Disentangling Gender Norms and Tax Incentives - Analyzing the Introduction of Joint Income Taxation for Same-Sex Couples *

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PRELIMINARY AND INCOMPLETE

Abstract

One potential factor that contributes to the gender earnings gap is the joint taxation of spouses. This can create negative work incentives for the secondary earner, typically the wife. However, quantifying the impact of joint taxation on earnings has been challenging due to the lack of exogenous variation and the simultaneous influence of traditional gender norms. To address these challenges, we exploit the introduction of joint taxation for same-sex couples in Germany in 2013. This allows us to analyze the entire population of same-sex couples who file taxes jointly using newly linked administrative income tax return data. To determine the effects of joint taxation, we employ a difference-in-differences approach using different-sex couples as the control group. Our findings reveal that same-sex secondary earners experience a significant decrease in earnings after filing taxes jointly, leading to a substantial widening of the partner pay gap. Primary earners also reduce their earnings, although not as substantial, suggesting that the income effect is stronger than the substitution effect for them.

Keywords: Joint Income Taxation, Gender Norms, Female Labor Participation, LGBTQ

JEL Codes: J12, J16, J22, H24, D13

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1 Introduction

The persistent disparity in long-run earnings between married men and women, especially mothers, has been a concern in recent economic literature (see for instance, Blau and Kahn, 2017; Kleven et al., 2019). Joint taxation is considered to be one of the contributing factors behind the gender earnings gap by reducing the incentives for the secondary earner to work, typically the wife, thus limiting the labor market participation of married women (Borella et al., 2023). In a progressive income tax system, joint taxation increases the marginal tax rate for one spouse not only in their own but also in the spousal income. This means that the secondary earner faces a higher marginal tax rate compared to individual taxation, while the opposite is true for the primary earner. However, analyzing the impact of joint income taxation is difficult for several reasons. First, there is a lack of exogenous variation that could change the tax burden between spouses. Second, transitions between tax regimes often coincide with changes in marital status, which introduces an additional source of distortion. Third, traditional gender norms that promote an unequal burden of care work and division of labor often confine women to secondary earning roles. Consequently, it is difficult to disentangle the impact of such norms from that of joint taxation on female earnings.This paper aims to overcome these challenges.

In this paper, we examine the impact of joint taxation on earnings and intra-household income allocation. We exploit the introduction of joint taxation for same-sex civil partnerships in Germany in 2013. This allows us to analyze the pure impact of joint income taxation on how spouses allocate their income within households. Same-sex couples (SSCs) have been able to enter registered civil partnerships in Germany since 2001. However, it was not until 2013 that they gained access to joint taxation, while different-sex couples had already enjoyed this benefit. It is important to note that this reform did not change any other aspects of civil partnerships. This unique setting provided a quasi-experimental setting to study the impact of exogenous changes in partners' tax burden. Due to kinks in the German tax code, changes in marginal tax rates are heterogeneous depending on a household's overall and relative income. Additionally, the incentives for marriage or civil partnerships remained the same for couples who were already in a civil partnership, as the reform only affected their tax burden. To disentangle the influence of gender norms from the effects of the tax system in place, SSCs serve as a valuable comparison group because they are arguably less influenced by traditional gender norms within couples (Goldberg, 2013).

We employ novel and unique administrative tax return data from 2008 to 2018 for the entire population. Unlike survey data, administrative tax records are not subject to misreporting or small sample sizes, providing us with accurate and comprehensive information

on household income, earnings of spouses, and the tax obligations of couples. To be more precise, we observe the universe of income tax returns filed jointly by all civil-partnered SSCs, and we can link these observations to both individuals' income tax returns prior to the approval of joint filing.

To empirically measure the impact of joint taxation, we examine the impact on both individuals within a couple (secondary and primary earner) as well as on the couple as a whole. We consider the introduction of joint taxation as a quasi-experiment. We use two different approaches. First, we apply a (dynamic) difference-in-differences and event study approach. We consider same-sex couples as our treatment group and different-sex couples as our control group. This approach allows us to estimate the effects on absolute income levels and the distribution of income within households. Second, we estimate the elasticity of taxable income and exploit how changes in marginal tax rates vary across the income distribution.

Our dynamic Difference-in-Differences approach demonstrates that when same-sex couples file jointly, the secondary earner experiences a significant decline in earnings of up to 11.7% compared to a different-sex secondary earner prior to the introduction of joint taxation for SSCs. Furthermore, three years after the introduction of joint filing for same-sex couples, the partner pay gap increases by up to 10.7% in comparison to the partner pay gap of different-sex couples. These results indicate joint taxation has a substantial impact on the incomes of partners' income, contributing to greater inequality within households. Furthermore, the reform significantly reduces the earnings of the primary earner, though less considerably than the secondary earner, indicating that the income effect from receiving tax benefits through joint taxation outweighs the substitution effect of facing a lower marginal tax rate for the primary earner. We plan to test the robustness of these findings using various approaches. In summary, if we consider earnings as a proxy for labor supply, we can conclude that joint taxation reduces the labor market participation of the secondary earner.

Contribution and related literature We contribute to several strands of literature. First, we contribute to the literature that examines spouses' labor supply responses to family income tax reforms. There is limited quasi-experimental evidence due to the lack of natural experiments. The findings consistently show that joint taxation has a negative (positive) impact of joint (individual) taxation on women's labor supply, particularly when they are the secondary earner. However, no significant effect has been found for men (Kalíšková, 2014; Koch, 2024; LaLumia, 2008; Selin, 2014).[1] Closest to our paper, Isaac (2023) examines

[1] LaLumia (2008) examines the impact of transitioning from separate to joint taxation in certain US states in 1948 using repeated cross-sectional survey data. The study reveals a significant decrease in the

the impact of the introduction of joint filing for same-sex marriages on the labor supply of same-sex spouses in the US. Using a generalized difference-in-difference approach, Isaac (2023) compares same-sex couples to different-sex couples as the control group. He estimates the effect of the predicted change in the marginal net-of-tax rates on annual hours worked and labor force participation of SSCs. He finds no significant intensive margin responses (hours worked) but relatively large extensive margin responses (labor force participation) among secondary earners which is in line with Selin (2014). Our project contributes to the existing literature in several ways. First, we address the issue of income misreporting and identification errors of treated individuals that are often encountered in survey data by using high-quality administrative data.[2] The tax return data provides precise information on earnings and taxes over a longer time window, enabling us to track individuals or couples and observe the evolution of effects over time. Second, we have access to the universe of German SSCs who file jointly, resulting in a large sample size. Third, the income tax system in Germany provides clear financial benefits for couples in terms of their overall tax burden when they switch from single to joint income taxation. In contrast, the joint taxation system in the US leads to a marriage benefit for some newlyweds and a marriage penalty for others. We estimate that same-sex couples in Germany receive an average tax benefit of €829, while approximately 40% of marriages in the US face a "marriage penalty". Isaac (2023) reports an average marriage penalty of $449 for same-sex couples. Therefore, in Germany, both the income and substitution effect discourage the secondary earner from working, whereas this is not consistently the case in the US. Moreover, the German withholding income tax system allows married couples or civil partnerships to engage in tax planning and shift the burden of withholding income tax among partners in order to minimize the total intra-year tax burden for the couple. We can exploit this feature to examine the impact of tax planning on the intra-household inequality of same-sex couples. In general, our findings align with previous research, suggesting that the labor supply of the secondary earner decreases following the implementation of joint taxation. However, in contrast to earlier studies, we observe significant responses regarding the intensive margin of labor supply.

labor force participation of married women in states that switched to joint taxation. In a similar vein, Selin (2014) assesses the switch from joint taxation to separate taxation in Sweden during the early 1970s. The study relies on two waves of panel data from a small sample and focuses on female employment. He finds that female employment experienced substantial growth among women married to high-income earners. Furthermore, Kalíšková (2014) investigates the introduction of joint taxation for married couples (with at least one child) in the Czech Republic in 2005 on spouses' labor supply. She uses data from Czech Labor Force Survey and estimates a decline in the employment rate of married women with children, although she only observes a minimal effect on hours worked. In addition to these quasi-experimental studies, a series of papers employ structural life cycle models to evaluate the effect of joint taxation on married women's labor supply (see Bick and Fuchs-Schündeln, 2017, 2018; Borella et al., 2023; Guner et al., 2012).

