Wages, Work Hours, and Work Effort: How Tax Rates Affect Taxpayers' Occupational Choice

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April 12, 2021

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Abstract

While labor studies of the effects of income taxation have often focused on labor force participation and work hour decisions, Feldstein (1995) argued that taxpayers ultimately want to adjust their taxable income in response to changes in marginal tax rates. He also pointed out that adjusting taxable income is not limited to changing hours of work. For instance, facing higher tax rates, individuals may reduce their taxable income by giving up high-paid occupations that require high levels of effort in exchange for jobs that pay lower wages but are less onerous. In this paper, I examine how individuals change their occupations to adjust their wages, levels of work effort, and number of work hours in response to changes in marginal tax rates. In particular, I estimate effects of the switch from separate to joint taxation at the federal level in 1948 on married couples' occupations. This policy increased marginal tax rates for wives but decreased them for husbands. My results show that joint taxation had no effect on husbands, reduced labor force participation rates among wives, and induced wives who remained in the labor force to choose occupations that paid lower wages, required lower effort, but involved the same level of full-time work. These results reveal that under some circumstances, individuals may respond to higher tax rates by reducing work effort instead of reducing work hours. The largest effects of joint taxation were on middle-age wives, who faced the largest husband-wife earning gap among all wives.

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Acknowledgements: I am indebted to my committee members, V. Joseph Hotz, Seth Sanders, Arnaud Maurel, and Peter Arcidiacono, for valuable comments and encouragement throughout this research project. I also thank Marjorie McElroy, Robert Garlick, and participants in Labor Luch Work Shop Series at Duke Economics Department for helpful feedback on earlier versions of the paper. All errors are mine alone.

1 Introduction

Economists have long shown that taxes could distort labor force participation and work hour decisions (Keane, 2011). From a theoretical perspective, the standard labor supply model often assumes wage is exogenous, so economic agents could only respond to taxes through work hours, including choosing to work zero hours. However, Feldstein (1995) argued that individuals ultimately want to adjust their taxable income when facing changes in tax rates and adjusting taxable income is not limited to changing hours of work. In a world where individuals choose occupations by considering the tradeoff between wages and amenities, changes in tax rates may distort their occupational choice by altering their incentives to obtain one type of compensation versus the other. When their wages get taxed away at a higher rate, individuals may choose to obtain compensation in the form of untaxable benefits instead of wages. For instance, facing higher tax rates, one may give up a high-paid occupation that requires a high level of effort in exchange for a job that pays a lower wage but is less onerous.

To investigate such responses to changes in tax rates, I leverage a quasi-natural experiment. In 1948, the US government passed a Tax Revenue Act (henceforth TRA48), which shifted federal taxation of family income from separate taxation to joint taxation. Generally speaking, joint taxation causes the tax liability of one spouse to depend on income of the other spouse. The specific form of joint taxation studied in this paper is *joint taxation with income splitting*, which requires each spouse to pay taxes on half of the couple's combined income. The opposite of joint taxation is *separate taxation*, which mandates each spouse to pay taxes on own income only. Under progressivity, switching from separate to joint taxation would increase marginal tax rates for secondary earners, who are often the wives, while decreasing marginal tax rates for primary earners, who are often the husbands. Such changes in tax rates create incentives for married individuals to alter their occupations.

The switch from separate to joint taxation in 1948 only affected couples in a subset of states due to historical reasons. Section 2 provides more details on these variations. Taking advantage of this unique setting, my paper estimates a difference-in-differences model, where couples in states affected by TRA48 form my treatment group, couples in other states form my control group, and TRA48 is the treatment. The main data used in this paper come from the 1940 and 1950 Censuses. Data in 1940 reflect the pre-treatment period and data in 1950 reflect the post-treatment period.

I view occupations as bundles of attributes that are implicitly priced in observed wages. Choosing an occupation is effectively choosing one such bundle of occupational characteristics. To look at effects on occupations, I use occupational characteristics as outcomes. Three main outcomes in this paper are wage level, full-time work requirement, and the intensity of tasks performed in occupations that individuals choose. All outcomes are specific to each occupation by gender, thus a change in any outcome reflects a change in occupations.

Wage level is defined as the median weekly wage of all workers in an occupation. Looking at effects of joint taxation on this outcome allows me to see whether joint taxation induces

individuals to choose occupations with different levels of pecuniary benefits. Full-time work requirement is one nonpecuniary aspect of occupations. It is defined as the share of full-time workers in an occupation, essentially reflecting the probability of having to work full-time. This outcome is closely related to work hours conditional on employment–a margin of intensive labor supply often studied in labor research of income taxation.

Task intensity is another nonpecuniary aspect of occupations. I use data on the intensities of occupations from Autor et al. (2003), which include measures of intensity for five tasks that workers may have to perform on their jobs. Each measure shows how intensively a task is used in an occupation. Task intensity measures the level of required effort that one must exert at work. Arguably, work effort is also an intensive margin of labor supply but it is rarely examined in labor studies of taxation. By looking at effects of joint taxation on full-time work requirement and task intensity of occupations, I am able to contrast effects of joint taxation on two intensive labor supply margins.

My results show that switching from separate to joint taxation had no effect on husbands but affected wives in multiple ways. It caused married women to drop out of the labor force at higher rates. Among wives who remained in the labor force, joint taxation induced them to choose occupations that paid 3.4% lower median annual income. More importantly, the reduction in income was due entirely to reduction in wage: joint taxation had no effect on the level of full-time work involved in an occupation held by married women. Thus, when faced with higher marginal tax rates, working wives who remained in the labor force chose lower-paid occupations but did not choose occupations in which part-time work was more prevalent. Instead, I find that they chose lower-wage occupations that required lower effort as measured by task intensity. These results confirm Feldstein's insight that in response to higher tax rates, individuals try to reduce their taxable income, but this income distortion could result from various channels beyond work hour adjustment. Furthermore, I find that the effects of joint taxation on wages and task intensity were economically significant. They were roughly 1/3 the effects of having a child in the household.

I also find that the switch to joint taxation in 1948 had distributional consequences. As discussed in section 2, my theory predicts that joint taxation had larger effects on couples with larger husband-wife earning gaps. Empirically, I find evidence supporting this theory. Looking at heterogeneous effects of joint taxation on wives of different age groups, I find that effects of joint taxation were concentrated among middle-aged wives, who faced the largest husband-wife earning gaps. Moreover, middle-age married women were also the group who held the highest-paid occupations among all married women. These results suggest that joint taxation may contribute to sustaining the gender wage gap by encouraging women to choose lower-paid occupations, particularly at the age when they had the best chance to get ahead, making it difficult for women's earnings to catch up with men's.

Occupational information is only available for labor force participants in my sample. Hence, one potential concern is that the results might have been driven by the differential selection into the labor force across control and treatment groups during the 1940s. To mitigate this concern, I correct for this source of selection bias using both Heckman procedures and

control function approaches. These corrections do not change my results. All estimated effects also stay the same when I control for major non-tax events happening in the 1940s that could have differentially affected occupations of people in control and treatment states. I also empirically rule out the potential for endogenous selection into marriage due to the switch to joint taxation and concurrent tax changes that could be confounders and affect my findings.

To explain the results that married women who stayed in the labor force chose to respond to joint taxation through work effort rather than work hours, I consider the possibility that married women faced a limited range of options for reducing their hours of work by changing occupations. Using estimates from this paper combined with estimates of taxable income elasticity in the literature and Census data on work hours, my back-of-envelope calculations reveal that moving from full-time to part-time work in response to joint taxation would be suboptimal for the vast majority of married women in my sample.

My paper contributes directly to the literature on the effects of joint taxation on married women's work-related outcomes[1]. Closest to mine is LaLumia (2008), which uses the same tax variations induced by TRA48 but looks at employment, work hours conditional on employment, and non-wage income. Her null result on work hours is consistent with my findings that joint taxation did not cause married women to choose occupations involving less full-time work. My paper focuses on another facet of work behaviors that LaLumia does not examine, which is the change in occupations among married women to reduce wages and avoid high-effort jobs when faced with joint taxation. While it is true that women who stayed in the labor force did not reduce their work hours, their labor supply still changed in a significant way through occupational shifts. My paper helps paint a more complete picture of how TRA48 affected labor market outcomes of married couples.

Eckstein et al. (2019) is the only paper I know of that examines effects of joint taxation beyond work hour distortion. The authors build a model to explain changes in wages, employment, education, marriage rates, and fertility for five US birth cohorts born between 1935 and 1975. They then simulate the effect of eliminating joint taxation to examine how such tax change would affect those outcomes. Their results show that abolishing joint taxation would increase pre-tax wage rate of married women, which is consistent with my results of joint taxation's negative wage effects on married women. However, Eckstein et al. does not explicitly show whether the change in pre-tax wage rate comes through changes in occupations. My paper reveals that the switch from separate to joint taxation in 1948 did induce occupational shifts among married women, which manifest in wage reduction. I also show that this wage decline came in exchange for lower work effort–an outcome that Eckstein et al. (2019) does not consider.

[1]Most papers on joint taxation have focused labor force participation and employment distortion. Consistently, they show that joint taxation reduces labor force participation and employment rate among married women in various countries, such as Sweden (Selin, 2014), Spain (Fuenmayor et al., 2018), Czech Republic (Kaliskova, 2014), Canada (Crossley and Jeon, 2007), and Germany (Haan, 2010; Meier and Wrede, 2013; Guner et al., 2012; Gustafsson, 1992).

My paper also contributes to the broad literature on labor market responses to income taxation. While most papers in this literature focus on labor force participation, employment, and work hour distortion (Keane, 2011), I show that in some circumstances, non-hour responses to taxation could be more prominent than hour response, which suggests the need to extend the standard labor supply model to allow for non-hour responses to income tax. My paper is also one of the few that looks at effects of taxation on occupations[2]. Powell and Shan (2012) is the closest to mine in this area. This paper estimates effects of marginal tax rates and after-tax income on total disamenity compensation. It shows that a higher marginal tax rate would induce people to choose lower-paid occupations with lower disamenities. My paper takes one step further to show that among disamenities, some respond much more than others. Specifically, married women who stayed in the labor force reduced work effort when faced with joint taxation, but did not change their work hours. My results provide a more nuanced understanding of heterogeneous distortion of taxation on various types of disamenities.

This paper proceeds as follows. In section 2, I discuss the background details of the 1948 Tax Revenue Act and major events happening during the 1940s. Section 3 describes the data that I use in this paper. Section 4 lays out my methodology, discusses main results, and heterogeneity analyses. In section 5, I discuss robustness checks. Section 6 proposes a potential mechanism that may explain my results. Lastly, I conclude my paper and discuss potential avenues for future research in section 7.

2 Background

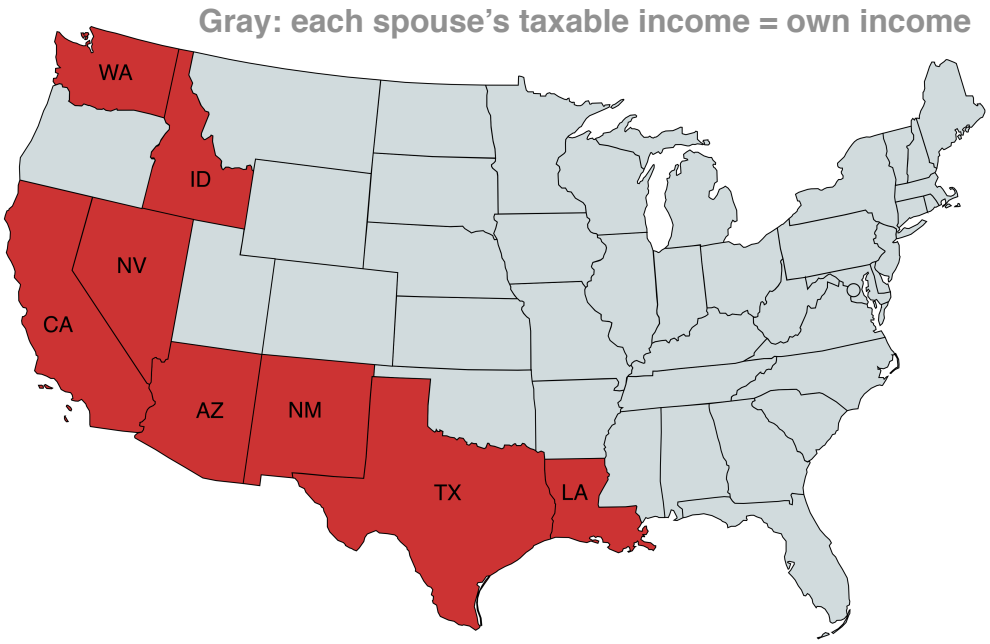
To examine effects of joint taxation on occupations of married couples, this paper leverages a quasi-natural experiment in the US, which was induced by the passage of the 1948 Tax Revenue Act (TRA48). Effects of TRA48 varied geographically due to differences in the determination of taxable income for married individuals across states before 1948. This section discusses these differences, consequences of TRA48 on affected couples, and major events happening during the 1940s that might have differentially affected occupations of married couples across states.

2.1 1948 Tax Revenue Act

Before 1948, everyone in the US filed separate federal returns. The IRS required each individual to pay taxes on his or her taxable income, where the definition of taxable income depended on state of residence. For married individuals, states differed in their views of how

[2]A few papers look at effects of income taxation on work-related behaviors beyond number of hours work. They either look at convexity of the income tax schedule or the differences between personal income taxation and corporate taxation. Gentry and Hubbard (2004) show that income tax progressivity discourages individuals from moving to higher-paid jobs since the convexity of the tax schedule taxes away the benefits of a successful job search. Cullen and Gordon (2007) find that a lower personal tax rate reduces entrepreneurial risk taking because it reduces the taxes saved from deducting business losses. Gentry and Hubbard (2000) raise the concern that higher income tax progressivity discourages entrepreneurs from embarking on their business endeavours since progressivity punishes financial success.

much total family income was attributed to each spouse. These differences partitioned the US into two groups of states, as indicated in the map below.



In each of the "gray" states on the map, each spouse's taxable income is the income that the person generated, regardless of the other spouse's income. This practice is called *separate taxation*. In each of the eight highlighted states, also called community property states, each spouse's taxable income is half of the couple's total income. Thus, married couples in community property states faced the same tax consequences as if they were under *joint taxation with income splitting*.

