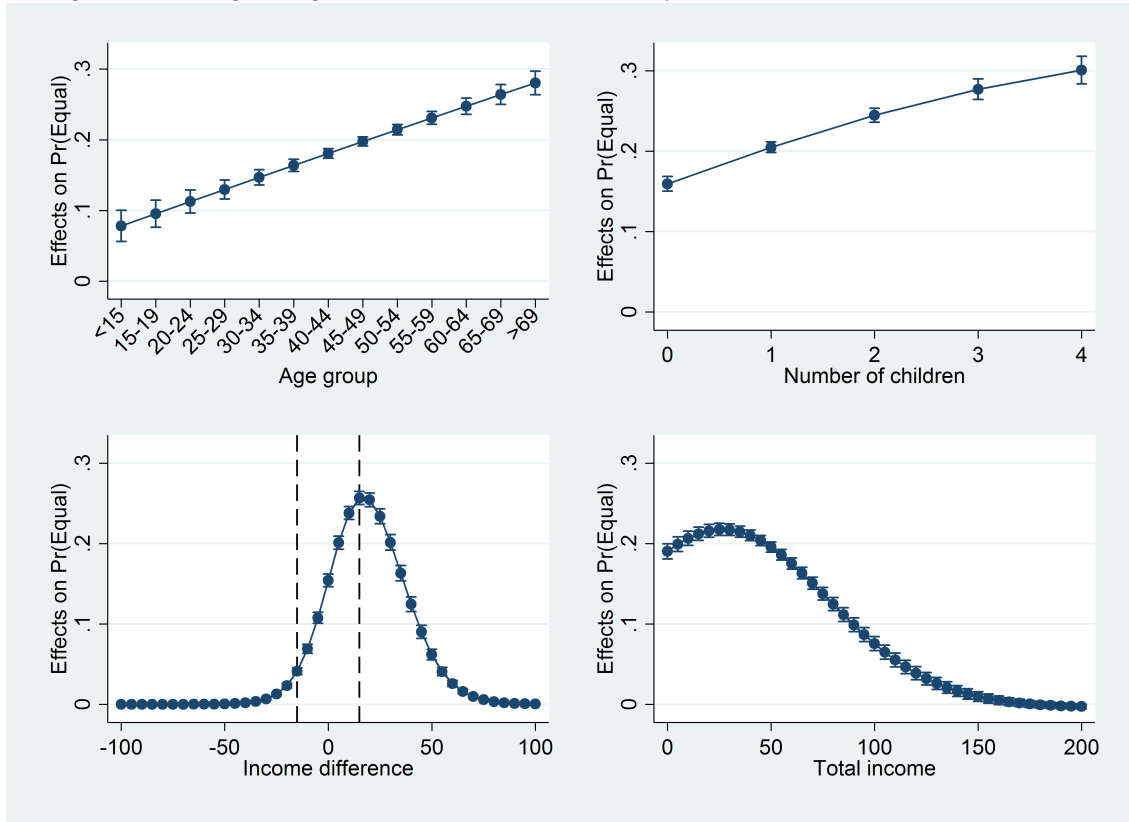
a little bit stronger for the old cohorts (older than 44). The difference between the old East and West German cohort is between 8.2 and 14.4 percentage points larger than the difference between the young cohorts in East and West Germany. Hence, the difference in the choosing behavior due to age increases with age.¹⁹ This supports our hypothesis that the differences before 1990 are responsible for the observed disparities in behavior of East and West German married couples.

The behavior of couples in decision-making differs in East and West Germany, too. For couples who have at least one child, the East effect is between 10.0 and 17.2 percentage points stronger than for couples without children. The difference in the effect of religious affiliation between East and West German couples is between -1.1 and 1.6 percentage points, which is rather small compared to the other differences, and only significant at the 5%- and 10%- level, respectively. Accordingly, the religious affiliation of the husband changes the East effect only slightly. Hence, the religious affiliation seems to have the same relative influence in East and West Germany.

The second step in the presentation of the marginal effects is to plot the East effect at different values of certain socio-demographic variables. This approach again shows divergences between East and West German couples at certain values of socio-demographic characteristics. Figure 5

¹⁹This approach compares differences in the influence of socio-demographic variables in East and West Germany, but not the levels at certain values of socio-demographic variables.

Figure 5: Average marginal effects of the East dummy at certain values of other variables.