[2]SSCs are clearly identified since this information has to be declared upon tax filing.

Our study also contributes to the growing body of literature on the labor supply and earnings of same-sex individuals and couples, as well as LGBTQ individuals in general. For a comprehensive review on this topic, please refer to Badgett et al., 2021.

Studies focusing on labor market outcomes show that same-sex couples distribute their household and labor allocation more equally (e.g. Van der Vleuten et al., 2021). Male same-sex couples spend less and female same-sex couples more time in the labor force than their same-gender counterpart in different-sex couples, however the gap among female secondary earner between different- and same-sex couples is significantly reduced when controlling for children (Antecol and Steinberger, 2013; Leppel, 2009; Tebaldi and Elmslie, 2006). In addition, Drydakis (2022) and Carpenter (2007) show that there exists a wage gap between hetero- and homosexual individuals, which is positive for women and negative for men.

We explore how joint taxation affects earnings of same-sex couples filling a notable research gap highlighted by Badgett et al. (2021) regarding public policies affecting LGBTQ individuals. To the best of our knowledge, our study is the first that examines such a large sample of same-sex couples with high-quality administrative data.

This paper is set up as follows. Section 2 describes the institutional setting and 3 the applied data as well as samples. Section 4 addresses our empirical strategy explaining our identification. Section 5 shows our results. Section 6 concludes.

2 Institutional Setting

2.1 Taxation of Couples in Germany

Final income tax As in many other countries, such as the US and various European countries (refer to Table A.1 for an overview), the German tax system allows married couples and civil partnerships to choose whether to file their taxes jointly. While spouses also have the option to file individually, the majority of married couples in Germany opt for joint taxation. To distinguish between individual and joint taxation, we compare the total tax liabilities for both systems. Under individual taxation, the total tax liability, $T_{individual}$, is calculated by summing the tax liabilities based on the income of spouse 1 (denoted as y_1) and spouse 2 (y_2) respectively:

$$T_{individual} = T(y_1) + T(y_2) \tag{1}$$

Thus, the marginal and average tax rates of spouse 1 and 2 remain unaffected by the income of their partners. On the other hand, when filing taxes jointly, the couple's income tax liability, T_{joint}, is calculated by taking half of their combined income, and then doubling

it:

$$T_{joint} = 2 \cdot T((y_1 + y_2)/2) \tag{2}$$

In the context of a progressive tax system, joint income taxation has two effects. First, it results in a lower marginal tax rate (MTR) for the primary earner compared to individual taxation. However, the secondary earner is subject to a higher MTR. Figure 1a illustrates how the MTR for secondary earner varies based on both their income and the overall household income under joint taxation, as opposed to individual taxation. Generally, the greater the income difference between spouse 1 and spouse 2, the greater the increase in the MTR for the secondary earner. Various kinks in the German tax code contribute to variations in the MTR for the secondary earner in relation to the overall household income. Second, joint taxation reduces the overall tax burden resulting in tax benefits for those who file jointly.[3] Figure 1b demonstrates these benefits for specific household incomes and relative income shares. The magnitude of tax benefits increases with the difference in relative income between spouses, particularly favoring the single-earner model. Additionally, tax benefits vary across the income distribution due to tax kinks in the German income tax schedule. Appendix B provides a numerical example comparing joint taxation with individual taxation for two partners to further illustrate these effects.

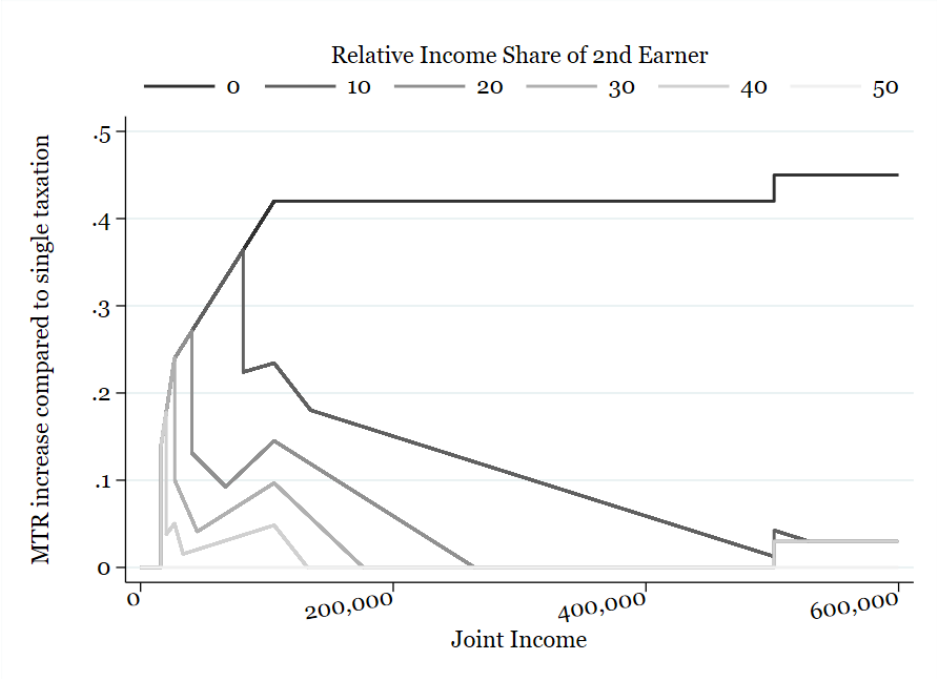
Although tax systems may not explicitly discriminate between genders, they can feature implicit gender biases that arise from the interaction between the tax system, economic behavior, and social expectations of male and female taxpayers. It is worth noting that women typically contribute less than half of the household income. For example, in Germany, Hermle et al. (2024) show that the average female income share is around 36% for all married women. Differences in relative household income, coupled with a progressive and joint income tax system, create lower labor supply incentives for women as the secondary earner. This is because under joint taxation, women face higher marginal tax rates compared to individual taxation. As a result, this higher tax burden may discourage women from fully participating in the labor force, both at the extensive and intensive margin. Consequently, this restrict their earning in comparison to their male counterparts.

Withholding income tax In the German context, joint taxation can have negative effects on the labor supply of the secondary earner. These effects may be exacerbated by the choice of the withholding income tax schedule (*Lohnsteuerklassen*). Just like many other developed and developing countries, Germany has an automatic income tax withholding system from income earned from employment. Under this system, the employer deducts the expected