These differences in the determination of taxable income stem from differences in state histories. California, Texas, Louisiana, New Mexico, and Arizona used to be Spanish colonies. A Spanish tradition dating back to the 5th century considers husband and wife equal contributors to family income and dictates that each of them owns half of the total income generated during marriage. Community property tradition was introduced to these states during their time under Spanish rule and then included in these states' constitutions when they became part of the United States. In the late 19th century, thousands of migrants from California brought community property tradition with them to Nevada, Idaho, and Washington, turning these states into community property states (Newcombe, 2011). Since these eight states viewed husband and wife as equal contributors to family income, they also viewed each spouse as having equal tax responsibility and defined taxable income for each spouse as half of the couple's total income. Meanwhile, other states followed the tradition of the English common law and viewed the income that each spouse generated during marriage

as belonging to that person only. Taxable income for each spouse in these states was thus defined as the income that this person earned, regardless of the other spouse's income. The cross-state differences in taxable income definition for married individuals long preceded the 1940s and were not driven by any economic phenomenon happening during this decade.

In 1948, after World War II had already ended, the US federal government passed a Tax Revenue Act with the main purpose of reducing income tax payments relative to the 1947 level. One feature of this Act was the introduction of joint filing. For the first time in American history, the US government allowed couples in any state to file federal taxes jointly. If a couple chose to file a joint return, each spouse would pay taxes on half of the couple's combined income[3]. Since married individuals in eight community property states had already paid taxes on half of their family income before 1948, they were not affected by this policy change. Meanwhile, couples in other states faced a shift from separate to joint taxation. This unique setting allows me to investigate effects of joint taxation using a difference-in-differences framework, where couples in community property states form my control group and couples in other states form my treatment group.

2.2 Consequences of Switching from Separate to Joint Taxation

For couples in the treatment group who were also subject to progressive taxation, the switch from separate to joint taxation could dramatically reduce marginal tax rates for secondary earners, while increasing them for primary earners. Furthermore, these changes in marginal tax rates were larger for couples with larger husband-wife earning gaps. To see these points more clearly, consider two hypothetical couples, Alex-Barbara and Carl-Daisy, with incomes as shown in the table below.

	Couple Alex-Barbara		Couple Carl-Daisy	
	Alex	Barbara	Carl	Daisy
Income	15,000	5,000	17,000	3,000
MTR under separate taxation	47%	26%	50%	22%
MTR under joint taxation	38%	38%	38%	38%
MTR difference	-11	12	-12	16

The marginal tax rates reported in this table are computed based on the 1950 Tax Rate Schedule provided by the IRS[4]. The marginal tax rate for Barbara under separate taxation

[3]Although joint filing was not mandatory, it is safe to assume that compliance rate was high. The IRS strongly encouraged couples to file jointly and explained tax-saving benefits of joint filing in its instruction of 1040 tax return forms. Hence, it is unlikely that couples were not aware of the ability to file jointly and the benefits of doing so. The IRS also made it convenient for couples to file jointly. If couples filed a joint return, the Collector would compute their tax liability on both separate and joint basis, and give them the benefit of the lower figure, which, in most cases, would be the figure on joint basis. Therefore, except if the two spouses could not sign on the same return, it is both beneficial and convenient for them to file jointly. While I do not have data on tax filing status in the 1940s, data on tax filing status in the 2000s provided by IPUMS CPS show that 96% of married couples in the US filed joint returns.

[4]https://www.irs.gov/pub/irs-prior/i1040–1950.pdf

would be 26%, and the marginal tax rate for Alex would be 47%. When joint taxation replaced separate taxation, each spouse would be responsible to pay taxes on $10,000, which is half of their combined income. Each spouse would then face a marginal tax rate of 38%. Thus, because of progressivity, the switch from separate to joint taxation increased the marginal tax rate for Barbara by 12 percentage points, and decreased the marginal tax rate for Alex by 11 percentage points.

Carl and Daisy made the same total income as Alex and Barbara, but had larger earning gap. Half of their combined income was also $10,000, so each spouse also faced a marginal tax rate of 38% under joint taxation. However, under separate taxation, Daisy would face a marginal tax rate of 22%, so joint taxation increased her marginal tax rate by 16 percentage points. Carl faced a 50% marginal tax rate under separate taxation, so his marginal tax rate got reduced by 12 percentage points when joint taxation replaced separate taxation. Daisy's marginal tax rate increased more than Barbara's, and Carl's marginal tax rate decreased more than Alex's.

These changes in marginal tax rates occured only under progressive taxation. In 1940, a couple must make at least $6000 in total income to be subject to progressive taxation[5]. This threshold was $5200 in 1950[6]. Therefore, I have to restrict my sample to couples who earned high enough income to be subject to progressivity. In section 3, I discuss how I achieve such sample.

The literature on elasticity of taxable income with respect to marginal tax rates has shown that a higher marginal tax rate induces individuals to reduce taxable income (Feldstein, 1995; Feldstein, 1999; Gruber and Saez, 2002; Chetty, 2009; Heim, 2009; Saez et al., 2012). Following similar logic, the dramatic increase in marginal tax rates would cause Barbara and Daisy, the secondary earners, to reduce taxable income. Meanwhile, Alex and Carl, the primary earners, would have the incentive to increase taxable income, since their marginal tax rates declined significantly. Because the changes in marginal tax rates were larger for Carl and Daisy than they were for Alex and Barbara, effects of joint taxation on taxable income should also be larger for Carl-Daisy, the couple with the larger earning gap. Section 4 shows my empirical investigation of these heterogeneous effects.

Under progressivity, switching from separate to joint taxation also saved tax liability for these couples. Computed based on the 1950 Tax Rate Schedule, the total tax liability for Alex and Barbara was $5,830 under separate taxation, but only $5,260 under joint taxation. Thus, after-tax family income for this couple went up when joint taxation replaced separate

[5]Personal exemption for a married couple in 1940 was $2000. The marginal tax rate was flat for all couples making no more than $4000 in taxable income. Hence, the minimum amount of total income a couple must make to be subject to progressive taxation was $6000.

[6]Personal exemption in 1950 was $600 for each individual, or $1200 for each married couple. The marginal tax rate was flat for each individual making no more than $2000 in taxable income. Since each married individual's taxable income in 1950 was half of the couple's total taxable income, this means the marginal tax rate was flat for all couples making no more than $4000 in taxable income. Hence, the minimum amount of total income that could make a couple subject to progressive taxation was $5200.

taxation. Carl and Daisy saved even more tax liability than Alex and Barbara, due to the larger earning gap. Theoretically, this increase in after-tax family income would create an income effect that encouraged both spouses to purchase more normal goods. These normal goods could be more leisure time, more pleasant working condition with less demanding tasks, etc. In so doing, they effectively reduced their taxable income, due to either working fewer hours or working at lower wages in exchange for more nonpecuniary benefits.

Gruber and Saez (2002) show small, negative income effects of tax changes on taxable income, so the income effect induced by joint taxation might not be large. In this paper, I am not able to disentangle effects of changes in after-tax income (income effect) and changes in marginal tax rates (substitution effect), due to limited income information available in the 1940 and 1950 Censuses, as explained in section 3. Therefore, effects of joint taxation that I show in this paper are combined income and substitution effects.

For Barbara and Daisy, both income and substitution effects of joint taxation induced them to reduce taxable income. Meanwhile, Alex and Carl faced opposite income and substitution effects. The simple theory I have discussed so far only tells us that joint taxation would cause secondary earners to lower their taxable income. To reduce taxable income, they might reduce their work hours, or move to occupations that paid lower wages but offered more nonpecuniary benefits, such as those that require lower effort. Current theory on effects of tax changes does not predict which of these ways would be more responsive to a tax change. My empirical results in section 4 contrast effects of joint taxation on work hours and work effort (as measured by task intensity), which sheds light on this issue. Appendix B shows diagrams that illustrate how this switch affect marginal tax rates and after-tax income for any couple subject to progressive taxation.

2.3 Concurrent Events in the 1940s

Besides the shift from separate to joint taxation, many other tax changes happening in the 1940s might also lead to differential trends in occupations of married couples across states. From 1940 to 1950, marginal tax rates increased significantly for all income levels, but these increases were generally larger at higher incomes. During this decade, California's tax code became less progressive, while Colorado, Delaware, Mississippi, Oklahoma, and Vermont made their tax codes more progressive.(Bakija, 2019). After the shift from separate to joint taxation at the federal level in 1948, Kansas, Oklahoma, and Oregon also allowed joint taxation at the state level.

The 1940s was also a quite turbulent period in American history due to American involvement in World War II. As men were drafted or enlisted in the war, they left vacancies in high-paid, traditionally male-dominated occupations for women to fill. During World War II, western states were major recipients of total military spending, which fostered rapid expansion in manufacturing and opened up new high-paid factory jobs. Economic boom in western states also attracted a huge number of migrants from other states to fill vacancies in aircraft and ship building factories. Being considered "frontier", western states might also experience other regional trends during the 1940s that differed from the rest of the country. Section 5

discusses the implications of these tax and non-tax events and explains how I address them.

3 Data

The main data in this paper come from 1% public-use microdata samples of 1940 and 1950 Censuses. They are two repeated cross sections and also the only data sets covering the 1940s period that I know of. These Censuses provide basic demographics for each individual, which include age, gender, race, ethnicity, Spanish surname, state of residence, place of birth, marital status, ages of youngest and oldest children, and number of children in the household. I also know employment and labor force participation status of each person. Occupation and industry information are only available for labor force participants.

Information on education, income, and numbers of weeks worked is quite limited in these two Censuses. While the 1940 Census provides education and weeks worked for all respondents, the 1950 Census provides them for only a random subset. Personal and family income information is not available in the 1940 Census, and available for only a random subset in the 1950 Census. The only income information provided in the 1940 Census is wage/salary income, which is available for every individual age 14 or older. Wage/salary income is known for only a random subsample in 1950[7]. For each married couple in the 1% sample of the 1950 Census, I have education, income, and weeks worked information for only one spouse.

As explained in section 2, the switch from separate to joint taxation only affected couples who earned high enough income to be subject to progressivity. Hence, I need to restrict my sample to high-income couples. Given the limited information on total family income in these two Censuses, I use education as a proxy and restrict my sample to couples with at least one high-school graduate spouse[8]. I do the same analyses shown in section 4 for couples with low education, i.e. those with at least one spouse having no more than 8 years of schooling, and find that effects of joint taxation on these couples were indeed insignificant.

The wage/salary income composition of couples in my sample suggests that on average, husbands were primary earners and wives were secondary earners. Wives earned higher income than husbands for only 4.75% of all couples and 23% of dual-earner couples. Thus, for the majority of wives, the switch from separate to joint taxation would raise their marginal tax rates, which would likely induce them to reduce taxable income as suggested by Feldstein

[7]Both 1940 and 1950 Censuses have a sample-line structure. On each Census form, an individual's information was recorded on a line specific to him or her, in response to Census questions. Some lines were designated as "sample-line", and whoever fell on such lines would be asked additional questions at the end of the Census form. It is random who fell on these lines. The list of additional questions for a sample-line person depended on his/her age and whether he/she was a household head. This sample-line structure means that certain variables are only available for sample-line people. Education, income, and weeks worked are all sample-line variables in the 1950 Census, meaning that they are only available for sample-line people.

[8]To be more precise, I restrict my sample to couples in which the sample-line spouse had at least 12 years of education. Although I know only one spouse's education for every couple in 1950, Pencavel (1998), Schwartz and Mare (2005), and Mare (1991) document a strong positive assortative mating pattern during the 1940 - 1960 period, so one spouse's education was indicative of the other spouse's education.

(1995). Such reduction in taxable income could result from reduction in work hours, including the choice to drop out of the labor force, or from reduction in wage, which may accompany an increase in nonpecuniary benefits.

To test the prediction on the response of taxable income to joint taxation and explore the channels through which this response occurs, ideally I would estimate effects of joint taxation on income, wage, full-time work status, and nonpecuniary benefits at individual level. To circumvent the limited information on income, wage, and weeks worked[9], as well as the lack of nonpecuniary benefit measures in the two Censuses, I use occupational characteristics as outcomes. The main outcomes in this paper include log(median annual income), log(median weekly wage), full-time work requirement, and task intensity of an occupation that one chooses to hold. They allow me to look at effects of joint taxation on taxable income, wage rates, full-time work, and work effort, respectively, through effects of joint taxation on occupations. Using median wage and income in one's occupation as indicators of one's earnings also has the advantage that these outcomes have fewer measurement errors than individual wages and incomes. I will now discuss outcome variables in this paper in more details.

Log(median annual income), log(median weekly wage), and full-time work requirement come from the 1950 Census special report on occupational characteristics[10]. They are specific to each occupation by gender, and available to only labor force participants[11]. The median annual income is the median of annual income among all workers in an occupation. Looking at effects of joint taxation on log(median annual income) allows me to see whether joint taxation led individuals to adjust taxable income conditional on staying in the labor force. One could think of this as the intensive margin of taxable income. It is the choice over how much income to generate conditional on generating income, which is analogous to intensive margin of labor supply–the choice over how many hours to work conditional on working.

Since individuals may reduce their taxable income by dropping out of the labor force, I also estimate effects of joint taxation on the labor force participation rate. This outcome represents the extensive margin of labor supply, which is often studied in labor research of income taxation. One could also think of this as the extensive margin of taxable income, i.e. the choice over whether or not to generate income. As mentioned at the beginning of the paper, numerous studies on joint taxation, including LaLumia (2008) which looks at TRA48 specifically, have shown that joint taxation reduced labor force participation and employ-

[9]The two Censuses provide hours worked information for all respondents age 14 or older. LaLumia (2008) estimates effects of joint taxation on this outcome among married women and finds no effect.

[10]This report includes some summary statistics of earnings and full-time status for workers in each occupation by gender. These summary statistics are calculated based on answers to sample-line questions in the 1950 Census regarding income and weeks worked. The sample-line people in this Census are a random 3.33% subsample of the entire population. Although I could have constructed these measures using the sample-line persons in the 1% sample of 1950 Census, sample-line persons accounted for only 24% of this 1% sample and did not cover all occupations held by others in 1950.

[11]This is because the 1950 Census special report provides summary statistics of income, wage, and full-time work for each occupation. I merge data from this report with the 1% Census samples using occupational codes, which are only available for labor force participants.

ment among married women. Given such abundant evidence in the existing literature, I show my estimates of joint taxation's effects on labor force participation to illustrate one way in which tax changes distort taxable income, but will devote the majority of my paper to effects of joint taxation on the intensive margin.