Notes: Based on regression results from the logit estimation in column 1 in table 7: control variables are total income, income substitutes, cost of tax consulting, number of children, wife has higher earnings, and religion. Monetary variables are measured in 1,000 €. The model is completely interacted with the East dummy. The dependent variable is a dummy that denotes 1 if the couple chooses the egalitarian tax class combination (equal). Income difference is plotted as gross income husband minus gross income wife. 95%-Confidence intervals are plotted.

shows the East effect at values of age group, number of children, the gross income difference, and total gross income of the couple. These plots support the results from table 8. With increasing age group, the effect of the East dummy on the probability to select combination e increases. Additional children correspond to an increasing effect of the East dummy on the probability to choose equal tax classes, too.

In figure 5, we additionally include the gross income difference and the total gross income. The plot of the East effect on the probability to choose equal tax classes relates to the descriptive figure 1. The area between the dashed lines represents, again, the range where it can be efficient to choose e . The areas on the right and on the left represent the range, where it is never optimal to choose e . The plot shows that the probability to choose e is larger in East Germany than in West Germany, even when it is not optimal to choose e . This is especially the case, when

the husband has the higher earnings. This result shows that when the income difference is hold constant and it is net income maximizing to choose m or f , East German couples are more likely to choose the egalitarian combination. The difference in the probability to choose e between East and West German couples increases at low incomes and starts to decrease at a total income of about 30,000 €. Accordingly, the East effect diminishes with larger aggregate incomes of the couple, all else equal.

6.3 Discussion

The estimated results show robust differences in the tax planning behavior of married couples in East and West Germany. The probability to choose equal tax classes is about one fifth larger for East German couples than for West German couples. Since we controlled for economic incentives and observable socio-demographic variables, other non-observable characteristics must explain theses differences. The literature overview in the introduction stated that there are persistent differences between East and West Germans after the German reunification. One approach to explain behavioral differences in tax planning decisions is pictured in the reference-dependent model by Tversky and Kahneman (1991). This model states the opposite of the Coase theorem: the result of a decision process is *not* independent of claims in the initial situation (Kahneman et al., 1990). Accordingly, there is a reference point that influences allocations. This reference point is referred to as the initial or default situation (Tversky and Kahneman, 1991), but norms or comparison to a social group can also be seen as a reference point (Van der Stadt et al., 1985).

Since East and West Germans face the same tax law and institutions since fourteen years in 2004, disparities in the behavior seem to be driven by differences that were in place before 1990. An interpretation of the reference-point model in this context is that the different tax laws before 1990 serve as reference points for East and West German couples. The tax law of the former GDR had no marital income splitting. Accordingly, East Germans were not used to this institution until reunification.²⁰ In contrast to East Germans, West Germans are used to this tax institution. This would also explain the increasing East effect for older cohorts.

Accompanying reasons are other policies and social norms that were different in the two German states before 1990. In the former GDR, women were used to work full-time and to earn their own money, which was not the case for many of the West German women. This difference in female labor supply could have influenced the beliefs of couples how the two partners should be taxed –

²⁰Another explanation might be that East German couples stick to the default combination more often than West German couples, because they are less aware of the possibilities to change this combination.

equally or not. The explanation that the diverging behavior is influenced by the time before 1990, is also supported by the result that the differences get stronger for older couples. This finding is in line with the results by Alesina and Fuchs-Schündeln (2007), who find a stronger effect of the former political regime on older cohorts.

The results of our analysis also support the findings of Bauernschuster and Rainer (2010). They find that East Germans have a more egalitarian view on men and women. The difference in tax planning behavior of East and West German couples points into the same direction: East German couples prefer equal tax treatment whereas West Germans prefer unequal tax treatments with a disadvantage for the wife. This consistency gives evidence that expressed attitudes correspond to real decisions and behavior.

7 Conclusion

The main result of this analysis is that East German couples have a 17.8 to 19.3 percentage points higher probability to choose equal tax schedules for husband and wife than West German couples. This result seems to be driven by former political differences between East and West Germany due to the time of German separation. These findings are in line with other studies like Alesina and Fuchs-Schündeln (2007), Rainer and Siedler (2009), Bauernschuster and Rainer (2010), and Ockenfels and Weimann (1999), who find that East and West Germans have different social preferences. This paper contributes to the literature by evaluating tax decisions with administrative data in the context of tax planning. The results are relevant for economic research, as well as for policy makers. It should be considered that reactions by economic subjects can be influenced by different reference points. Hence, studies conducted with data from one country are not automatically applicable to other countries. The same applies for policy reforms.