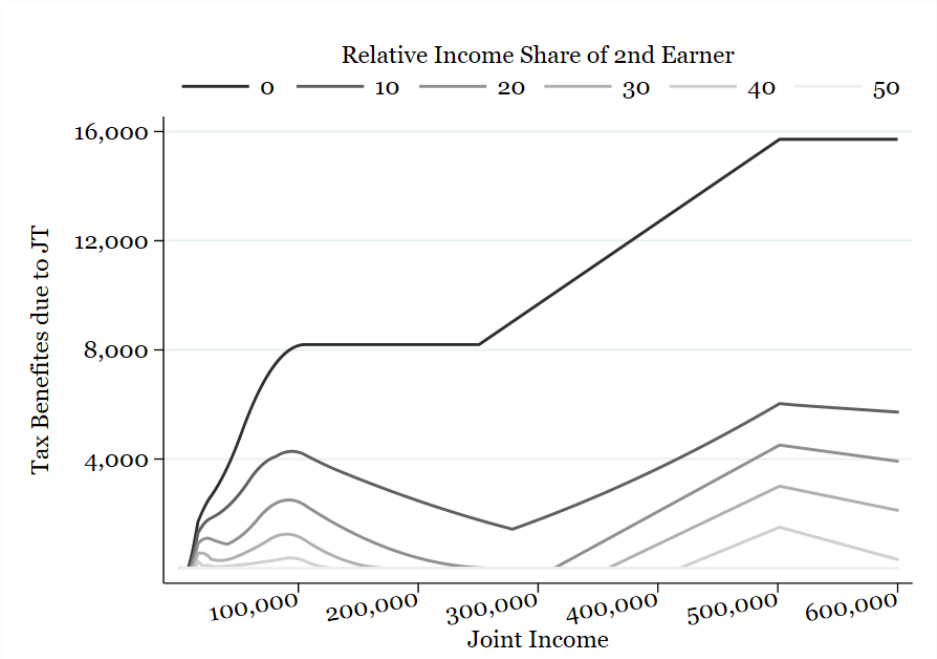
[3] In contrast to Germany, the US or Switzerland's joint taxation systems might imply a marriage penalty (higher taxes for married individuals compared to unmarried individuals with the same income).

Figure 1: Joint taxation vs. individual taxation

(a) Change in marginal tax rates for the secondary earner under joint taxation



(b) Tax benefits under joint taxation



Notes: Figure (a) shows the difference in marginal tax rates for the secondary earner when switching from single to joint taxation for different levels of the income of the partner. Figure (b) shows the absolute benefits of joint taxation compared to single taxation for specific relative income distributions among partners. Figure A.2 illistrates both graphs with cut-offs at 200.000 of the joint income.
Source: Own calculation based on the tax schedule in 2013.

income tax payments from the employee's salary on a monthly basis, and transfers them directly to the tax authority. This withholding income tax is then applied towards the individual or married couple's final income tax liability when they file their ta return the following year.

The withholding tax is determined by the so-called tax class. By default, both spouses are assigned to tax class IV, which corresponds to the individual tax schedule.[4] Due to tax benefit from joint income taxation and tax splitting, couples with unequal earnings often end up with overestimated withholding taxes. To ensure that monthly withholding income taxes align with the final annual income taxes, spouses can choose to assign different tax classes. Typically, the primary earner is assigned tax class III, while the secondary earner is assigned tax class V. This means that the basic tax allowance from the spouse in tax class V is transferred to the spouse in tax class III. However, this choice also has implications for the tax burden and net earnings of each spouse. The secondary earner, now subject to higher average and marginal tax rates, faces a higher individual tax burden and lower net earnings. On the other hand, the primary earner benefits from lower average and marginal tax rates, resulting in a smaller monthly tax burden and higher net earnings. Notably, the couple's effective final income tax burden is not influenced by the choice of the withholding tax schedule. However, it does depend on the timing of tax payments throughout the year and how the individual tax burden is distributed within the couple.

In theory, the labor supply decision should not be affected by withholding rates as long as households are not constrained by liquidity throughout the year, spouses fully combine their incomes, and do not mistake their finale income tax for their withholding income tax. However, studies have shown that spouses do not completely combine their incomes (see e.g. Attanasio and Lechene, 2014; Beblo and Beninger, 2017; Blundell et al., 2007; Giommoni and Rubolino, 2022; Lundberg et al., 1997) and that individuals have a misunderstanding of complex tax schedules (see e.g. Abeler and Jäger, 2015)

Consequently, the German income tax not only incentivizes unequal earnings among spouses but also reinforces an unequal allocation of net wage income. This exacerbates the negative impact of joint taxation on the secondary earner.

[4]The default tax class of IV/IV was implemented in 2013. Before 2013, spouses had to actively select their tax classes at their local city office (Koch, 2024).

2.2 Same-Sex Civil Partnerships

To establish a legal framework for same-sex couples in Germany, the concept of civil partnership (*Eingetragene Lebenspartnerschaft*) was introduced in 2001.[5] This marked a pivotal shift from a historical backdrop tainted by anti-homosexual regulations.[6] While civil partnerships in Germany granted homosexual couples access to many rights similar to different-sex marriages, certain distinctions still remained. These distinctions were intentionally maintained in order to secure a majority in the Federal Council (Sanders, 2016).

In 2013, joint income taxation was extended to include civil partnerships, which corrected a previous inequality. On May 7, 2013, the different income tax treatment of same-sex and different-sex couples was declared incompatible with the constitution (BVerfGE, May 2013). The reform was implemented in July 2013. Figure A.1 displays the number of Google searches on joint taxation (*Ehegattensplitting*) and civil-partnership (*Lebenspartnerschaft*) around the time of the reform. From now on, civil partnerships can file their taxes jointly. In some cases, civil partnerships were even able to retroactively file together for previous years. This was possible if they had not already filed their taxes for those years or if they had filed objections against their local tax authority for not allowing joint filing. As a result, these tax assessments were not yet legally binding. As a one-off payment, the civil partnerships received refunds for the years they filed retroactively, including interest.[7] This observation is in line with expectations, considering the significant benefits outlined in Figure 1b. The implementation of joint filing for SSCs did not immediately result in the automatic assignment of tax classes IV/IV, as is the case for married different-sex spouses. Instead, this change was only introduced in 2015. SSCs were required to submit a letter to their local tax authority requesting a change in their tax classes to IV/IV or III/V.

In October 2017, same-sex marriage was finally introduced, allowing marriage for same-sex couples.[8] Couples who already had civil partnerships could choose to maintain their status or convert it into a marriage. As part of this legislative change, the option to enter into new civil partnerships was abolished.

Figure 2 shows the absolute number of registered civil partnerships from 2007 to 2020. The total number of partnerships increased each year until 2017 when same-sex marriage became legal. After that, no new civil partnerships were established, as existing ones had

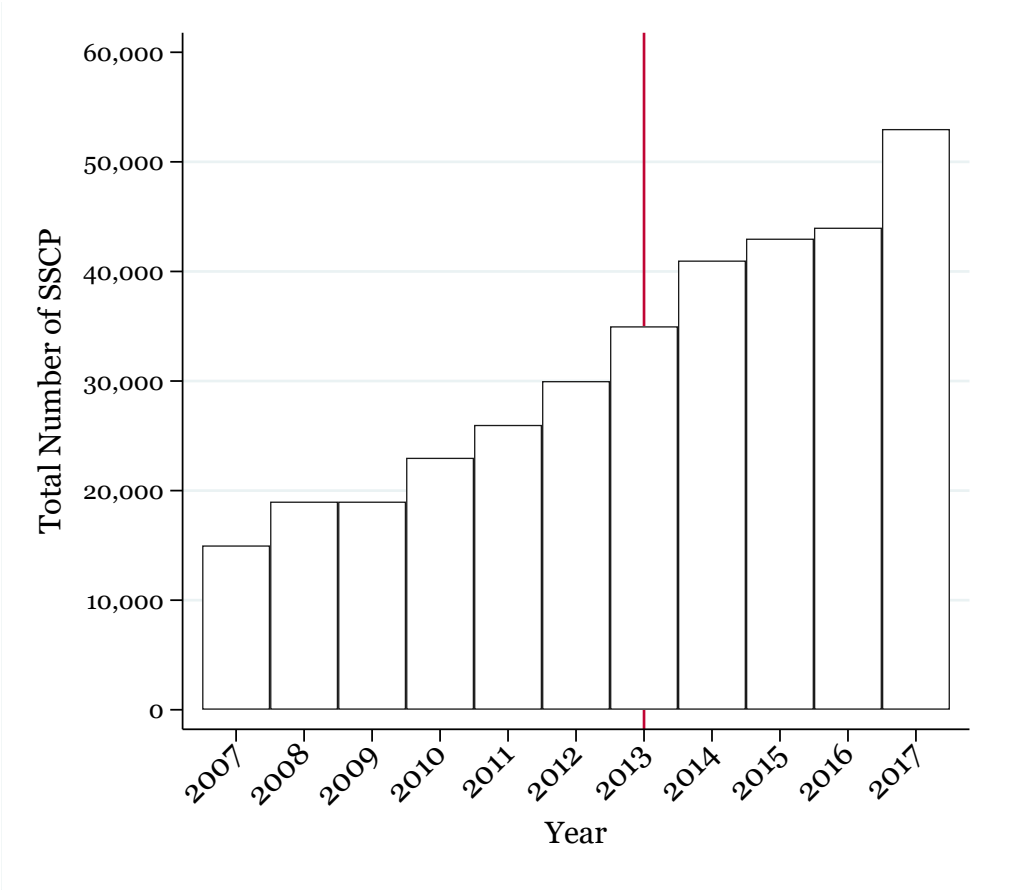
[5] Civil-partnership was only available for same-sex partners in Germany, setting it apart from countries like France, where civil partnerships are open to both same-sex and different-sex couples.