Log(median weekly wage) and full-time work requirement are two outcomes that allow me to examine whether effects of joint taxation on log(median annual income) were due to wage adjustment or work hour adjustment. The median weekly wage is the median of weekly wage among all workers in an occupation. Full-time work requirement is defined as the share of full-time workers in an occupation, and reflects the probability of having to work full-time. Facing higher marginal tax rates under joint taxation, working wives might choose to reduce taxable income by working fewer hours or working at lower wages in exchange for more nonpecuniary benefits. If they chose to reduce work hours, I would expect to them to switch to occupations with lower full-time work requirement. If they chose to reduce their wages, I would expect them to move to occupations with lower median weekly wage.

To see whether the wage adjustment in response to joint taxation was accompanied by changes in nonpecuniary benefits, I examine effects of joint taxation on task intensity of occupations that individuals chose to hold. Data on task intensity come from Autor et al. (2003), who construct measures of intensity for five tasks that workers may have to perform on a job. These tasks include: routine manual, nonroutine manual, routine cognitive, nonroutine interactive, and nonroutine analytical tasks. Each task intensity measure is a continuous variable that reflects how intensively a task is used in an occupation. I use these task intensity measures as proxies for required work effort, which is a disamenity since having to exert more effort often causes more stress, fatigue, and discomfort. Work effort is seldom observed directly and thus rarely examined in labor studies of taxation. Using task intensity measures as proxies for work effort allows me to circumvent the lack of a direct effort measure. This approach also offers a new interpretation of Autor et al.'s task intensity variables, which have been used mostly to reflect skill content in occupations.

My result from estimating a linear hedonic wage model, shown in table 1, indicates that these task intensity measures are positively correlated with wage in general, which support the interpretation of work effort as a disamenity that gets compensated with higher wage in the labor market. If joint taxation induced married women to choose occupations that required lower effort, I would expect to see joint taxation having negative effects on at least one of the following task measures: routine manual, nonroutine manual, routine cognitive, and nonroutine analytical.

Table 1 – Task intensity measures are positively correlated with wage

Dep. Var: Log(Median Weekly Wage)	
Routine Manual	0.016***
	(0.003)
Nonroutine Manual	0.031***
	(0.003)
Routine Cognitive	0.008***
	(0.001)
Nonroutine Interactive	-0.006*
	(0.003)
Nonroutine Analytical	0.088***
	(0.004)
Observations	7098

Notes: These coefficients are obtained by regressing log(median weekly wage) on five task measures, controling for education, age, race, ethnicity, immigration status, children status, husbands' occupations, and state fixed effects in sample of female labor force participants in 1940. I restrict my sample to the 1940 Census in order to control for education.

Table 2 below shows summary statistics of demographics among wives in the labor force. Spanish ancestry is a dummy for having a Spanish surname. The percentages of Hispanics and Spanish ancestry in control states seem quite low at 1-2%, given that these states used to be Spanish colonies. This is because I restrict my sample to couples with at least one high-school graduate spouse. If I remove this restriction, 11% of wives in the control group were Hispanic and 8% had Spanish ancestry. In both 1940 and 1950, most demographic characteristics of the wives in control and treatment states were not statistically different, which suggests that wives in these two groups were quite comparable. There was no differential trend in any demographic characteristic across treatment and control groups from 1940 to 1950, so any differential trend in outcomes was unlikely to be driven by differential changes in demographics actross the two groups.

Table 2 – Demographics of Wives in the Labor Force

	1940			1950		
	Treatment mean	Control mean	Diff b	Treatment mean	Control mean	Diff b
Age	32.43	33.25	0.82**	34.07	34.80	0.44*
White	0.96	0.95	-0.00	0.96	0.96	0.00
Hispanic	0.00	0.01	0.01**	0.00	0.02	0.01***
Spanish ancestry	0.00	0.01	0.01*	0.00	0.01	0.01***
Have children under 18	0.21	0.22	0.01	0.27	0.27	-0.00
No. own kids in household	0.37	0.40	0.03	0.48	0.46	-0.04*
No. kids under 5y/o	0.08	0.07	-0.01	0.12	0.12	0.00
Observations	6050	1464	7514	13227	3845	17072

Although there was no differential trend in demographics, there were diffrential trends in some outcomes across the two groups from 1940 to 1950, as shown in table 3 below. Here I highlight the most notable changes in mean differences from 1940 to 1950.

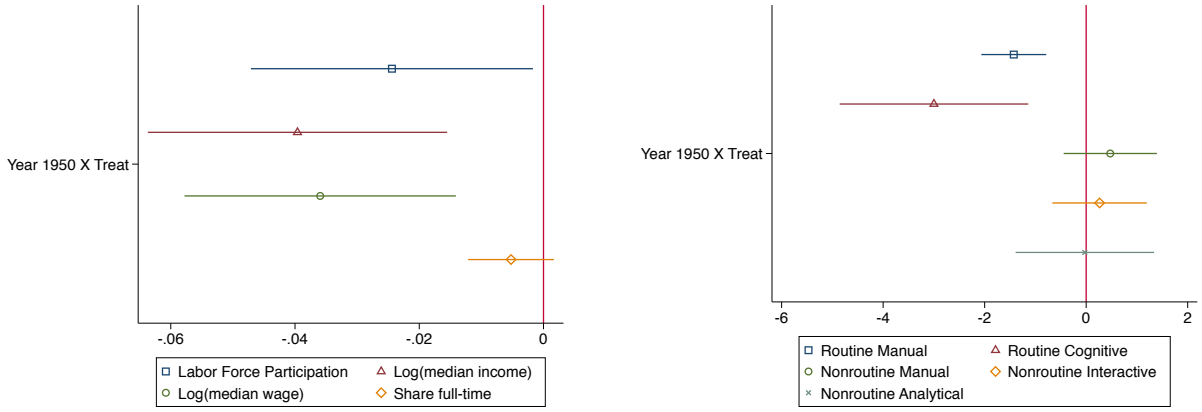
Table 3 – Outcomes among Wives

	1940			1950		
	Treatment mean	Control mean	Diff b	Treatment mean	Control mean	Diff b
In Labor Force	0.19	0.20	0.01**	0.28	0.32	0.04***
Log(median annual income)	7.47	7.42	-0.05***	7.48	7.48	-0.00
Log(median weekly wage)	3.71	3.67	-0.04***	3.72	3.72	0.00
Share Full-time	0.58	0.59	0.01	0.60	0.61	0.01***
Nonroutine Manual	9.89	8.88	-1.01**	8.91	7.42	-1.61***
Routine Manual	47.37	45.78	-1.60**	48.86	48.69	-0.17
Nonroutine Interactive	8.09	8.95	0.87	7.92	8.52	0.73*
Routine Cognitive	49.36	43.73	-5.64***	56.03	53.39	-2.75***
Nonroutine Analytical	36.75	36.69	-0.06	36.71	36.67	0.09

In 1940, when the two groups of states were exposed to different tax regimes, wives in treatment states worked in significantly higher paid occupations than their counterparts in control states. They also worked in occupations that required higher routine manual task intensity. In 1950, when both treatment and control states were under joint taxation, all differences in log(median annual income), log(median weekly wage), and routine manual task intensity vanished. There was also a diffrential trend in labor force participation rates. In 1940, wives in treatment and control states participated in the labor force at roughly equal rates. However, in 1950, the labor force participation rate among wives in the treatment states became significantly lower than that among wives in the control states.

To see these differential trends more clearly, I regress each outcome on a year dummy, a treatment dummy, and an interaction of year and treatment dummy for my sample of wives. The figures below show coefficients on the interaction term for each outcome.

Figure 1 – Raw Difference-in-Differences Estimates of Joint Taxation Effects



From 1940 to 1950, relative to their counterparts in the control group, wives in the treatment group participated in the labor force at a lower rate. They also took occupations that paid lower annual income, lower weekly wage, and involved lower intensity in routine manual and routine cognitive tasks.

Figure 1 is just suggestive of joint taxation's effects, since the events mentioned in section 2 might have given rise to similar differential trends. The magnitudes of these effects may also be sensitive to demographic controls. Furthermore, the effect of joint taxation on labor force participation poses an empirical challenge as occupational information is only observed for labor force participants, and endogenous selection into the labor force could potentially bias the estimated effect of joint taxation on occupations. Section 4 below discusses my methodology more formally and and section 5 addresses potential confounders.

Among husbands, there was generally no differential trend in outcomes and demographics. Applying the methodology laid out in section 4, I also find that joint taxation had no effect on husbands. From this point on, the main paper focuses on results among wives. Appendix E provide details of my analyses for husbands.

4 Methodology and Main Results

In this section, I explain the methodology that I use to estimate effects of joint taxation and discuss the results obtained from applying this methodology to the data described above. I also show results from heterogeneity analyses which examine the prediction that joint taxation had larger effects on married women facing larger husband-wife earning gaps.

4.1 Methodology

Leveraging the quasi-natural experiment induced by the 1948 Tax Revenue Act, I use a difference-in-differences framework to estimate effects of joint taxation. Since the policy did

not affect couples in 8 community property states, these couples form my control group, while other couples form my treatment group. The treatment here is the Tax Revenue Act of 1948. Data in 1940 reflect the pre-treatment period, and data in 1950 reflect the post-treatment period. My baseline difference-in-differences estimation equation is:

$$Y = \beta_0 + \beta_1 Year1950 + \beta_2 Year1950 \times Treat + \gamma' \mathbf{X} + \epsilon \tag{1}$$

where Y is either a dummy for labor force participation or one of occupational characteristics discussed in section 3, $Year1950$ is a dummy for year 1950, $Treat$ is a dummy for treatment group, and $\mathbf{X}$ is a vector that includes state fixed effects, age, age^2, a dummy for White, a dummy for Spanish ancestry, and a dummy for having any kid under 18. The coefficient β_2 captures the effect of joint taxation on Y.

In order for this difference-in-differences framework to causally identify effects of the switch from separate to joint taxation on married women, the parallel trend assumption needs to hold. This assumption states that without the tax change, outcome variables would have followed parallel trends across control and treatment groups. In the context of this paper, validity of this parallel trend assumption requires two conditions. First, there must be no differential change in group composition that might have been reflected in differential outcome trends among married women. Second, there must be no other event happening during the 1940s which might have had differential effects on labor force participation or occupations of married women in control and treatment groups. Section 5 discusses potential threats to each condition and how I address them.

4.2 Main Results

Table 4 below shows results when estimating equation 1 with labor force participation, log(median annual income), log(median weekly wage), and full-time work requirement as outcomes. The first column indicates that joint taxation reduced labor force participation rates among married women by 2.4 percentage points. Given the base labor force participation rate of 19% among married women in the treatment group in 1940, this is a sizable effect on the extensive labor supply margin. This estimate is consistent with LaLumia (2008), which shows that the switch from separate to joint taxation in 1948 was associated with a 2 percentage point decline in married women's employment rates. My estimate is also in line with studies of joint taxation in other OECD countries, which show joint taxation causes between 1.6 to 3 percentage point reduction in employment and labor force participation rates among married women (Kaliskova, 2014, Fuenmayor et al., 2018).

Summary statistics in table 3 of section 3 show that from 1940 to 1950, the labor force participation rate among married women in the treatment group increased from 19% to 28%. My estimated effect of joint taxation on labor force participation suggests that without the switch from separate to joint taxation in 1948, the labor force participation rate among these women could have gone up to 30.4%, which would significantly close the gap in participation rates between control and treatment groups in 1950. While the 1940s was a time when labor force participation among women dramatically increased (Goldin, 1991), this increase might

have been even larger if joint taxation had not replaced separate taxation.

Table 4 – Effects of Joint Taxation on Labor Force Participation, Wages, and Full-time Work

	(1) LFP	(2) Log(Income)	(3) Log(Wage)	(4) % Full-time
Year 1950	0.137***	0.061***	0.045***	3.251***
	(0.008)	(0.008)	(0.007)	(0.187)
Year 1950 × Treat	-0.024**	-0.034***	-0.032***	-0.413
	(0.010)	(0.010)	(0.009)	(0.366)
Age	0.025***	0.013***	0.011***	-0.115
	(0.001)	(0.002)	(0.002)	(0.111)
Age squared	-0.000***	-0.000***	-0.000***	-0.001
	(0.000)	(0.000)	(0.000)	(0.001)
White	-0.103***	0.337***	0.271***	9.620***
	(0.015)	(0.028)	(0.026)	(1.022)
Have children under 18	-0.289***	-0.090***	-0.063***	-4.351***
	(0.006)	(0.009)	(0.008)	(0.259)
Spanish ancestry	-0.006	-0.048**	-0.034**	-2.073
	(0.019)	(0.022)	(0.016)	(1.548)
State FE	Y	Y	Y	Y
Observations	109580	24586	24584	24586

Notes: The first specification includes all wives in couples with at least 1 high-school graduate spouse. Other specifications only include wives in the labor force. Median weekly wage is not available for the occupation "chainmen, rodmen and axmen", which was held by only 2 women in the 1940 and 1950 Census. All specifications include Census household weights. Standard errors (in parentheses) are robust and clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The effect of joint taxation on labor force participation suggests that one way in which married women reduced their taxable income in response to higher marginal tax rates under joint taxation was to drop out of the labor force. The response of labor force participation to tax changes is a typical extensive margin of labor supply that economics studies of taxation often examines. In this paper, it is also seen as a response on the extensive margin of taxable income.

The coefficient on Year 1950 × Treat in columns 2 indicates the response to joint taxation on the intensive margin of taxable income. It shows that joint taxation induced married women to choose occupations that paid 3.4% lower in median annual income. Thus, joint taxation reduced taxable income among working wives. Comparing the difference-in-differences coefficient and the coefficient on having a child under 18 reveals that the effect of joint taxation on log(median annual income) was about 1/3 the effect of having a child in the household, which suggests that the effect of joint taxation on taxable income among working wives was economically significant.

Columns 3 and 4 shed light on whether this reduction in taxable income among working wives was due to wage adjustment or work hour adjustment. Theory does not predict which

channel might respond more to tax changes. Married women may reduce their taxable income by working fewer hours, working at lower wages, or both. My empirical results show that the reduction in annual income was due entirely to reduction in wages, and joint taxation had no effect on the level of full-time work in occupations held by working wives. The difference-in-differences coefficient in column 3 indicates that from 1940 to 1950, working wives in the treatment group chose occupations that paid them 3.2% lower in median weekly wage, relative to their counterparts in the control group. This effect is roughly 1/2 the effect of having a child in the household.