An implication for the German income tax splitting is that East and West German couples handle tax planning in terms of tax class choices completely different. What becomes obvious, is that the institution of income tax splitting and the choice of different tax classes is much more fitted for the economic circumstances and attitudes of West German married couples than for East German married couples. Since income differences are much larger in West Germany, West German couples benefit more from the splitting advantage. Accordingly, they make more use of the different allocation of tax classes, which also has long-term implications for the labor supply of married women in West Germany. Additionally, the possibility to allocate a “good” and a “bad” tax class to the spouses accounts more for the gender role attitudes of West German couples than to the

more egalitarian view of East German married couples.

One conclusion is that the income tax splitting is a West German tax institution that subsidizes mainly West German marriages and reinforces traditional West German gender roles. Hence, a policy implication is that the current income tax splitting should be replaced by another taxation principle for marriages that mitigates the disincentive of secondary earners to participate in the labor market. A solution would be to implement individual taxation with deductions for maintenance of the spouse if he or she does not work or earn not enough money. Sweden abolished joint taxation of married couples in 1971. This reform resulted in a strong increase of labor supply by married women (Selin, 2014). The Swedish case could serve as a model for a reform in Germany.

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Appendix 1

Calculation of the monthly tax payments: Table 9 shows the tax function according to the tax law in 2004. Y is the amount of income that is left after all allowances are deducted from gross income (except of the basic tax-free allowance). The amount of these tax deductions depends on personal characteristics and the chosen tax class. For the calculation of the monthly amount of income tax due, the monthly income is extrapolated to the whole year. Then, all allowances are deducted and the tax function is applied. Afterwards, the amount of income tax is divided by twelve. Table 11 shows the allowances depending on the tax class. Income tax is not the only

Table 9: Taxable income (Y) and German tax function $T(Y)$ in Euros in 2004.

Y	$T(Y)$
$0 - 7,664$	0
$7,665 - 12,739$	$(Y - 7,664) * [(793.10 * 10^{-8}) * (Y - 7,664) + 0.16]$
$12,740 - 52,151$	$(Y - 12,739) * [(265.78 * 10^{-8}) * (Y - 12,739) + 0.2405] + 1,016$
$52,152 - \infty$	$0.45 * Y - 8,845$

Source: §32a EStG 2004.

tax levied on the gross income. There are the church tax (if the taxable person is member of either the Catholic or Protestant Church) and a solidary surcharge (Solidaritätszuschlag), which was implemented after the German reunification. These taxes are calculated as a percentage of the income tax due. Church tax is 9%²¹ and solidary surcharge is 5.5% of the income tax due. If one has children, child allowances (Kinderfreibeträge) lower the tax base for the church tax and the solidary surcharge, but not for the monthly income tax. The procedure is shown in table 10, where c denotes the number of children. Here, the child allowances only influence the amount of

Table 10: Church tax and solidary surcharge.

Tax class	3	4	5
$Y - \text{child allowance} = Y_{child}$	$Y^3 - 5,808 \text{€} \times c$	$Y^4 - 2,904 \text{€} \times c$	$Y^5 - 0 \text{€} \times c$
Church tax	$T(Y_{child}^3) * 0.09$	$T(Y_{child}^4) * 0.09$	$T(Y_{child}^5) * 0.09$
Solidary surcharge	$T(Y_{child}^3) * 0.055$	$T(Y_{child}^4) * 0.055$	$T(Y_{child}^5) * 0.055$

church tax and solidary surcharge, but the choice of tax classes also determines who receives the

²¹Bavaria, Baden-Württemberg: 8% plus church fee (Kirchgeld).

monthly amount of child benefits. The person in class 3 receives the total amount for all children and the person in class 5 receives no child benefits, in class 4 the child benefits are divided.²²

Table 11: Calculation of taxable income for tax classes 3, 4, and 5.

Tax class	3	4	5
Gross income			
– Pension allowance (Versorgungsfreibetrag §19 II EStG)	yes	yes	yes
– Increment to pension allowance (Zuschlag zum Versorgungsfreibetrag)	yes	yes	yes
– Standard deduction for pensions (Versorgungsbezüge-Pauschbetrag §9a I EStG)	102 €	102 €	102 €
– Allowance for elderly retired persons (Altersentlastungsbetrag §24a)	yes	yes	yes
–/+ Registered allowance/additional amount (Freibetrag/Hinzurechnungsbetrag §39 a I EStG)	yes	yes	yes
– Standard deduction for employees (Arbeitnehmer-Pauschbetrag §9a EStG)	920 €	920 €	920 €
– Standard deduction for special expenses (Sonderausgaben-Pauschbetrag §10c EStG)	72 €	36 €	–
– Provisional lump sum (Vorsorgepauschale)	yes ×2	yes	–
= Taxable income			

Source: §39b EStG 2004.