[6] Most notably, until 1994, the *law against homosexuality act* criminalized relationships between two males. However, in 1969, it was partially amended to only prohibit homosexual prostitution and illicit relations involving individuals under the age of 21.

[7] See interview script in Appendix for more detailed insights on this process.

[8] Same-sex marriage was supported by a majority of the population (Küpper et al., 2017).

Figure 2: Absolute number of same-sex civil partnerships



Notes: This figure shows the annual absolute number of registered same-sex civil partnerships in Germany for male, female and total same-sex partnerships. The red line indicates the introduction of joint taxation. *Source*: Federal Statistical Office, based on Micro Census.

the option to transition to marriage. Throughout the years, the number of male same-sex partnerships consistently exceeded the number of female partnerships. It is worth noting that there is no significant increase in partnerships in the years 2013 or 2014, indicating a consistent pattern in the dynamics of civil partnerships even after the introduction of joint filing for same-sex civil partnerships.

3 Data

To assess how joint taxation impact the earnings of sames-sex couples, we leverage the *German Taxpayer Panel* (TPP) for the years 2008-2018. The TPP is yearly data set that includes information on all German taxpayers. It is managed and provided by the German Federal Statistical Office and the statistical offices of the Länder. The dataset consists of

administrative micro data obtained by merging income tax returns and tax assessments from the tax authority. The tax unit can be either single individuals, married couples, or civil partners who file their taxes jointly.

We have access to data on the entire population of German taxpayers. This access requires specific research project inquiries and is granted with a restricted set of variables.[9] The data includes specific information about taxable income, which is divided by different income sources. It also provides details about final and withholding income taxes. Additionally, it includes basic socio-demographic characteristics, such as gender, marital status, filing status, year of birth, state of residence, religion, year of birth of children, and the number of children. It is important to note that we use labor income as a proxy for labor supply because the tax return data does not contain information about hours worked.

To correctly identify same-sex couples, specifically those in registered civil partnerships, we rely on a unique feature in our data set. In 2013, a same-sex marker was introduced to indicate joint filing for civil partners. This distinction gives us a significant advantage compared to survey data from other countries. By utilizing this marker, we are able to create a distinct sample of all same-sex civil partners who have filed their taxes jointly at some point in time.

Upon filing jointly, one partner is added to the other partner's spell.[10] This means that both partners can be observed when filing jointly. However, the original data does not allow for the observation of individual filing spells for both partners before and after joint filing. By utilizing individual tax IDs introduced in Germany in 2010, we are able to link partners across all years. To the best of our knowledge, we are the first to link German income tax data for same-sex couples before they file jointly. With our unique access to the entire population of same-sex civil partnerships filing jointly, this data set allows us to explore the dynamics of same-sex couples surrounding civil partnerships.

3.1 Sample Restrictions

We focus on the years between 2008 and 2018, specifically examining the introduction of joint filing for same-sex civil partnerships. Our main analysis only includes tax units that filed their taxes jointly in 2013, which was the year of the reform. To narrow down our sample, we set an age criterion and include only individuals within the prime working age range of 20 to 55 in 2013.We also require individuals to have a stable income prior to the reform, meaning their income must not deviate from the three-year average over the pre-reform period. This mitigates concerns about mean reversion.Additionally, we ensure a minimum of labor force

[9]Usually, the TPP is only provided as a stratified 5% random sample.

[10]For different-sex couples the wife is typically appended to the husband's spell.

attachment by further restricting our sample to tax units in which both individuals had positive income. This allows us to measure the partners' intensive margin of labor supply. We plan to explore the extensive margin of labor supply in additional analyses.

As mentioned in section 2, same-sex civil partners could file taxes jointly not only from 2013 onwards but also had the option to retroactively file their taxes jointly for preceding civil partnership years, as long as their tax assessments for those years were still pending. In our dataset, we can identify the retrospective joint filing and use this information as a marker for civil partners predating 2013. However, we are hesitant to include retroactive filing same-sex civil partners in our main sample, as these couples constitute a specific group for two reasons. First, the act of filing taxes retroactively likely suggests a higher level of tax literacy and/or significant financial advantages associated with retroactive filing. Secondly, the intra-household income distribution of this subgroup exhibits compositional biases.

We observe that there is heterogeneity in the number of preceding years for which couples choose to file retroactively. The majority of couples choose to file retroactively for only one year, while the minority choose to do so for multiple years. There are even a few couples who start filing retroactively several years before 2013. This difference in behavior may be due to the difficulty of linking couples or the absence of individuals' data for these earlier retroactive filing years in our dataset. As a result, the sample is biased due to the fact that the changes in average relative income share are not a result of changes over time, but rather due to the composition of the sample. Therefore, we have decided to exclude retroactively filing couples from our empirical analysis for now. We will focus our attention on same-sex civil partners who first filed their taxes jointly in 2013 and did not file retroactively. This will allow us to address the issue of compositional shifts within the sample.

3.2 Descriptive Statistics

The descriptive statistics for the entire sample, which includes partners who retroactively file and those who do not, are presented in Table 1. The control group for the pre-reform year of 2012 consists of married different-sex spouses. It is important to note that we define different-sex spouses in terms of primary and secondary income earners, regardless of gender, just as we do for same-sex couples. Approx. 40% of the couples in our same-sex sample are female couples. This finding aligns with the data presented in Figure 2, which is derived from the German Micro Census data. The average age of the primary earner is 40 years, while the average age of the secondary earner is 38 years. This pattern is consistent among the three same-sex samples, with partners typically having an age difference of around 5 years. In the case of different-sex spouses, they tend to be slightly older and have a smaller age

gap. Furthermore, the number of children varies across the different samples. On average, different-sex couples have 1.72 children, while same-sex couples have notably fewer at 0.32 children. Column 3 highlights that among same-sex partners, those who do not engage in retroactive filing are those who are least likely to have children. Same-sex couples are slightly less likely to live in Western Germany. Additionally, they are more likely to be self-employed, with retro-filers having the highest share of self-employed. These findings suggest that same-sex partners who file retroactively might have a greater understanding of tax matters, possible due to having a tax advisor.

The total income from business, self-employment and employment for the primary earner is quite similar in all four samples, although no retro-filer primary earners have a slightly smaller income. In contrast, the income of the secondary earner is significantly lower for different-sex couples and the highest for no retro-filer same-sex couples. This pattern aligns with the partner pay gap, which refers to the difference in income between partners relative to the overall household income. The partner pay gap is highest for different-sex couples and lowest for no retro-filer same-sex couples.