The magnitude of this wage effect is somewhat large compared to the effect of joint taxation on pretax wage rates found in Eckstein et al. (2019). This paper shows that for the American cohort born in 1965, abolishing joint taxation would increase the pretax wage rates among married women by 1.3%, which is only about 1/3 my estimate of joint taxation's effect on wage rates among working wives. One potential explanation for the differences between my estimate and theirs is that I study an event where joint taxation was introduced and raised marginal tax rates for married women, while Eckstein et al. simulate a situation where joint taxation is removed and married women face lower marginal tax rates. Effects of an increase and a decrease in tax rates on married women's wage rates could be asymmetric, because it is probably harder for women to move up the wage ladder than for them to move down. Married women might be able to reduce their wages significantly when faced with higher marginal tax rates, but might not be able to increase their wages by a large percentage when their marginal tax rates decline.

The difference-in-differences coefficient in column 4 is negative but not statistically significant. Thus, there is no evidence that working wives switched to occupations that required less full-time work when faced with joint taxation. This result is consistent with LaLumia's finding that the switch from separate to joint taxation had no effect on the number of hours worked among working wives.

Overall, results in table 4 show that when joint taxation replaced separate taxation, married women reduced their taxable income in multiple ways. On the extensive margin, they were less likely to participate in the labor force. On the intensive margin, they switched to occupations that paid them lower wage rates. Interestingly, they did not switch to occupations that required lower probability of full-time work. Hence, working wives who stayed in the labor force reduced their taxable income by lowering their wages instead of cutting down their work hours.

Most demographic controls had significant effects on the outcomes examined in table 4. Some of them demonstrated interesting patterns. All else equal, older wives were more likely to participate in the labor force and worked in higher-paid occupations, but the positive effects of age on both labor force participation rates and occupational earnings declined with age. All else equal, married women at the age of 30 were the most likely to participate in the labor force, while wives between 35 and 37 years old held highest-paid occupations among all working wives.

Compared to non-White women, White women were less likely to participate in the labor force but held higher-paid occupations if they worked. Women who had Spanish ancestry worked in lower-paid occupations but participated in the labor force at the same rate as other women.

Having a child in the household was associated with 9% lower in median annual income and 6.3% lower in median weekly wage. These estimates are in line with studies on the earning penalty of motherhood. Wilde et al. (2010) shows that having a child reduces pay among high-skill women by 8%, and Lundberg and Rose (2000) shows that the wage rate of first-time mothers declines by about 5% after birth.

Since joint taxation induced working wives to choose occupations that paid lower wages without any change in full-time work requirement, I examine effects of joint taxation on work effort, which is a disamenity, to see whether there is any evidence that married women traded wages for more nonpecuniary benefits.

Table 5 – Effects of Joint Taxation on Task Intensity

	(1) Routine Manual	(2) Nonroutine Manual	(3) Routine Cognitive	(4) Nonroutine Interactive	(5) Nonroutine Analytical
Year 1950	3.560***	-1.756***	11.183***	-0.637	0.096
	(0.140)	(0.343)	(0.521)	(0.516)	(0.525)
Year 1950 × Treat	-1.261***	0.393	-2.464***	0.185	0.080
	(0.298)	(0.397)	(0.886)	(0.544)	(0.558)
Age	-0.162**	0.008	-0.266	0.123	0.605***
	(0.075)	(0.083)	(0.192)	(0.095)	(0.075)
Age squared	-0.002**	0.001	-0.006***	0.001	-0.007***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
White	11.004***	-5.076***	25.702***	-7.072***	8.194***
	(0.799)	(0.480)	(2.450)	(0.629)	(0.635)
Have children under 18	-3.769***	3.071***	-8.437***	-0.583**	-2.165***
	(0.283)	(0.155)	(0.857)	(0.259)	(0.227)
Spanish ancestry	-1.390	0.904	0.176	-1.768	-2.851**
	(0.963)	(1.042)	(3.595)	(1.627)	(1.096)
State FE	Y	Y	Y	Y	Y
Observations	23209	23209	23209	23209	23209

Notes: Data on task intensity are missing for 5.6% of married women in the labor force, which explains why the number of observations in table 5 is smaller than that in table 4. Excluding those with missing task intensity measures does not change results of joint taxation effects on median annual income, median weekly wage, and share full-time. All specifications include Census household weights. Standard errors (in parentheses) are robust and clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5 above examines effects of joint taxation on task intensity measures obtained from Autor et al. (2003), which capture work effort as a disamenity. Since work effort was compensated with higher wages, as shown in table 1 in section 3, I would expect that the negative

effect of joint taxation on log(median weekly wage) was accompanied by negative effects of joint taxation on one or some task intensity measures. Results in table 5 show that joint taxation was indeed associated with lower intensity in routine manual and routine cognitive tasks, while having no effect on any nonroutine task.

To interpret the magnitude of joint taxation's effects on task intensity measures, I will now discuss these outcomes in more details. Each task intensity measure is a continuous variable that captures how intensively a task is used in an occupation. For each person, the value of a task measure indicates the percentage of workers in 1960 who held occupations that required lower intensity in that task than this person's occupation. For example, dressmakers have a value of 56.98 for routine manual. This means 56.98% of women in 1960 held occupations that used routine manual tasks less intensively than dressmakers. This high value makes sense since according to Autor et al.'s definition, routine manual tasks are those that require moving fingers and manipulating small objects with fingers rapidly or accurately, which describes the typical job of dressmakers.

The coefficient on the difference-in-differences term in column 1 of table 5 shows that after joint taxation replaced separate taxation, working wives in the treatment group chose occupations that were ranked 1.26 percentile lower in the distribution of routine manual task intensity across all occupations. In total, there were 200 occupations spanning a range of routine manual task intensity from 10.17 to 87.84, which means on average, each jump from one occupation to the next on the ladder of routine manual task intensity was roughly 0.39 percentile[12]. Moving to an occupation that was ranked 1.26 percentile lower was equivalent to jumping about 3.3 steps down a ladder of 200 steps.

A jump of less than 4 steps on a 200-step ladder may not seem to be sizable, but this effect magnitude is plausible. Given that the post-treatment period is only 2 years after the tax change, effects on occupations observed in this paper are short-term impacts of the switch from separate to joint taxation. Within such a short period of time, individuals might be constrained by the types of occupations that they could switch to because employers often require job applicants to have relevant skills and work experience, which might take time to accumulate. For example, dressmakers might be more likely to switch to working as shoemakers than working as real estate agents. Furthermore, as mentioned in section 3, the traditional interpretation of Autor et al.'s task intensity measures is skill content of occupations. Because individuals tended to switch to occupations requiring similar skills, joint taxation likely induced working wives to switch to occupations that were close enough to their original occupations but required lower effort.

I will now discuss how much of the decline in work effort as measured by routine manual task intensity could explain the decline in wage. As indicated in table 1, 1 percentile increase in routine manual task intensity was associated with roughly 1.6% higher in median weekly wage. Thus, 1.26 percentile decline in routine manual task intensity would be associated with about 2% decline in median weekly wage, which accounts for 62.5% of the 3.2% wage

[12] $0.39 \approx (87.84 - 10.17)/200$.

reduction among working wives due to joint taxation. This suggests that a large part, but not all, of the wage reduction was accompanied by a reduction in work effort. This makes sense because work effort is only one of many nonpecuniary aspects that a job might entail. Besides reducing work effort, married women might also choose occupations that offered more flexibility to allocate work hours or other fringe benefits, which they had to trade wages for.

Column 3 of table 5 shows that joint taxation was associated with 2.46 percentile lower in routine cognitive task intensity. Given that 1 percentile increase in routine cognitive task intensity was associated with 0.8% higher in median weekly wage, as indicated in table 1, the 2.46 percentile lower in routine cognitive task intensity would be associated with 1.97% decline in wage rate. Combining this with the wage reduction due to decline in routine manual task intensity would more than explain the total wage reduction. However, as shown in Appendix D, effects of joint taxation on routine cognitive task intensity are not robust. As a result, I do not interpret the difference-in-differences coefficient reported in column 3 in depth here.

Some coefficients on demographic controls in table 5 are statistically significant. Older wives worked in occupations with lower routine manual task intensity but higher nonroutine analytical task intensity. The positive effect of age on nonroutine analytical declined with age, while the negative effect of age on routine manual increased with age. These patterns are quite plausible, given that task intensity measures also reflect skill content of occupations. As mentioned above, routine manual tasks are those that require finger dexterity, which might become more challenging as one ages. According to Autor et al.'s definition, nonroutine analytical tasks involve quantitative reasoning, which may be more suited to older individuals who tend to have more education and experience than younger ones. All else equal, wives at around 43 years old held occupations with the highest nonroutine analytical task intensity.

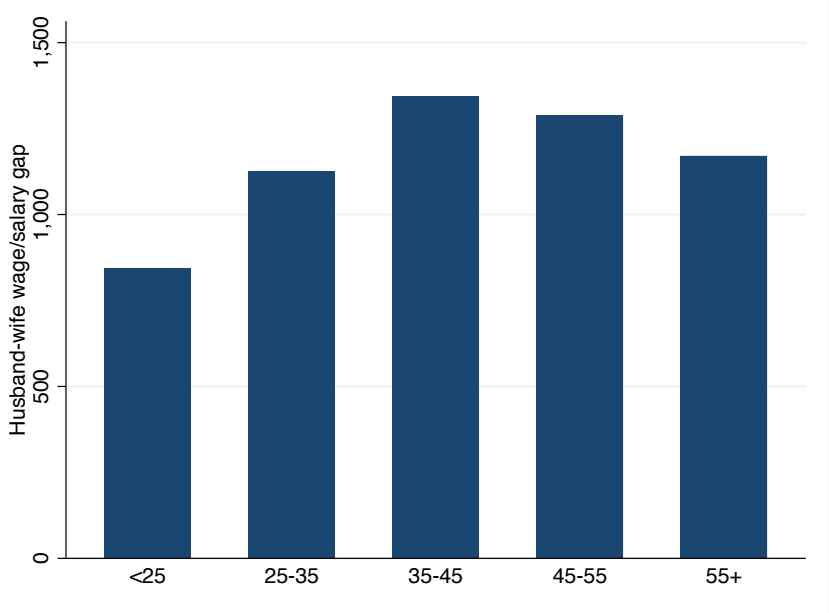
Compared to non-White women, White women took occupations with higher intensity in routine manual, routine cognitive, and nonroutine analytical tasks, but lower intensity in nonroutine manual and nonroutine interactive tasks. Women with Spanish ancestry took occupations with lower nonroutine analytical task intensity than other women. Women with children chose occupations with lower intensity in most tasks, except for nonroutine manual task.

In summary, the key take-way from tables 4 and 5 is: when joint taxation replaced separate taxation, married women reduced their taxable income by dropping out of the labor force or moved to occupations that paid lower wages, required lower effort, but involved the same level of full-time work. These results show that in response to tax changes, individuals may adjust their taxable income via multiple channels, including but not limited to work hours. More importantly, they reveal that in some cases, such as the one studied in this paper, the intensive margin that responds to tax changes might take the form of wages and work effort, rather than work hours.

4.3 Heterogeneity Analyses

Theory in section 2 predicts that joint taxation had larger effects on married women who faced larger husband-wife earning gaps. In this subsection, I provide a test for this prediction. Since the 1950 Census provides income for only one spouse in every couple and the 1940 Census does not provide personal or family income, I do not observe husband-wife earning gap directly. To circumvent this data limitation, I examine heterogeneous effects of joint taxation on married women by age. As shown in figure 2 below, the wife's age is quite indicative of the husband-wife earning gap.

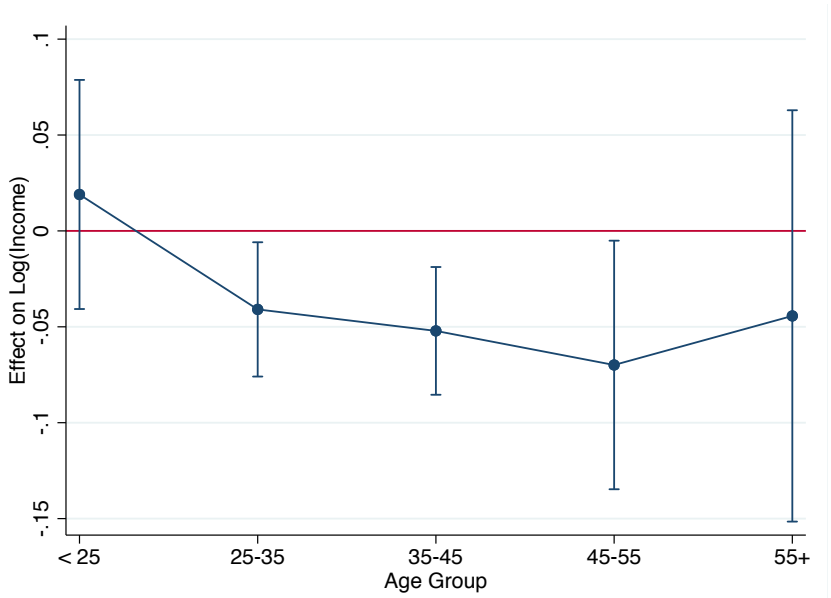
Figure 2 – Husband-Wife Earning Gap By Wife's Age



Since the only earning information I have for both spouses is wage/salary income in the 1940 Census, I compute the average husband-wife wage/salary gap by wife's age using data from the 1940 Census. Figure 2 reveals that the average earning disparity within couple first increased with the wife's age, reached its peak for wives who were between 35 and 45 years old, then decreased slightly. If joint taxation had larger effects on wives facing larger husband-wife earning gap, I would expect to see larger negative effects of joint taxation on taxable income among wives in the middle age groups.

To see heterogeneity of joint taxation's effects by wife's age, I divide my sample of married women into age bins of roughly 10 years each and estimate a variant of equation 1 with log(median annual income) as the outcome variable, where I interact dummies of these age bins with the diff-in-diff term Year1950 $\times$ Treat. All second-order interaction terms are also included. Figure 3 plots coefficients on Year1950 $\times$ Treat specific to each age bin.

Figure 3 – Heterogeneous Effects of Joint Taxation among Wives by Age



Notes: Census household weights are applied to all specifications. Standard errors are clustered at state level.