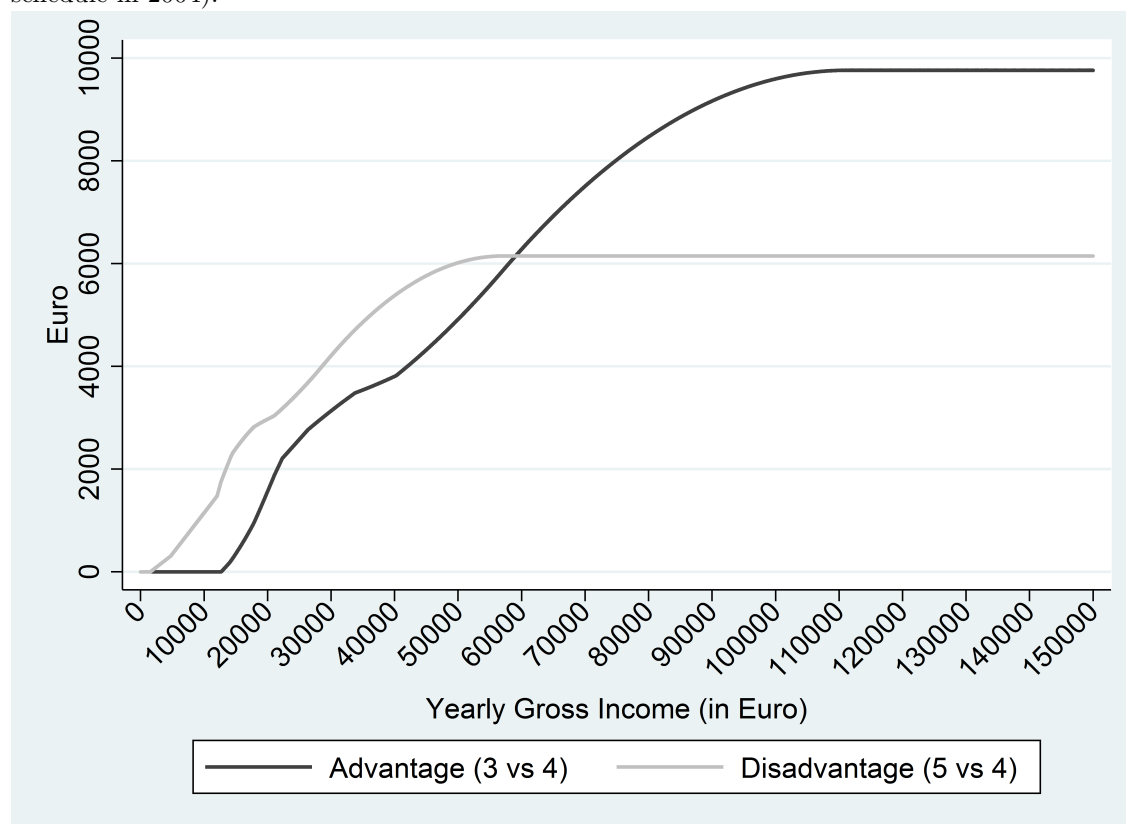
Appendix 2

Due to the progressivity of the German income tax schedule the tax gain of receiving class 3 compared to 4 is not equal to the loss by applying 5 compared to 4 at the same income level. Figure 6 shows that the tax advantage of choosing 3 and the disadvantage of choosing 5 compared to 4 are asymmetric. In the range from 0 to 59,043 €²³ of yearly gross income, the disadvantage of class 5 exceeds the advantage of class 3. At higher incomes the advantage of 3 increases further, while the disadvantage of 5 remains unchanged. This comparison emphasizes that couples, where both have or one partner has higher earnings than 59,043 €, should always choose m or f . Even if

²²In Germany exist child allowances and child benefits. Parents receive child benefits every month. At the end of the year the financial authority checks if the couple is better off by keeping the child benefits or by paying them back and receiving a child allowance instead.

²³This is the yearly gross income, where the lines cross in figure 6.

Figure 6: Tax advantage and disadvantage for class 3 and 5 compared to 4 (German income tax schedule in 2004).