Specifically, when same-sex couples file their taxes retroactively, there is a 12 percentage point lower gap between them and couples who do not file retroactively. This difference implies that, on overage, these partners understand the advantages of joint filing in situations where there is a significant income disparity. As a result, they choose to take advantage of the option for retroactive filing.

We estimate the hypothetical change in MTR for both the primary and secondary earner in a same-sex couple if they had been filing jointly in the baseline year 2012. We are not able do this for the retro-actively filing couples, as these couple already filed their taxes jointly in 2012. This way, we do not observe the individual taxable income of each partner in 2012, which is necessary to estimate the MTR change resulting from a switch to joint taxation. The MTR would have decreased by 3 percentage points for primary earners and increased by 7 percentage points for secondary earners. Furthermore, we also estimate the tax benefit that would have been obtained if joint taxation had already been introduced in 2012. Same-sex couples, who do not file retroactively would have experienced tax savings of €829. This amount is considerably higher when compared to the average marriage penalty of $449, as reported by Isaac (2023).

4 Empirical Strategy

To estimate the causal effect of introducing joint taxation, we run two separate specifications. First, a dynamic difference-in-differences design with the treatment being the introduction

Table 1: Descriptive Statistics

	SSC			
	(1) Main	(2) Retro	(3) No Retro	(4) DSC
Female couple	0.39	0.38	0.42	-
	(0.11)	(0.10)	(0.12)	
Age 1st earner	39.60	39.89	38.84	42.16
	(6.34)	(6.27)	(6.45)	(5.11)
Age 2nd earner	38.16	38.22	38.00	43.05
	(6.81)	(6.83)	(6.75)	(4.87)
Age difference	4.62	4.71	4.37	2.95
	(4.21)	(4.34)	(3.83)	(2.67)
Nr. children	0.32	0.38	0.19	1.72
	(0.71)	(0.78)	(0.51)	(0.98)
West Germany	0.81	0.80	0.82	0.86
	(0.40)	(0.40)	(0.39)	(0.35)
Self-employed	0.57	0.60	0.53	0.44
	(0.49)	(0.49)	(0.50)	(0.50)
Income 1st earner	59,490	61,266	54,803	59,567
	(71,748)	(78,685)	(48,612)	(151,704)
Income 2nd earner	20,664	17,880	28,017	12,329
	(21,040)	(21,100)	(19,015)	(17,646)
Partner pay gap	0.51	0.55	0.43	0.65
	(0.33)	(0.33)	(0.26)	(0.33)
MTR change 1st earner	-	-	-0.03	-
			(0.04)	
MTR change 2nd earner	-	-	0.07	-
			(0.09)	
Couple's tax benefit	-	-	829	-
			(1,509)	
N	12,221	8,365	3,856	2,769,383

Notes: Table illustrates the descriptive statistics of the analyzed samples of same-sex civil partnerships and the control group of different-sex couples in the baseline year before the reform (2012). The sample *Main* includes all individuals that first appear in 2013. Samples *Retro* and *No Retro* are subsamples of the *Main* sample and include only couples that made use of the option to file retroactively before in 2013 and those that did not, respectively. Income is the sum of income from business, self-employment and employment. The partner pay gap is defined as the difference between partners' income relative to the total household income. The MTR change is the hypothetical change in MTR if the same-sex couple was already filing jointly in the baseline year of 2012. The tax benefit is the same-sex couple's tax saving if joint taxation was already introduced in 2012. Raw data (unweighted), mean values.

of joint filing for same-sex civil partners in 2013. Hence, same-sex couples are our treatment group since they enjoy potential tax benefits resulting from the introduction of joint income taxation. Our control group are married different-sex couples because they could already benefit from joint filing and the reform in 2013 does not affect them.[11] The dynamic difference-in-differences approach allows us to observe how the effect of joint taxation on partners' income evolves over time. Second, we plan to leverage variation in each partners marginal tax rate as a result of the switch from individual to joint taxation due to the reform to estimate an elasticity of taxable income (ETI), illustrated in Figure 1a.

4.1 Difference-in-Differences

For our difference-in-difference specification, we estimate the following dynamic regression:

$$y_{it} = \delta_i + \gamma D_t^k + \mu T_i + \sum_{k \neq 2012} \beta^k \cdot (D_t^k \cdot T_i) + X_{it} + \epsilon_{it} \tag{3}$$

where y_{it} refers to the respective outcome variable of unit i at time t. Unit i either refers to the couple, the secondary earner, or the primary earner. The outcome variables are secondary earner's log income, primary earner's log income, and the partner paygap. Income is the sum of income from business, self-employment and employment. We adjust income variables by the consumer price index. D_t is a binary time indicator variable that takes value 1 in each post-treatment period. T_i is a binary treatment indicator variable equalling 1 when i is in a same-sex civil-partnership. $(D_t \cdot T_i)$ is the interaction term, and hence, β_k the coefficient of interest, which captures the difference in treatment effects before and after the reform. δ_i are individual fixed effects and X includes control variables on unit i. In the case of the couple, we include information on age difference, mean age, children, and region. For our analysis of the primary and secondary earner, we include their age, combined age, children, and region. ϵ_{it} captures unobserved factors.[12]

The identifying assumption we make in this difference-in-differences framework is that incomes of same- and different-sex couples would have evolved parallel to each other in the absence of the introduction of joint filing for same-sex civil partners in 2013. We explore this in Section 5.

[11] We exclude different-sex spouses that got married from 2008 to 2013 and focus on already married spouses.

[12] Since our setting involves a single treatment date, we do not need to assume homogeneous treatment effects as highlighted in the new DiD literature (e.g. Goodman-Bacon, 2021).

4.2 Elasticity of Taxable Income

To estimate behavioral responses to taxation, we rely on a well-known concept in public finance. The elasticity of taxable income (ETI) summarizes all different types of behavioral responses to income taxation. Compared to labor supply elasticities, it also captures tax avoidance and tax evasion behavior. An ETI measures the responsiveness of taxable income to changes in the net-of-tax rate (NTR) - defined as one minus the marginal tax rate. We follow the most standard regression specification:

$$log\left(\frac{y_{it}}{y_{it-k}}\right) = e \cdot log\left(\frac{1-\tau_{it}}{1-\tau_{it-k}}\right) + \delta f(y_{it-k}) + \theta X_{it-k} + \delta_i + \epsilon_{it}, \tag{4}$$

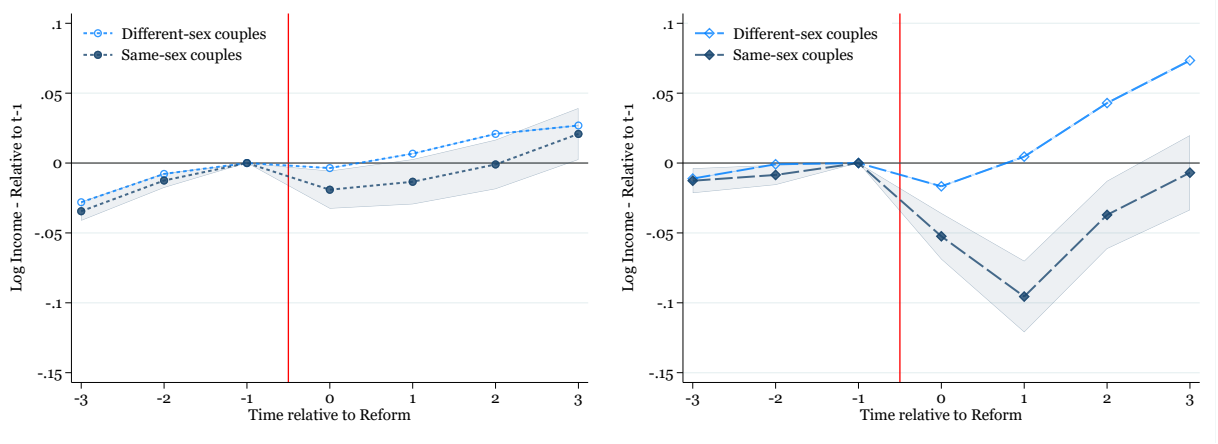
e is the parameter of interest, k is the chosen difference length and $t-k$ denotes the base-year. X_{it-k} is a vector of control variables which contains of standard demographic variables (number of children, age, and West-vs. East-Germany). A set of year fixed effects μ_t control for any omitted variables in differences that are the same on average for all individuals. $f(y_{it-k})$ denotes the income control in order to capture non-tax related income trends (e.g. reversion to the mean and heterogeneous income growth across the earnings distribution). We follow the most standard approach and control for the log of pr-reform income $\ln(y_{i,t-k})$ (Auten and Carroll, 1999). ϵ_{it} an individual error term.