As evident in Figure 3, joint taxation the negative effects of joint taxation on taxable income were concentrated among middle-aged women, who also faced the largest husband-wife earning gaps among all women. Married women below 25 years old were not affected by joint taxation. Meanwhile, joint taxation induced working wives between 25 and 45 years old to choose occupations that paid between 4 and 6% lower in median annual income. The point estimate of joint taxation's effect on married women above 55 years old is also negative but not statistically significant. This imprecision could be partly due to the fact that only 5% of all working wives were above 55 years old, making the sample size for these women quite small. When controlling for potential confounders discussed in section 5 below, the effects of joint taxation on log(median annual income) among women aged 25-35 and 45-55 lose statistical significance, but the effect among women aged 35-45 remained negative and statistically significant. These results confirm that joint taxation had larger effects on married women facing larger husband-wife earning gap, which also suggests joint taxation might contribute to sustaining the gender wage gap by widening the earning disparity between husbands and wives.

Besides, combining with the fact that all else equal, married women held highest-paid occupations when they were around 35-37 years old, as pointed out in section 4.2, results in figure 3 imply that joint taxation discouraged working wives from taking high-paid occupations when they were actually at the peak of their careers. Since these wives also faced the largest husband-wife earning gaps, it is likely that their husbands might also be at the peak of their own careers, which enlarged the gap in earnings between the spouses and caused joint taxation to have more negative effects on taxable income among wives. Thus, due to the lifecycle pattern of earning trajectory, joint taxation might induce married women to

take lower-paid jobs at the age when they had the best chance to get ahead, which made it hard for women's earnings to catch up with men's.

In summary, results in this section confirm my theoretical prediction that joint taxation had larger effects on wives facing larger husband-wife earning gaps. In my sample, effects of joint taxation were concentrated among middle-waged wives, who faced the largest husband-wife earng gaps and also tended to hold the highest-paid occupations.

5 Robustness Checks

As discussed at the end of section 4.1, validity of the identification assumption in my research design requires satisfying two conditions. First, there must be no differential change in group composition that might have been reflected in differential trends in labor force participation and occupations among married women. Second, there must be no other event happening during the 1940s which might have had differential effects on labor force participation and occupations among married women in control and treatment groups. I will now discuss potential threats to each condition and how I address them. Detailed results are provided in Appendix D.

5.1 Compositional Change

There are two major threats to the first condition: endogenous selection into marriage, and endogenous selection into the labor force. The following subsections explain what each of these threat entails and describes my approach to tackle them.

5.1.1 A. Selection into Marriage

Since couples with larger husband-wife earning gaps would save more tax liabilities when joint taxation replaced separate taxation, joint taxation might have encouraged such couples to get married. In that case, from 1940 to 1950, the composition of couples in the treatment states might include more couples with large husband-wife earning gaps relative to the composition in control states. It is possible that the wives in such couples were less likely to work or take a demanding job than other wives because couples with larger earning gaps between spouses might demonstrate a stronger specialization pattern, where the wives specialized more in home production and the husbands specialized more in market work. This would cause β_2 to pick up effects of differential changes in the composition of married couples rather than effects of join taxation.

Because the 1950 Census provides education and income information for only one spouse in every couple, I am not able to directly look at differential changes in husband-wife earning gaps for couples in control and treatment states. Instead, I estimate effects of joint taxation on the incidence of marriage among women in the labor force by education levels. My calculation of husband-wife gaps in wage/salary income by wife's education using the 1940

Census reveals that more educated wives faced larger husband-wife earning gaps. Hence, if joint taxation increased marriage rates among couples with larger husband-wife earning gaps, I would expect to see joint taxation had a positive effect on the marriage rate among highly-educated women. Results in tables 6 and 7 of Appendix D show that joint taxation had no significant effect on the marriage rate of any education group of women, which suggests joint taxation did not affect marriage decisions in the 1940s. The literature on marriage penalty of income taxation shows that tax rates only have very small effects on marriage rates (Alm and Whittington, 1999; Alm and Whittington, 2003). Hence, potential endogenous selection into marriage is unlikely to drive results in this paper.

5.1.2 Selection into the Labor Force

Since joint taxation reduced labor force participation rates among married women, endogenous selection into the labor force could create differential changes in group composition that confound estimated effects of joint taxation on occupations. More specifically, if the married women who dropped out of the labor force under joint taxation came disproportionately from high-paid occupations, then on average, wives in the treatment group would work in lower-paid occupations relative to those in the control group after the 1948 Tax Revenue Act passage, even if joint taxation had no effect on occupations among those who stayed in the labor force. In such case, I would overestimate the negative effects of joint taxation on occupational earnings among married women.

To address this concern, in specifications with occupational characteristics as outcomes, I correct for this source of selection bias using Heckman (1976), which involves 2 stages. The first stage models selection into the labor force with the following probit:

$$Pr(\text{LFP} = 1|\text{Year}, \text{State}, \mathbf{X}, Z) = \\ \Phi(\delta_0 + \delta_1 Year1950 + \delta_2 Year1950 \times Treat + \psi'\mathbf{X} + \zeta Z + \eta) \quad (2)$$

where Φ is the CDF of the standard normal distribution, LFP is a dummy for labor force participation, $Year1950$, $Treat$, and $\mathbf{X}$ are the same as those in equation 1, and Z is an exclusion restriction which directly affects labor force participation but does not directly affects occupational choice.

I choose Z to be State-by-Year-by-Gender labor force participation rate. This variable captures local transitory macroeconomic shocks, which are likely to affect short-term labor supply but should not affect occupations, since occupations reflect long-term career choice and are unlikely to respond to short-term local business cycles. Since $\mathbf{X}$ includes state fixed effects, which should absorb state-specific permanent economic conditions, the exclusion restriction here reflects the short-term deviation from the long-term local trend. The local business cycle captured by Z must also be uncorrelated with local business cycles induced by the swith from separate to joint taxation.

Furthermore, as shown in Appendix D, I include a large set of controls in $\mathbf{X}$ that account for World War II mobilization, industrial expansion/contraction, migration, and regional trends

when I conduct robustness checks. Therefore, in my specification with full controls, the local business cycle captured by Z is uncorrelated with any of these phenomena that could have long-term impacts on local economic conditions and induce significant shifts in occupational choice. This means Z represents the shock to local economic condition that is unlikely to have any major long-term implication and thus unlikely to cause individuals to switch careers.

The second stage of the Heckman procedure is similar to equation 1 except that the outcome now is a latent variable of occupational characteristics, which is only observed among labor force participants:

$$Y^* = \beta_0 + \beta_1 Year1950 + \beta_2 Year1950 \times Treat + \gamma' \mathbf{X} + \epsilon \tag{3}$$

where $Y^* = Y$ if LFP $= 1$.

Appendix D shows results from estimations of Heckman procedures. I also correct for selection using more recently developed control function approaches laid out in Lee (1983), Dubin and McFadden (1984), Bourguignon et al. (2007), and Dahl (2002), which relax Heckman's assumption of joint normality. Effects of joint taxation on median annual income, median weekly wage, and routine manual task intensity are robust to these methods, while the effect of joint taxation on routine cognitive task intensity becomes insignificant when I use control functions to correct for endogenous selection into the labor force.

5.2 Concurrent Events

As mentioned in section 2, many major tax and non-tax events happened in the 1940s. These events might have contributed to differential trends in labor force participation and occupations among married couples across control and treatment states. If I do not appropriately control for them, my estimated effects of joint taxation might pick up effects of these events. In this section, I explain the identification threat posed by each of these events and how I handle them. Sections 5.2.1 - 5.2.4 discuss non-tax events. Sections 5.2.5 - 5.2.7 discuss tax events.

5.2.1 World War II Mobilization

With America involved in WWII in the 1940s, men were drafted or enlisted in the army, leaving vacant jobs for women to fill. The flow of women into traditionally male-dominated occupations was likely larger in states with higher mobilization rates. If WWII mobilization rates were systematically higher in control states than in treatment states, then women in control states would likely participate in the labor force and take up jobs in male-dominated occupations at a higher rate than their counterparts in treatment states. Since male-dominated occupations tend to pay higher than female-dominated occupations, such a phenomenon would likely result in wives in control states holding higher-paid occupations than those in treatment states.

To address this concern, I include as a control an interaction of year 1950 with state-specific

WWII mobilization rates taken from Goldin and Olivetti (2013). The coefficients on this interaction term capture the differential changes in outcomes across states from 1940 to 1950 that were driven by state differences in WWII mobilization rates. Controlling for WWII mobilization rates does not change any result significantly[13].

5.2.2 Industrial Expansion/Contraction

During World War II, western states were major recipients of military spending, which fostered a dramatic expansion of the manufacturing sector in those states. This expansion opened up a large number of high-paid factory jobs which women, including married ones, were encouraged to take under Rosie the Riveter propaganda. Such a phenomenon would lead women in control states to participate more in the labor force, as more economic opportunities were available to them. They would also be more likely to work in higher-paid occupations than those in treatment states.

I include the state-year specific employment shares for five major industries to tackle this problem. These industries include agriculture, manufacturing, trade, personal service, and professional service. I pick manufacturing, trade, personal service, and professional service because these are 4 major industries with the largest employment shares. I include agriculture because the agriculture sector was shrinking significantly during the 1940s, but might not have shrunk at the same rate in all states. Together, these industries accounted for about 85% of employment in 1940s. All effects of joint taxation are robust to these controls, except for the effect on routine cognitive task intensity, which becomes insignificant.

5.2.3 Migration

The economic boom in western states due to rapid manufacturing expansion might also attract a large number of migrants from the rest of the country to these states to take advantage of new economic opportunities. This phenomenon would increase the labor force participation rate in western states relative to that in other states, since the composition of people living in the west would change to consist of more career-driven migrants. Such changes in composition might also cause people in the western states to hold higher-paid occupations than those in other states, on average. Furthermore, because joint taxation benefited high-income couples more than low-income couples, it is possible that high-income couples might have migrated to control states before 1948 to save tax liabilities, but did not

[13] A related issue is the return of veterans after World War II, which might have driven women out of the labor force and male-dominated jobs. Ideally, I would control for an interaction of year 1950 with state-specific veteran share of population, which would account for the effect of labor market disruption due to veteran return from war. However, data on WWII veteran status in the 1950 Census are not reliable. As pointed out by IPUMS, data on veteran status in the Census are not consistent with figures compiled by the Veterans Administration, which might have been because the location of the question on the Census schedule causing some reporting errors. The state-specific veteran shares that I construct from these data are negatively correlated with mobilization rates from Goldin and Olivetti (2013), which is the opposite of what I expected, since states where more men went to war should also have more veterans returning from war. For these reasons, I do not control for veteran status. If the rate of veteran return was positively correlated with the mobilization rate, controlling for the latter would likely be sufficient.

move back after 1948 since federal tax treatment of couple's income became similar in all states. If wives in high-income couples worked in high-paid occupations themselves, such migration patterns would result in married women in control states working in higher-paid occupations relative to those in treatment states.

I handle these concerns by including 16 dummies for migration from each of the 8 control states to the rest of the country and migration from the rest of the country to each of these 8 states. More specifically, I have 8 dummies for individuals who were born in each of the 8 control states but were residing in a treatment state, and 8 dummies for individuals who were born in a treatment state but were residing in each of the 8 control states. Including these dummies do not affect my estimates of joint taxation's effects on labor force participation and occupations.

5.2.4 Regional Trends

Being considered "frontier" states, western states might follow regional trends that differed from the rest of the country. For example, it might be the case that married women in frontier states were more culturally accepted to work and pursue high-paying jobs than other states. If these cultural differences were intensified during the 1940s for reasons unrelated to the switch from separate to joint taxation, married women in these states might work more and take higher-paid occupations relative to those in other states, even without an effect of joint taxation. To account for such regional trends, I include Census region by year fixed effects in my controls. This does not affect my estimated effects of joint taxation on occupations, but makes the effect on labor force participation insignificant.

5.2.5 Changes in Progressivity at the Federal Level

In this section, I rule out the possibility that changes in income tax progressivity from 1940 to 1950 resulted in the differential trends in labor force participation and occupations of married women across control and treatment group. As described in section 2, marginal tax rates were higher in 1950 than in 1940 at all income levels, but the increase in marginal tax rates was larger at higher income levels. Table 3 in section 3 shows that in 1940, wives in the treatment group held higher-paid occupations than those in the control group. Hence, it is possible that wives in the treatment group were more discouraged from working and taking high-paid jobs than wives in the control group due to the changes in progressivity in federal income tax.

Since the differential effects of marginal tax rates rely on differences in income only, I examine whether the changes in income tax progressivity contributed to the differential trends in married women's occupations by investigating whether high-income and low-income wives in the control states experienced differential trends in occupations from 1940 to 1950. If the progressivity changes led wives in control and treatment groups to take occupations paying different wage levels because they earned different income levels in 1940, these changes should have also led higher-income wives in control states to choose lower-paid occupations relative to lower-income wives in these same states. The purpose of restricting to wives in

control states is to isolate effects of progressivity changes from effects of the switch from separate to joint taxation. These wives had always faced joint taxation, and thus were not differentially affected by the switch.

Using education as proxy for total income, I define a high-income wife as a married woman with at least 12 years of education, and a low-income wife as a married woman with no more than 8 years of education. I estimate a Heckman procedure, correcting for endogenous selection into the labor force, with two estimating equations. The first-stage equation is:

$$Pr(\text{LFP} = 1|\text{Year, Education}, \mathbf{X}, Z) = \\ \Phi(\delta_0 + \delta_1 Year1950 + \delta_2 Year1950 \times HighIncome + \delta_3 HighIncome + \psi'\mathbf{X} + \zeta Z + \eta) \quad (4)$$

where Z is the same exclusion restriction used in equation 2, state-year-gender specific labor force participation rate. In the baseline specification, $\mathbf{X}$ includes age, age^2, a dummy for White, a dummy for Spanish ancestry, and a dummy for having any child under 18. In robustness check specifications, $\mathbf{X}$ also includes WWII mobilization rates, state-year industry employment shares, and migration dummies. The second-stage equation is:

$$Y^* = \beta_0 + \beta_1 Year1950 + \beta_2 Year1950 \times HighIncome + \beta_3 HighIncome + \gamma'\mathbf{X} + \epsilon \quad (5)$$

whre $\mathbf{X}$ is the same $\mathbf{X}$ in the first-stage equation, and Y^* are latent occupational characteristics, which are only observed among labor force participants. Results are shown in table 13 of Appendix D. The differences in marginal tax rate changes did not seem to result in differential trends in occupations across high-income and low-income wives.