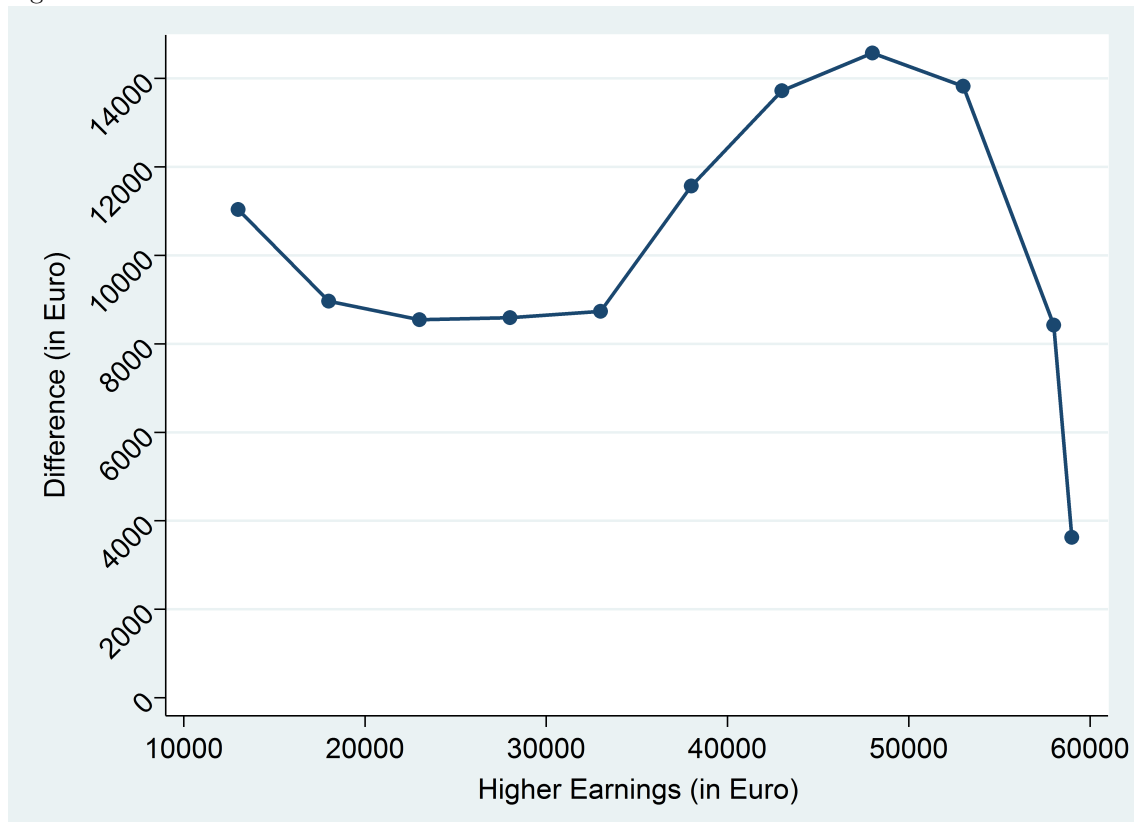


Notes: Own calculations using the program chart (“Programmablaufplan” 2004) by the German Federal Ministry of Finance. Yearly gross income is the individual earning of one spouse. Advantage is the monetary advantage of choosing 3 instead of 4 within one year. Disadvantage is the monetary loss of choosing 5 instead of 4 within one year.

the couple has equal earnings, they should choose different tax classes in this range, because the advantage of class 3 always exceeds the disadvantage of class 5. When both partners have lower earnings than 59,043 € the picture is not clear: the optimal tax class combination now depends on the income difference and the level of income. What becomes clear is that the closer the incomes are in this range, the more profitable it gets to choose e . The larger the income difference is, the lower is the advantage of e until it gets optimal to choose m or f .

Figure 7 presents the range of income differences between spouses, conditional on the income of the higher earner, in which it is still optimal to choose e . If the income difference becomes larger, it gets optimal to change the tax class combination from e to m or f , depending on who receives the higher income. The graph shows that a couple with a higher earner who receives yearly gross income of about 30,000 € should take e if the second earner receives income that is up to about 8,500 € lower than the higher income. In contrast, a couple with a higher earner, who receives

Figure 7: Range of income differences when e is still optimal, conditional on the income of the higher earner for selected values.



Notes: Own calculations using the program chart (“Programmablaufplan” 2004) by the German Federal Ministry of Finance. Higher earnings is the gross income of the spouse that earns more than the other partner. Difference is the gross difference between the two spouse’s incomes.

about 50,000€ should choose e if the second earner has up to about 14,000€ lower earnings. If the income of the second earner is lower than his/her difference suggests, the couple should change their tax class combination, if they want to maximize their aggregate monthly net income.

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