In a progressive tax system, the marginal tax rate and income are jointly determined. To overcome endogeneity problems, we take a common approach and construct mechanical tax rate changes. We hereby apply post-reform tax rules on pre-reform taxable income and instrument for the NTR. Since pre-reform taxable income is not available by definition, we construct hypothetical pre-reform taxable income for each couple by relying on a tax simulation model.[13] The resulting change in the net-of-tax rates is free of any behavioral responses. We apply instruments proposed by Gruber and Saez (2002) and Weber (2014).

An interesting aspect of such an approach is the fact that when using different outcome variables, e.g. taxable income vs. overall earnings, we limit the range of responses. For example, it allows us to see if individuals change their real behavior (e.g., labor supply adjustments) or if we see any changes in reporting behavior (e.g., a stronger response with taxable income).

[13]Note that we cannot simply add pre-reform taxable income of both spouses, divide it by two and apply the tax schedule to obtain the hypothetical pre-reform marginal tax rate. It is necessary to establish a simple tax simulation model to account for e.g. larger tax allowances or different child allowances in case of joint filing.

Figure 3: Income relative to reform year



(a) Primary earner (b) Secondary earner

Notes: This figure shows event study results from estimating Equation 3 for the secondary and primary earner without the interaction term $D_t \cdot T_i$. The sample includes all same-sex couples that first filed jointly in 2013 and did not retroactively file taxes jointly. Panel (a) shows the result for primary earners. Panel (b) shows the result for secondary earners. Primary and secondary earners are defined on the basis of the pre-reform years. $t = 0$ is the reform year of 2013. Income is the sum of income from business, self-employment and employment. Shaded areas are 95% confidence intervals. Confidence intervals of different-sex couples are very narrow due to the large sample size.

5 Results

In this section, we present the estimation results of the effect of the introduction of joint taxation on the primary and secondary earners' income and the partner pay gap, employing a DiD approach.

5.1 General Results

Income We first run an event study for incomes of the primary and secondary earner for same and different-sex couples to check how incomes evolve around the reform. Figure 3a illustrates the income trend for primary earners and Figure 3b for secondary earners. Note that we define primary and secondary earner based on pre-reform years $t = -3$ to $t = -1$, so that partners do not switch between being the primary or secondary earner. The income of primary earners in same-sex partnerships remains relatively stable prior to the reform, experiences a decrease during the reform year, and then exhibits an upward trend starting from $t = 1$.[14] A similar pattern is observed for different-sex couples. However, the dip at

[14]Since we define primary earners as being primary earners over the pre-period, the small dip in earnings for both different-sex and same-sex couples illustrates a sort of mean reversion, where this event-time marks the first instance where these observations could potentially shift back to being secondary earners within their respective couples.

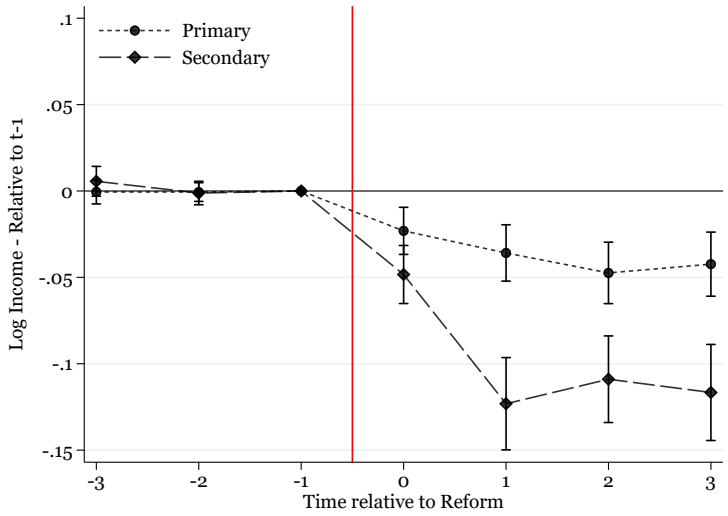
$t = 0$ is smaller, resulting in the upward trend at $t = 1$ and $t = 2$ running parallel but higher than the trend of primary earners in same-sex couples.

Secondary earners' income is relatively stable and on similar trends prior to the reform for both same-sex and different-sex couples. In the year of the reform and in $t = 1$, the earnings of secondary earners in same-sex couples considerably drop by 9.6% before reversing back to an upward trend in $t = 2$. However, the disparity in earnings with different-sex couples remains.

To eliminate general time trends, we next turn to our DiD approach, for which we employ different-sex couples as our control group. One implication of the identifying parallel trend assumption is that we should not observe an economically significant effect in the pre-reform period. In fact, Figure 4 shows that the pre-reform estimates are not statistically significantly different from zero for both earners. Income decreases by up to 12.3% for a same-sex secondary earner after filing taxes jointly post-reform relative to a different-sex counterpart. Three years after the reform, the difference to different-sex secondary earners is still at 11.7%. Similar to secondary earners, same-sex primary earners experience a reduction in income, but smaller in magnitude. Same-sex primary earners' income decreases by 4.2% three years after filing jointly post-reform relative to different-sex primary earners. Given that marginal tax rates fall for primary earners after the introduction of joint taxation for same-sex couples, the negative effect could indicate that the income effect from receiving tax benefits through joint taxation (see Figure 1b) is larger than the substitution effect for the primary earner, as these two effects go in the opposite direction for primary earners.

Partner pay gap It is important to evaluate the impact of the introduction of joint taxation also on the couple level to study the intra-household income distribution. We define the partner pay gap as the absolute difference between partners' incomes before taxes relative to the total income before taxes of the couple. In particular, the advantage of this concept is that we do not need to define the primary and secondary earner. Figure 5a shows the partner pay gap for different- and same-sex couples around the reform year. The pre-trends are stable and very similar, yet not statistically significant, for both groups. In the reform year $t = 0$, the partner pay gap trends diverge for the two groups. Same-sex couples' partner pay gap significantly widens, whereas different-sex couples' partner pay gap follows the slight upward trend from the pre-reform period. This can also be seen in the dynamic DiD results, illustrated in Figure 5b. The coefficients are slightly below zero for the pre-reform years. The partner pay gap then increases by up to 10.7% three years after the introduction of joint filing for same-sex couples relative to the partner pay gap of different-sex couples.