5.2.6 Differential Changes in Progressivity at the State Level

As pointed out in section 2, from 1940 to 1950, state income tax codes became more progressive in control states and less progressive in treatment states. This could potentially confound my results of joint taxation effects on occupations because the more progressive income tax codes in control states might have discouraged married women from taking high-paid jobs relative to their counterparts in treatment states. To address this concern, I drop states that changed their income tax progressivity from 1940 to 1950, which are California, Colorado, Delaware, Mississippi, Oklahoma, and Vermont. Results are shown in table 14 of Appendix D. Dropping these states does not change my results.

5.2.7 Differential Changes in Joint Taxation at the State Level

Bakija (2019) documents that while no state required couples to have the same filing status at state and federal levels, Kansas, Oklahoma, and Oregon allowed joint taxation at the state level following Tax Revenue Act 1948. As explained in Jones (1988), these changes in joint taxation at the state level were likely driven by the geographical proximity of these states to the two most populous community property states–California and Texas. Oregon adopted joint taxation to avoid losing high-earning couples to California, while Kansas and Oklahoma did so to avoid losing such couples to Texas. To examine whether the switch to joint taxation at state level had additional effects on top of the switch to joint taxation at the

federal level, I restrict my sample to treatment states which were all affected by the federal tax changes, and examine whether occupational trends were different for wives in Oregon, Kansas, and Oklahoma relative to other wives. Results are shown in table 15 of Appendix D. The switch to joint taxation at the state level does not seem to have affected occupations among these women.

6 Mechanism

In this section, I propose a mechanism that may explain why married women responded to the switch from separate to joint taxation in 1948 by either dropping out of the labor force or reducing work effort, without changing their work hours.

Following the basic model laid out in Saez et al. (2012), consider an economic agent who faces the following maximization problem:

$$\underset{c,z}{\text{Max}}\ u(c,z)\ \text{ subject to }\ c = (1-\tau)\cdot z + A \tag{6}$$

where c is disposable income, i.e. consumption; z is taxable income, which is taxed at rate τ; and A is nonlabor income. Assume u is increasing in c but decreasing in z, which reflects the fact that generating income involves costly activities, such as forgoing leisure, exerting work effort, etc. Furthermore, assume $z = w(e)\cdot h$ where h is work hours, e is work effort, and w is wage rate. Let w be increasing in e. When τ goes up, this agent will have the incentive to reduce z. Since $z = w(e)\cdot h$, she can reduce z by cutting work hours h or exerting lower effort e, which will reduce wage rate w.

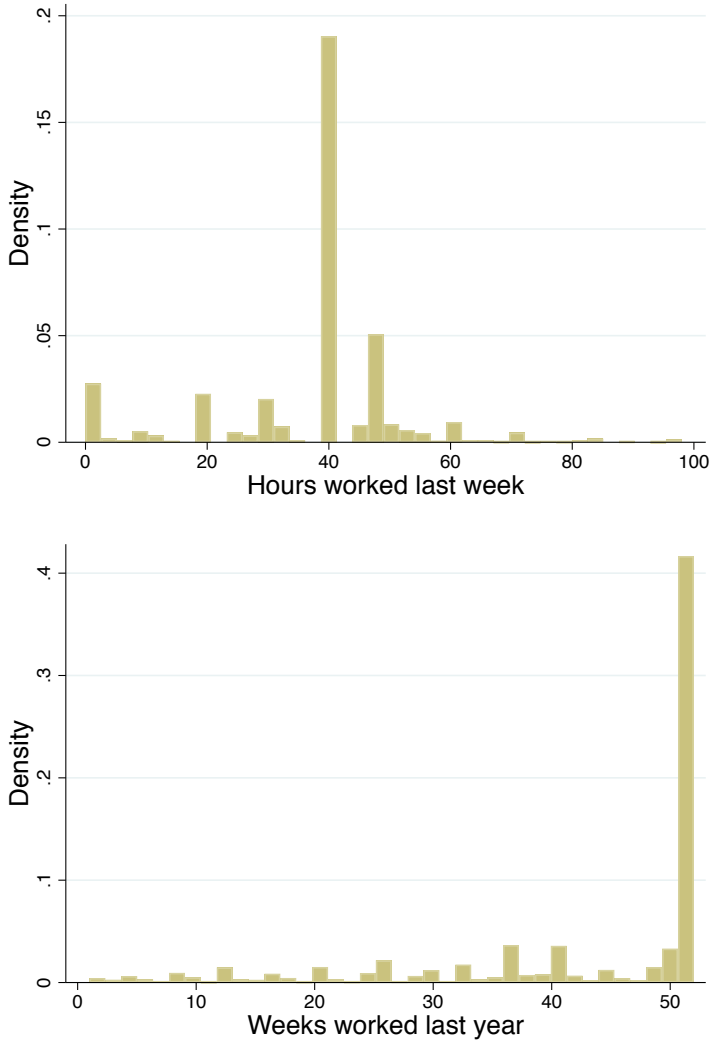
This standard model does not tell us which margin, h or e, will respond more to a change in τ. To obtain the conditions under which one margin would respond more than the other, I will need to impose additional assumption on u or consider constraints on the types of jobs one could take, which may make adjusting one margin more difficult than adjusting the other.

In the context of this paper, it could be that part-time jobs were associated with low social status, which might not be appropriate for someone from a highly-educated couple to take, while working full-time in a less intensive job was more socially acceptable. In that case, married women from highly-educated couples might prefer reducing work effort rather than reducing work hours. On the other hand, it might be that work hours were mostly uniform across occupations, while work effort was more variable. In that case, it would be easier for women to reduce their work effort than to reduce their work hours.

While I do not yet have evidence to support the first mechanism which posits that women in the 1940s prefered working full-time than working part-time, my data provide some suggestive evidence that work effort was more variable across occupations than work hours. Using Gini coefficients to measure variability, I find that the Gini coefficient of routine manual task intensity is 0.19, larger than the Gini coefficient of full-time work requirement, which is 0.16.

Figure 4 below shows distributions of work hours and work weeks among working wives in my sample in the 1940 Census, which reflects the pre-treatment situation. Only about 25% of these women worked less than 40 hours last week. Among those who worked part-time, they worked mostly 20 or 30 hours per week. 40% of them working 50 weeks or more last year.

Figure 4 – Distribution of work hours and work weeks among women



These figures suggest that there might not be a lot of part-time work available to women and the gap in hours between part-time and full-time work was quite large. This means if married women wanted to reduce their work hours, they would have to drop out of the labor force entirely or dramatically reduced their work hours. This explains why some married women responded to joint taxation by withdrawing from the workforce. For other women who did not take such extreme measures, they might have been constrained by the limited part-time jobs available and chosen to reduce work effort instead.

Saez et al. (2012) reports that the mid-range of taxable income elasticity in the literature is 0.25, which means 1% increase in marginal tax rates is associated with 0.25% decrease in taxable income. Figure 4 suggests that if women moved from working full-time to part-time, the smallest jump they could take would be from 40 hours per week to 30 hours per week, which is a 25% decline in work hours. Assuming no wage change, this reduction in work hours would translate into roughly a 25% decline in taxable income. Given an elasticity of 0.25, this dramatic decline in taxable income would only be optimal if there was a 100% increase, or a doubling, in marginal tax rates, which is very large and quite implausible, even with a highly progressive income tax code in 1950.

In the 1950 Census, only about 1.9% of highly-educated couples earned at least $10,000. Even among these top-earning couples, the biggest increase in marginal tax rates for secondary earners would be from 20%, which is the marginal tax rate on the first dollar, to 30%, which is the marginal tax rate on the 5,000th dollar. It is safe to say that a 100% increase in marginal tax rates only occured to a very small number of women, if any. In other words, reducing work hours in response to tax changes would likely be suboptimal for the vast majority, if not all, of women. This simple back-of-envelop calculation reveals that the limited variability in work hours across occupations might disallow women from optimally responding to tax changes through work hours.

On the other hand, in order for the change in work effort, as measured by task intensity, that I find in this paper to be optimal, one would only need roughly 8% increase in marginal tax rates, which is much more plausible than an 100% increase. My results in table 5 suggest that the switch from separate to joint taxation was associated with an 1.26 percentile decline in routine manual task intensity in occupations held by married women. The coefficient on routine manual in table 1 suggests that 1 percentile decline in routine manual task intensity was associated with 1.6% decline in wage rate. Hence, the 1.26 percentile decline in routine manual task intensity due to joint taxation would be associated with about a 2% decline in wage rate. Assuming no change in work hours[14], this would translate into a roughly 2% decline in taxable income. Given a taxable income elasticity of 0.25, a 2% decline in taxable income would be associated with an 8% increase in marginal tax rates.

While still inconclusive, these simple calculations reveal that the limited range of choices over work hours across occupations might explain why married women did not respond to joint taxation by changing work hours but adjusted work effort instead. More work will need to be done to pin down exactly the mechanism that drove married women to respond to joint taxation largely through labor force participation and work effort. Knowledge of the historical context would be particularly helpful to evaluate whether part-time work was associated with any social stigma, or whether part-time jobs were rare in the 1940s. It will also be interesting to conduct similar studies in other contexts where data on income, work effort, and full-time work are more available. Some of my plans for future work include such

[14]Technically, the wage rate here is weekly wage, so the precise measure of labor supply in time is the number of work weeks. Replacing work hours with work weeks do not change any of my analyses. I use the term work hours here to be consistent with the labor supply literature that often uses work hours as the measure of labor supply in time units.

studies. I will discuss them in my next and last section of this paper.

7 Conclusion

In this paper, I analyze effects of tax changes on wages, work hours, and work effort by examing effects on occupations of joint taxation. I leverage a quasi-natural experiement in 1948, when the US shifted federal taxation of family income from separate taxation to joint taxation. This tax change dramatically increased marginal tax rates for married women, decreased them for married men, and raised after-tax family income for couples in a subset of states.

My results show that joint taxation had no effect on husbands, reduced labor force participation rates among married women, and induced working wives who stayed in the labor force to choose occupations that paid lower wages, required lower effort, but involved the same level of full-time work. These results confirm Feldstein's insight that individuals adjust their taxable income in response to tax changes and may do so through various channels, including but not limited to work hours. More importantly, my findings reveal that in some cases, such as the one studied in this paper, the intensive margin of labor supply that responds to tax changes takes the form of work effort rather than work hours.

I also show that joint taxation had the largest negative effects on taxable income among middle-age married women, who faced the largest husband-wife earning gap among all married women in my sample. Interestingly, this was also the age range at which married women tended to hold the highest-paid occupations over their lifecycles. These results suggest that joint taxation might contribute to sustaining the gender wage gap by widening the earning disparity between spouses and discouraging married women from taking higher-paid occupation at the age when they had the best chance to get ahead.

To explain the findings that married women who stayed in the labor force chose to reduce their work effort rather than their work hours in response to joint taxation, I propose a mechanism where married women were constraint by the limited choices over work hours across occupations available to them. Using estimates from this paper and mid-range estimate of taxable income elasticity in the literature, together with Census data on work hours, my back-of-envelope calculations reveal that moving from full-time to part-time would likely be suboptimal for the vast majority of married women in my sample, which may explain why they did not make that move.

A similar research design that I use in this paper could be applied to more recent policy changes to examine effects of income taxation on wages, work hours, and work effort. One project that I plan to pursue is examing effects of the tax changes on homosexual couples induced by the Supreme Court ruling of *United States v. Windsor* in 2013, which recognizes marriages of homosexual couples and allows them to file taxes jointly. Such policy shifted the tax regime facing homosexual couples from separate taxation to joint taxation, which increases marginal tax rates on secondary earners. Isaac (2018) has looked at effects of this

policy change on work hours, which is the typical approach in labor studies of taxation. My investigation of the effects on wages, work hours, and work effort would complement this study. Contrasting findings in this project with those reported in my current paper may also shed some light on the conditions under which individuals may respond to taxes more extensively through one margin than another.

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8 Appendix

The Appendices in this section help enrich the paper and provide detailed results for the robustness checks that I summarize in the main paper.

A Tax Laws in 1940 and 1950

In this Appendix, I provide additional details information on tax laws in 1940 and 1950 to supplement section 2 in the main paper. Federal income tax in 1940 consisted of 3 components: a normal tax, a surtax, and a defense tax. Income subject to surtax was the difference between adjusted gross income (AGI) and the sum of personal exemption and dependent credit. AGI was the difference between total income from all sources (salaries, royalties, interests, etc.) and total losses (contributions, debts, etc.). Personal exemption for a married couple was $2000, which could be divided in any way between the two spouses. Dependent credit was $400 for each child under 18 years old or each person without self-support capability to whom the taxpayer had to provide chielf support. Dependent credit could not be shared between spouses. Only the main supporter of a dependent could claim credit for that dependent on his/her tax return. The surtax schedule was highly progressive, but progressivity only kicked in at $4000. For couples earning less than $4000 in taxable income, surtax is flat at 0%.

Income subject to normal tax was the difference between AGI and the sum of personal exemption, dependent credit, and earned income credit, which was the smaller of 10% of adjusted gross income and 10% of salaries. Normal tax was 4% of this balance. Defense tax was then computed as 10% of normal tax and surtax.

Since normal tax is flat and defense tax is a function of normal tax and surtax, progressivity of the federal income tax code was effectively driven by progressivity of the surtax schedule. Since personal exemption for a married couple was $2000 and progressivity only started to kick in at $4000 in taxable income, a married couple must make at least $6000 in taxable income to be subject to progressive taxation.

On April 2, 1948, the Tax Revenue Act of 1948 was passed and retroactive to January 1 of that year. The main purpose of this Act was to reduce individual income tax payments which used to be very high in order to finance the war efforts. This Act not only reduced tax rates and increased personal exemptions and dependent credits, but also allowed married couples throughout the country to file taxes jointly. If a couple decided to file jointly, each would be responsible to pay taxes on half of the couple's combined income. This change in tax policy effectively extended the tax treatment of couple's income in community property states to the entire nation. This was also the very first time in American history when couples could file taxes jointly no matter where they lived.

In 1950, personal exemption was $600 for each person, or $1200 for each married couple. Dependent credit was $600 per dependent. The income tax schedule was progressive, but

progressivity only started to kick in at $4000 for married couples. Therefore, couples must earn at least $5200 in total income to be subject to progressive taxation. All married couples were eligible to file taxes jointly. By 1950, federal joint taxation had been introduced for 2 years. The IRS tax filing instructions in 1950 devoted a chapter to explain the advantage of joint filing for married couples. Hence, it is unlikely that a considerable share of married couples would be unaware of the option to file jointly. Filing jointly benefited the family because it reduced family tax liabilities. The only family member who was potentially hurt by joint taxation was the secondary earner who faced a higher marginal tax rate. However, since the secondary earner contributed less to family total income, it it unlikely that he/she had the larger bargaining power than the other spouse to make the couple file taxes separately despite financial benefits to the whole family if filing jointly. Therefore, although joint taxation was not mandatory in 1950, it is unlikely that couples would choose to file separately.

B Diagrams of Joint Taxation Effects

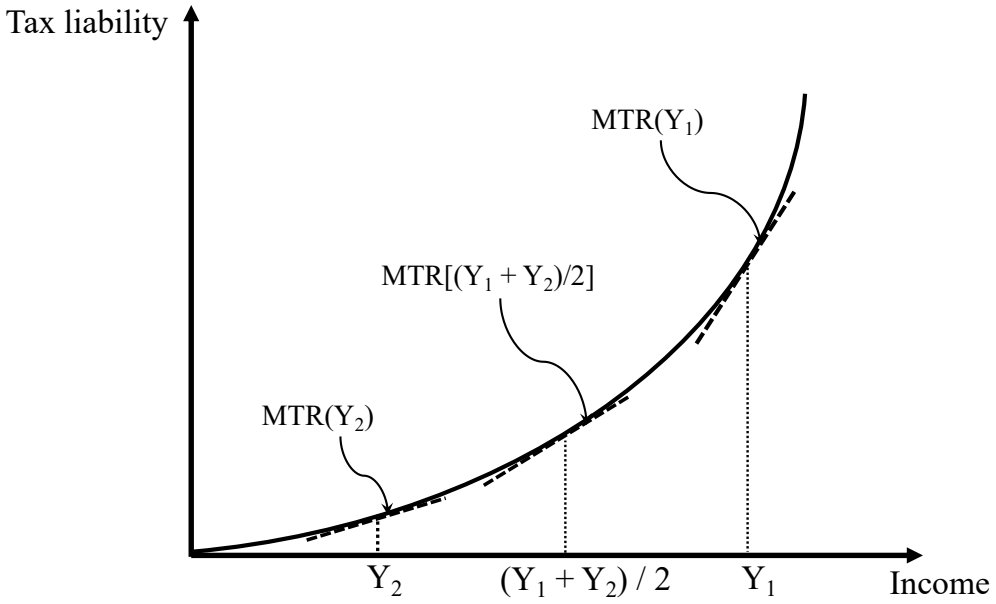
In this Appendix, I discuss effects of switching from separate to joint taxation for a generic couple who is subject to progressive taxation. I also contrast effects of this switch for two generic couples with different husband-wife earning gaps. Section 2 in the main paper describes these effects with numerical examples. The diagrams in this Appendix are meant to supplement this discussion.

B.1 Effects of Switching from Separate to Joint Taxation

Consider a married couple who make decisions as a unitary household pooling resources[15]. Assume the income tax structure is progressive, which means tax liability is an increasing and convex function of income. Let person 1 be the primary earner of the couple, and person 2 be the secondary earner. Let Y_1 be person 1's income, and Y_2 be person 2's income.

The diagram below illustrates changes in marginal tax rates facing each spouse when joint taxation replaces separate taxation.

[15]This is a common assumption in joint taxation literature (Bick and Fuchs-Schundeln, 2017; Meier and Wrede, 2013; LaLumia, 2008)

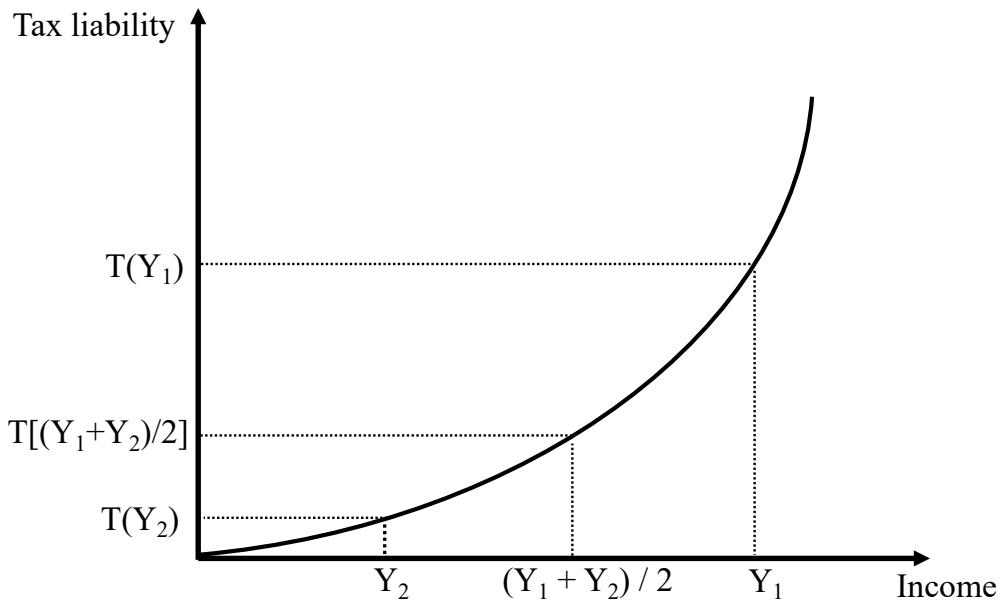


The marginal tax rate is the slope of the tax liability function. Under separate taxation, each spouse pays taxes on his or her own income, regardless of how much the other spouse makes. Hence, the marginal tax rate facing person 1 is the slope of the tax liability function at Y_1, while the marginal tax rate facing person 2 is the slope at Y_2. Under joint taxation, each spouse pays taxes on $\frac{Y_1+Y_2}{2}$, so the marginal tax rate facing each spouse is the slope of the tax liability function at $\frac{Y_1+Y_2}{2}$. Convexity of the tax function implies:

$$MTR(Y_1) > MTR\left[\frac{Y_1 + Y_2}{2}\right] > MTR(Y_2)$$

Therefore, when joint taxation replaces separate taxation, the marginal tax rate facing the primary earner goes down, while the marginal tax rate facing the secondary earner goes up. As show in Feldstein (1995), Feldstein (1999), Saez et al. (2012), a higher marginal tax rate induces individuals to reduce taxable income. Following similar logic, switching from separate to joint taxation would induce the secondary earner to reduce her taxable income, while incentivize the primary earner to increase his. To achieve such changes in taxable income, individuals could adjust their work hours, change occupations that offer different levels of wages and nonpecuniary benefits, or do anything that allows them to shield their income from taxes.

The switch from separate to joint taxation also save tax liabilities for this couple, as illustrated in the diagram below.



Under separate taxation, person 1 pays $\mathbf{T}(Y_1)$ and person 2 pays $\mathbf{T}(Y_2)$ in tax liability. Under joint taxation, each pays $\mathbf{T}\left(\frac{Y_1+Y_2}{2}\right)$ in tax liability. Convexity of the tax liability function gives:

$$\mathbf{T}(Y_1) + \mathbf{T}(Y_2) > 2\mathbf{T}\left(\frac{Y_1 + Y_2}{2}\right)$$

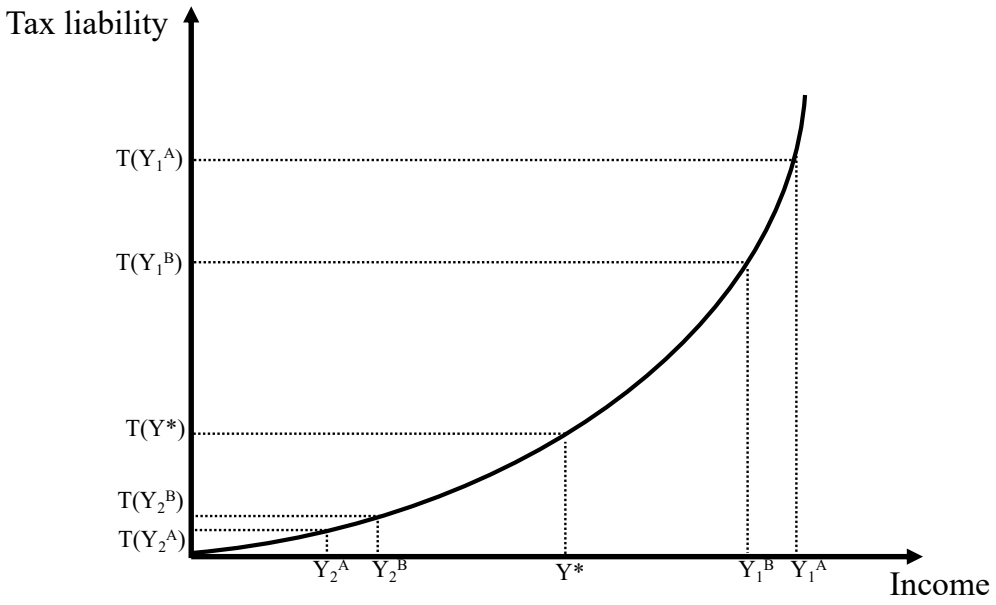
In other words, the couple pays lower tax liability under joint taxation than under separate taxation. Hence, their after-tax family income goes up when joint taxation replaces separate taxation. This creates a positive income effect, which induces both spouses to purchase more normal goods. Such normal goods could be more leisure time, more pleasant working conditions with less demanding tasks, etc. In so doing, they reduce their taxable income, either because of working fewer hours or working at lower wages in exchange for more nonpecuniary benefits.

Both income and substitution effects lead the secondary earner to reduce her taxable income, but they have opposite effects on the primary earner. The secondary earner could reduce her taxable income in multiple ways. She could reduce their work hours, including choosing to not work at all, or move to an occupation that pays a lower wage but offers more nonpecuniary benefits, such as requiring lower work effort. Theory does not predict which channel would be more responsive to tax changes. My empirical investigation in section 4 contrasts effects of joint taxation on work hours, wages, and work effort, which sheds light on this issue.

B.2 Heterogeneous Effects of Joint Taxation

The strengths of both income and substitution effects depend on the income gap between the two spouses. Consider 2 couples A and B, who make the same total family income. Suppose

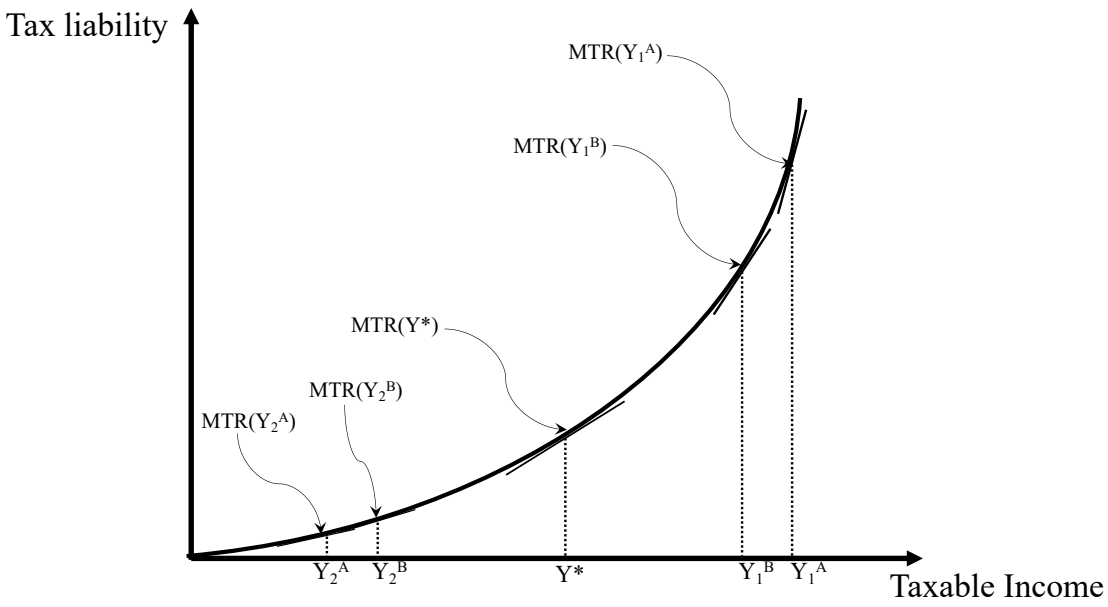
couple A has larger income gap than couple B. The graph below shows tax liabilities for spouses in these couples, where $Y^* = \frac{Y_1+Y_2}{2}$.



To compare the income effects facing these couples, we compare the tax savings they get when joint taxation replace separate taxation. Convexity of the tax function implies that:

$$\underbrace{T(Y_1^A) + T(Y_2^A) - 2 \times T(Y^*)}_{\text{Tax savings for couple A}} > \underbrace{T(Y_1^B) + T(Y_2^B) - 2 \times T(Y^*)}_{\text{Tax savings for couple B}}$$

So couple A faces larger income effects than couple B. To compare the substitution effects, we compare the changes in marginal tax rates each spouse faces.



Again, convexity of the tax function provides that:

$$\underbrace{|MTR(Y^*) - MTR(Y_1^A)|}_{|\Delta\text{MTR}| \text{ for primary earner in couple A}} > \underbrace{|MTR(Y^*) - MTR(Y_1^B)|}_{|\Delta\text{MTR}| \text{ for primary earner in couple B}}$$

$$\underbrace{MTR(Y^*) - MTR(Y_2^A)}_{\Delta\text{MTR for secondary earner in couple A}} > \underbrace{MTR(Y^*) - MTR(Y_2^B)}_{\Delta\text{MTR for secondary earner in couple B}}$$

So spouses in couple A face larger changes in marginal tax rates than spouses in couple B. Therefore, the substitution effects of joint taxation are larger on couple A than on couple B. Since couple A also faces larger income effects, the total effects of joint taxation on couple A are larger than on couple B. Furthermore, since income and substitution effects work in the same direction for the secondary earners but in opposite directions for the primary earners, the heterogeneous effect of joint taxation by income gap is most likely shown through larger effects on the secondary earner in the couple with the larger income gap.