Figure 4: Treatment effect for income

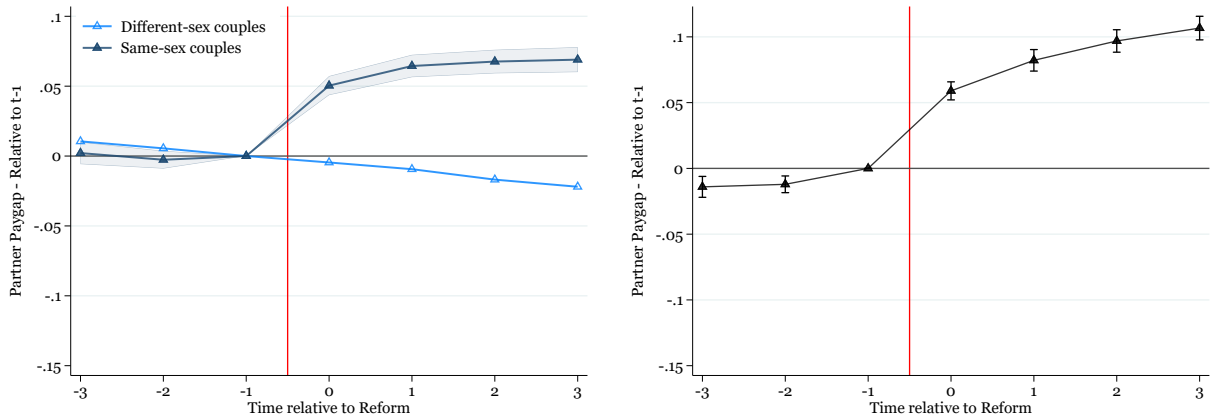


Notes: This figure shows the results from estimating Equation 3 for the sample, which includes all same-sex couples that first filed jointly in 2013 and did not retroactively file taxes jointly. The graphs represent the estimated coefficients from the interaction term (β_k) for the primary earners' and secondary earners' income. Primary and secondary earners are defined on the basis of the pre-reform years. $t = 0$ is the reform year of 2013. Income is the sum of income from business, self-employment and employment. Vertical segments are 95% confidence intervals.

To put these numbers into perspective, using the averages reported in Table 1, the combined income of the couple in the year prior to the reform amounts to €82,820 (€54,803 primary earner, €28,017 secondary earner), resulting in a relative pay gap of 0.43. A 10.7 percentage point increase in this gap would lead to a new relative pay gap of 0.537. Assuming overall income remains unchanged, this would translate into an increase in the absolute pay gap from €26,786 to €44,467, representing a rise of €17,681. However, as indicated in Figure 4 the reform also decrease the overall income of the couple. Hence, the absolute rise in the partner paygap must be lower.[15]

[15]Note that since the relative paygap is calculated as the absolute difference between the two incomes divided by their sum, it is sensitive to changes in both the numerator and the denominator. An increase in the absolute income gap (nominator) leads to a higher relative gap, while a decrease in total income (denominator) also results in a larger relative gap. The income results from Figure 4 show that there is also a decrease in the absolut income (denominator).

Figure 5: Partner pay gap relative to reform year and treatment effect



(a) Event study (b) Dynamic DiD

Notes: This figure shows the partner pay gap relative to reform year and treatment effect. Panel (a) shows event study results from estimating Equation 3 for the partner pay gap without the interaction term $D_t \cdot T_i$. Panel (b) shows the results from estimating Equation 3 for the partner pay gap. The graphs represent the estimated coefficients from the interaction term (β_k). The sample includes all same-sex couples that first filed jointly in 2013 and did not retroactively file taxes jointly. $t = 0$ is the reform year of 2013. Income is the sum of income from business, self-employment and employment. Shaded areas and vertical segments are 95% confidence intervals. Confidence intervals of different-sex couples in Panel (a) are very narrow due to the large sample size.

5.2 Heterogeneity

Male vs. Female We further anylze heterogeneities in our results regarding characteristics and income sources. First, we present our results separately for female and male civil partnerships, as the literature on same-sex couples has highlighted differences between these groups. The results are illustrated in Appendix Figure XX. While the event study results are not significantly different from each other, female partners appear to be less responsive to the reform. Both primary and secondary earners in female partnerships exhibit weaker reactions to the reform compared to their male counterparts. As this pattern is observed for both earners, the overall difference in the pay gap remains negligible.

East vs. West Germany The literature has shown that strong differences still exist between the formerly divided East and West Germany, even decades after reunification. However, it is not straightforward to predict whether these differences will manifest similarly in our context. Labor market differences between the two regions primarily stem from lower average wages, higher female labor force participation and a greater prevalence of dual-earner couples in the former East. However, we argue that within couples, gender norms likely play a lesser role in this setting, which could explain why the regional differences are

less pronounced in our results. Yet, lower withing-couple inequality in East Germany could lead to German couples there being less responsive to the incentives created by joint taxation. To analyze the regional differences, we divide our sample into civil partners located in East and West Germany. Our results, illustrated in Appendix Figure XX, show that while the differences between East and West Germany are not statistically significant, the event study results indicate a larger relative pay gap post-reform for West Germany. This is primarily driven by a more pronounced negative reaction among West German secondary earners.

Without vs. with Children Partnerships with childcare responsibilities may be more responsive to the incentives to specialize provided by the joint income tax schedule. To test this, we further split our sample based on whether the partnerships had children at the time of the reform. The results, illustrated in Appendix Figure XX, show that partnerships with children indeed exhibit a greater increase in their relative pay gap. This appears to be driven mainly by a strongerer negative reaction from the secondary earner.

Income Sources We also examine whether our findings are driven by all sources of income or if the observed reactions are specifically linked to either wage earnings or self-employment income. There are several ways to analyze heterogeneities in income sources. First, the sample can be split based on the types of income sources individuals have. Second, the results can be run separately for each income source. Third, it is possible to check whether the share of a specific income source decreased or increased after the reform.

5.3 Elasticity

In the long run, we also plan to utilize the heterogeneity in the marginal tax rate change illustrated in Figure 1a to estimate the elastictiy of taxable income.

6 Conclusion and policy implications

Joint taxation of spouses is often debated as a determinant behind the gender earnings gap, since it implies negative income incentives for the secondary earner, typically the wife. However, quantifying the impact of joint taxation on income has been challenging due to the lack of exogenous variation and the interaction with traditional gender norms. We overcome these two challenges by exploiting the introduction of joint taxation for same-sex couples in Germany in 2013. We use novel, uniquely linked, administrative income tax return data on the universe of all same-sex couples who file jointly. We find that a same-sex secondary

earner experiences a significant decline in their earnings after filing taxes jointly relative to a different-sex secondary earner and relative to prior to the introduction of joint taxation for same-sex couples. Primary earners also experience an earnings decrease, albeit considerably less pronounced. As a result, the partner pay gap significantly widens three years after the reform relative to different-sex couples. These findings indicate that joint taxation leads to greater income disparency between partners and negatively affects the earnings of the secondary earner. We shed light on the interaction of tax incentives and gender norms. Our findings suggest that gender norms are not the only reason for low labor supply of women, who are typically the secondary earner, but that joint taxation plays a major role. Moreover, due to the income effect of receiving tax benefits, the overall earnings of both partners are also reduced. These results indicate that in progressive tax systems, implementing a joint taxation scheme can lead to lower tax revenue due to decreased earnings.

Governments worldwide are facing the challenge of addressing the shortage of skilled workers. Abolishing joint taxation of spouses is currently debated in several countries such as Germany and Switzerland to boost labor supply, particularly among secondary earners, who are often women. This project not only offers the opportunity of further understanding the particular economic dynamics and challenges experienced by same-sex couples, but can also inform policy-makers about the economic costs of joint taxation and its detrimental impact on gender equality within the labor market.

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A Appendix Tables & Graphs

A.1 Appendix Tables

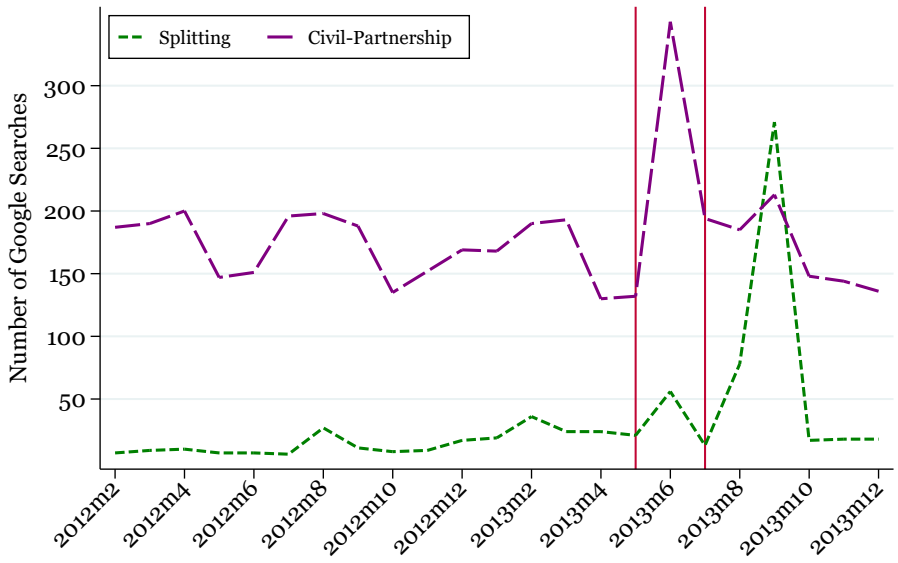
Table A.1: Personal Income Tax Systems

Country	**Tax filing**		
	Joint	Optional	Family
Brazil		x	
Chile		x	
Estonia		x	
France			x
Germany		x	
Ireland		x	
Israel		x	
Luxembourg	x		
Malta		x	
Norway		x	
Panama		x	
Poland		x	
Portugal			x
Spain		x	
Switzerland		x	
United States		x	

Notes: Table presents all countries whose personal income tax system is characterized either by joint filing of spouses, an option to file jointly or individually as spouses or income taxation based on the family level.
Source: OECD (2016).

A.2 Appendix Figures

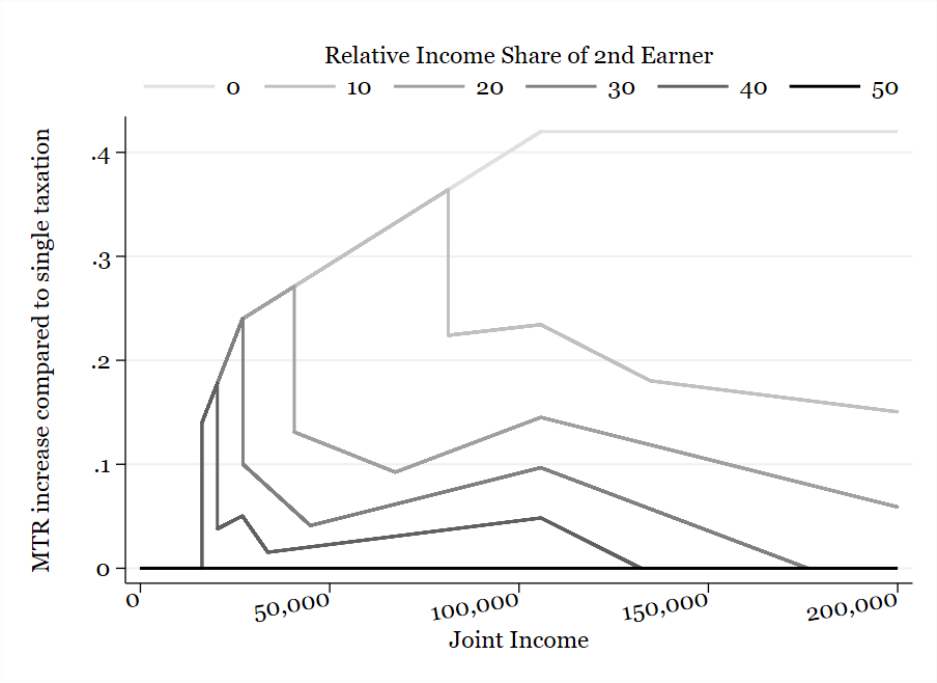
Figure A.1: Google searches on joint taxation and civil-partnership around 2013 reform



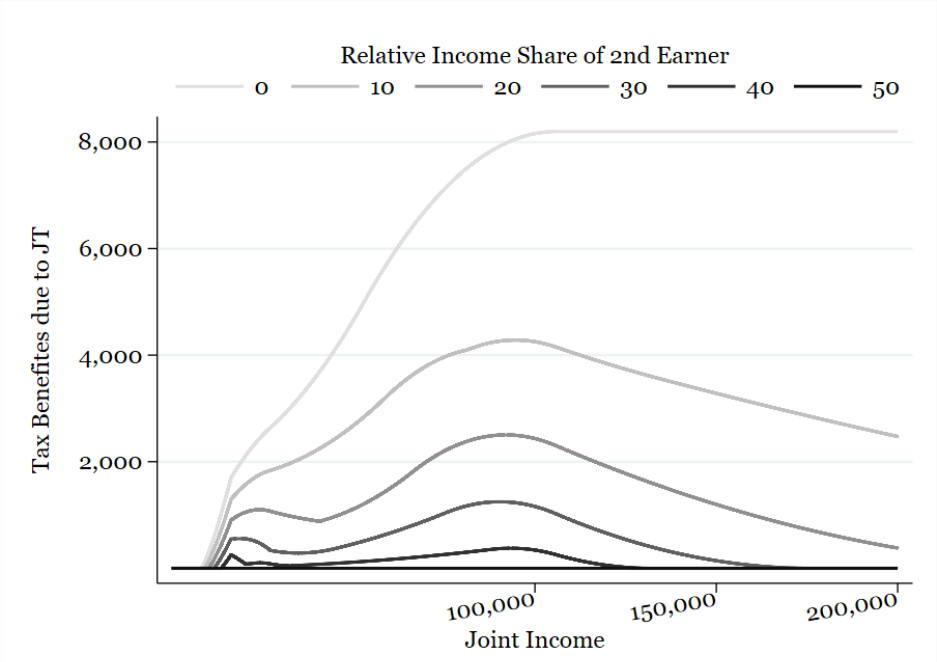
Notes: Figure shows the absolute number of monthly Google searches on joint taxation (*Ehegattensplitting*) and civil-partnership (*Lebenspartnerschaft*) in the months surrounding the ruling in May 2013 and the final reform in July 2013, marked by the red lines.
Source: Own calculation based on google trend data.

Figure A.2: Joint taxation vs. individual taxation - until 200,000

(a) Change in marginal tax rates for the secondary earner under joint taxation



(b) Tax benefits under joint taxation



Notes: Figure (a) shows the difference in marginal tax rates for the secondary earner when switching from single to joint taxation for different levels of the income of the partner. Figure (b) shows the absolute benefits of joint taxation compared to single taxation for specific relative income distributions among partners. Figure 1 illistrates both graphs with cut-offs at 600.000 of the joint income.
Source: Own calculation based on the tax schedule in 2013.

B Numerical Example of Joint vs. Individual Taxation

In this example, we compare the tax liability and marginal tax rates from joint and individual taxation for a hypothetical couple under the German income tax schedule from 2013. Person 1 earns 80,000 annually, while Person 2 earns 20,000 annually. When taxed individually, Person 1s tax liability is 23,576 with a marginal tax rate (MTR) of 42%, and Person 2s tax liability is 1,759 with an MTR of 25%. The combined tax liability for the couple is 25,335. However, when taxed jointly, the couples total tax liability decreases to 21,820 with a joint marginal tax rate of 36%.

Scenario	**Tax Liability (€)**	**Marginal Tax Rate (MTR)**
Taxed Individually	25,335	
Person 1 (80,000 €)	23,576	42%
Person 2 (20,000 €)	1,759	25%
Taxed Jointly (100,000 €)	21,820	36%

This reduction illustrates the benefit of joint taxation, particularly when there is a significant disparity in earnings between the two partners. The joint taxation system reduces the overall tax burden by 3,155, primarily by reducing the marginal tax rate applied to the higher earner (Person 1), while increasing it for the lower earner (Person 2).