In summary, when joint taxation replaces separate taxation, theory predicts that the secondary earner will reduce her taxable income but does not dictate in which way she will do so. The net effect on the primary earner is ambiguous. Theory also predicts that secondary earners in couples with larger income gap are more strongly affected. All effects of joint taxation can only occur under progressivity, hence a couple could only be affected by joint taxation if they are subject to progressive taxation.

C Data

In this Appendix, I provide details on the data sets used in this paper.

C.1 1940 & 1950 Censuses

Both 1940 and 1950 Censuses have a sample-line structure. On each Census form, an individual's information was recorded on a line specific to him or her, in response to Census questions. Some lines were designated as "sample-line", and whoever fell on such lines would be asked additional questions at the end of the Census form. It is random who fell on these lines. The list of additional questions for a sample-line person depended on his/her age and whether he/she was a household head. This sample-line structure means that certain variables are only available for sample-line people. For the purpose of this paper, I am interested in education, weeks worked, and income information. The table below shows availability of these variables in the two Censuses.

Variable	**1940 Census**	**1950 Census**
Education	Everyone	Sample-line
Weeks worked last year	Everyone age 14+	Sample-line age 14+
Total personal income	N/A	Sample-line age 14+
Total family income	N/A	Sample-line household head
Wage & salary income	Everyone age 14+	Sample-line age 14+
Business & farm income	N/A	Sample-line age 14+
Other income	N/A	Sample-line age 14+

Total family income is only available in 1950, and only reported for a family if the household head happened to fall on one of the sample lines. To get a sense of how high the progressivity thresholds were, I examine the families with reported total income and find that only 15% of these families had at least $5200 in total income, which was the minimum income required for a family to be subject to progressive taxation. This means only high-income couples were subject to progressivity and were affected by the switch from separate to joint taxation in 1948. Hence, I restrict my sample to high-income couples to examine effects of joint taxation. Given the limited information on total income in these two Censuses, I use education as a proxy. Since education is only known for sample-line people in 1950, and only one spouse within a couple could be a sample-line person, I restrict my sample to couples in which the sample-line spouse had at least 12 years of education.

My calculations based on the 1940 Census show that couples with at least one high school graduate made an average of $1552 in total wage/salary income, while other couples made only $990 on average. The home ownership rate for both types of couples was around 40% in 1940. However, conditional on owning a home, house value was about $4258 on average among couples with at least one high school graduate, and only about $2531 for other couples. Data from the 1950 Census shows that within couples who reported total family income, the average income among those with a high school graduate was $4359, while this average was only about $3495 among other couples. These pieces of evidence suggest that more educated couples were richer than their less educated counterparts, and thus education is a reasonable proxy for income.

Both 1940 and 1950 Censuses oversample large households. I include Census household

weights in all analyses to adjust for this oversampling. Since each household is assigned only one household weight, I exclude couples in secondary families and subfamilies to avoid including multiple couples from the same household. These couples account for 3% of the full sample. Both Censuses do not include households of people living in group quarters. Therefore, I exclude couples with a spouse reported to live in group quarters, as such cases are likely to be recording errors. I restrict my sample to couples in which both spouses were between 14 and 64 years old as this is the usual age range of labor force participants.

Outcome variables come from the 1950 Census special report on occupational characteristics, which includes some summary statistics of earnings and full-time status for workers in each occupation by gender. These summary statistics are calculated based on answers to sample-line questions in the 1950 Census regarding income and weeks worked. The sample-line people in this Census are a random 3.33% subsample of the entire population. For the purpose of this paper, my 3 outcomes of interest taken from the 1950 Census special report are: [1] log(median annual income), [2] log(median weekly wage), and [3] share of full-time workers. The first variable is the log of the median annual income of all men or all women working in an occupation in 1950. This variable comes directly from table 19 of the report. The second variable is the log of median weekly wage, which comes from table 20 of this report. That table provides median annual income for all full-time workers in each occupation by gender. Full-time work in 1950 Census is defined as working 50-52 weeks for all occupations, including paid vacations and absences. I divide this median annual income by 51 to get median weekly wage. Lastly, the third outcome variable is the percentage of full-time male or female workers in an occupation in 1950.

C.2 Task Intensity Measures from Autor et al. (2003)

To capture task intensity, I use task data constructed by Autor et al. (2003). These authors obtain original data on the intensity of different tasks performed in each occupation from the 1977 edition of the Dictionary of Occupational Titles (DOT). The DOT is a product of the Department of Labor, which contains evaluations of more than 12,000 highly detailed occupations, separately for each gender, along 44 metrics, including training times, physical demands, required worker aptitudes, temperaments, interests, etc. The Census occupational classification system is much coarser, with fewer than 300 codes in 1950. Autor et al. aggregate the 12,000 DOT occupational codes to match the Census occupational codes (COC), and take employment-weighted average across all DOT codes within each COC-gender cell to achieve DOT variables for each Census occupational code by gender. They choose 5 DOT variables capturing 5 types of tasks that an occupation may require: nonroutine analytical, nonroutine interactive, routine cognitive, routine manual, and nonroutine manual.

According to Autor et al.'s definitions, nonroutine analytical tasks are those that require analytical and quantitative reasoning. Examples of such tasks include: adding and subtracting 2-digit numbers; computing discount, interest, profit, loss; etc. Nonroutine interactive tasks involve direction, control, and planning of activities. Some typical nonroutine interactive tasks are: conducting prosecution in court proceedings; commanding vessel crew engaged in catching fish; etc. Routine cognitive tasks require adapting to predetermined standards,

limits, or tolerances. Such tasks might be: preparing and verifying voter lists from official registration records; measuring bottle dimensions using micrometers to verify the dimensions conform to manufacturing specifications; etc. Routine manual tasks are those that require moving fingers and manipulating small objects with figures rapidly and accurately. Examples of routine manual tasks include: sewing fasteners and decorative trimmings to articles; attaching hands to faces of watches. Lastly, nonroutine manual tasks involve eye-hand-foot coordination, such as driving buses, attending to beef cattle on stock ranch, etc.

Because DOT variables do not have a natural scale, Autor et al. (2003) transform them into percentile values corresponding to their ranks in the 1960 distribution of task input. They construct such distribution for each task by merging DOT variables with 1960 Census employment data for each gender-occupation and forming a gender-specific employment-weighted empirical cumulative distribution of task input across all occupations. The transformed measures are continuous variables, each of which takes a value between 0 and 100. For each person, the value of a task measure is the percentage of workers in the same gender in 1960 who held occupations that required lower intensity in that task than this person's occupation. For example, female accountants have a value of 66.64 for nonroutine analytical. This means 66.64% of women in 1960 held occupations that used nonroutine analytical tasks less intensively than accountants. I use these transformed measures as outcomes. These task measures are occupation-specific. Hence, changing the value of any task measure is equivalent to changing occupations.

D Robustness Checks

This Appendix shows results from robustness checks laid out in section 5.

D.1 Selection into Marriage

Since joint taxation saved more tax liabilities for couples with larger earning gaps, one potential concern is that the tax change in 1948 might have induced couples with larger earning gaps to get married, causing differential changes in composition of couples in control and treatment groups that may bias my estimated effects of joint taxation. To evaluate the validity of this concern, I estimate effects of joint taxation on the incidence of marriage among women by labor force participation status and by education level. The sample I use in this section includes only sample-line women since I have education information in 1950 for sample-line persons only. My calculation based on the 1940 Census data reveals that more highly-educated couples faced larger gaps in wage/salary income. Therefore, if joint taxation encouraged couples with larger earning gaps to get married, I would expect to see joint taxation having stronger positive effects on marriage rates among highly-educated women than other women. I define highly-educated women as women with at least 12 years of schooling. Below I will discuss effects of joint taxation on marriage rates among women by labor force participation status.

D.1.1 Joint Taxation & Marriage Rates among Women outside the Labor Force

Table 6 shows effects of joint taxation on marriage rates among women who did not participate in the labor force. The purpose of these estimations is to address the concern that joint taxation induced couples with larger earning gaps to get married and the wives in these couples were less likely to participate in the labor force than other wives, which would confound my estimated effects of joint taxation on labor force participation rates.

Table 6 – Effects of Joint Taxation on Marriage Rate among Women outside Labor Force

	(1) All	(2) 12+	(3) 8-11	(4) Below 8
Year 1950	0.016***	0.031***	0.016***	0.006
	(0.004)	(0.005)	(0.005)	(0.004)
Year 1950 × Treat	-0.003	0.005	-0.004	-0.001
	(0.004)	(0.006)	(0.006)	(0.004)
Year 1950 × Highly-Educated	0.002			
	(0.009)			
Treat × Highly-Educated	-0.005			
	(0.012)			
Year 1950 × Treat × Highly-Educated	0.009			
	(0.009)			
Age	0.039***	0.048***	0.059***	0.030***
	(0.000)	(0.001)	(0.001)	(0.000)
Age squared	-0.000***	-0.001***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Have children under 18	0.347***	0.260***	0.325***	0.408***
	(0.006)	(0.007)	(0.005)	(0.009)
White	0.028***	0.082***	0.029***	0.012***
	(0.004)	(0.006)	(0.006)	(0.004)
Spanish ancestry	-0.033***	-0.063***	-0.007	-0.020***
	(0.003)	(0.018)	(0.018)	(0.004)
State FE	Y	Y	Y	Y
Observations	330366	66772	108206	155388

Notes: All women in the sample used for estimations here are sample-line persons. All specifications include sample-line person weights. Standard errors (in parentheses) are robust and clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Column 1 of table 6 shows results when I interact the diff-in-diff term Year 1950 × Treat with a dummy for highly-educated women. The coefficient on the triple interaction term indicates whether joint taxation had differential effects on marriage rates among highly-educated women and other women. As shown in column 1, this coefficient is not statistically significant, so joint taxation did not seem to increase marriage rates among highly-educated women compared to other women.

Columns 2, 3, and 4 show results when I estimate effects of joint taxation on marriage incidence separately for women of different education groups. Each education group is defined

by the number of years of schooling. The coefficients on the diff-in-diff term are all insignificant. These results suggest that joint taxation was not associated with higher marriage rates for any group of women.

In summary, table 6 shows that joint taxation did not affect marriage rates among any education group of women outside the labor force, and that joint taxation was not associated with higher marriage rates among more educated women relative to other women. Therefore, it is unlikely that there was endogenous selection into marriage due to joint taxation that could have confounded the effect of joint taxation on labor force participation among married women.

D.1.2 Joint Taxation & Marriage Rates among Women in the Labor Force

Specifications in table 7 below are similar to those in table 6, except that they are estimated on sample of women in the labor force. These estimations are supposed to address the concern that joint taxation induced couples with large earning gaps to get married and the wives in these couples were less likely to take high-paying jobs than other wives. Such a phenomenon would confound my estimated effects of joint taxation on occupations.

Table 7 – Effects of Joint Taxation on Marriage Rate among Female Labor Force Participants

	(1) All	(2) 12+	(3) 8-11	(4) Below 8
Year 1950	0.056***	0.135***	0.083***	0.002
	(0.011)	(0.018)	(0.014)	(0.008)
Year 1950 × Treat	0.000	-0.004	-0.011	0.016
	(0.014)	(0.019)	(0.018)	(0.012)
Year 1950 × Highly-Educated	0.082***			
	(0.017)			
Treat × Highly-Educated	-0.036*			
	(0.019)			
Year 1950 × Treat × Highly-Educated	-0.006			
	(0.018)			
Age	0.040***	0.038***	0.044***	0.037***
	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	-0.000***	-0.000***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Have children under 18	0.347***	0.399***	0.333***	0.279***
	(0.014)	(0.017)	(0.015)	(0.015)
White	-0.001	-0.022**	-0.017*	0.012
	(0.011)	(0.009)	(0.009)	(0.021)
Spanish ancestry	-0.068*	-0.041	-0.032	-0.091*
	(0.039)	(0.035)	(0.033)	(0.046)
State FE	Y	Y	Y	Y
Observations	97943	45369	34778	17796

Notes: All women in the sample used for estimations here are sample-line persons. All specifications include sample-line person weights. Standard errors (in parentheses) are robust and clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Similar to table 6, table 7 show that joint taxation had no effect on marriage incidence for any education group of women, as evident in the insignificant coefficients on the diff-in-diff term Year 1950 × Treat in columns 2, 3, and 4. Coefficient on the triple interaction term in column 1 also shows that joint taxation had no differential effect on marriage rates among highly-educated women compared to other women. Thus, it is unlikely that joint taxation caused endogenous selection into marriage that might have driven my results of joint taxation's effects on occupations among marired women.

D.1.3 Additional Comments on Joint Taxation and Marriage

When I pool all education groups and estimate effects of joint taxation on marriage incidence by labor force participation status, my estimates of effects of joint taxation are statistically insignificant. When I pool all women and again estimate effects of joint taxation on marriage, my estimates are also insignificant. Therefore, it seems that joint taxation did not have an effect on marriage decisions in the 1940s.

D.2 Selection into Labor Force

As shown in section 4, joint taxation reduced labor force participation rates among married women. If the wives who were induced to drop out of the labor force came disproportionately from high-paid high-effort occupations, then joint taxation would cause the composition of married women in the treatment states to consist of fewer women pursuing such occupations relative to the composition in the control states. In that case, results in tables 4 and 5 may pick up the differential changes in composition of married women across the two groups of state and overestimate effects of joint taxation on occupations.

To evaluate the validity of this concern, I examine heterogeneity of joint taxation's effects on labor force participation by age. As discussed in section 4, middle-age wives held higher-paid occupations than other wives, all else equal. Hence, if joint taxation reduced labor force participation rates disproportionately among wives holding high-paid jobs, I would expect to see joint taxation having larger negative effects on labor force participation rates among middle-age wives.

Results of this heterogeneity analysis are shown in table 8 below. Joint taxation actually had larger negative effects on labor force participation among wives aged 25-35 and wives aged 55+. Among all wives, these were roughly the middle-earners, meaning they did not hold either the highest- or lowest-paid occupations. Therefore, even though joint taxation had larger effects on these wives than other wives, these heterogeneous effects might not lead to differential changes in composition of wives across control and treatment group that bias my estimates of joint taxation's effects on occupations.

Table 8 – Effects of Joint Taxation on Labor Force Participation by Age

Dep. Var: In Labor Force	
Year 1950 × Treat × Age 25-35	-0.028**
	(0.014)
Year 1950 × Treat × Age 35-45	-0.012
	(0.020)
Year 1950 × Treat × Age 45-55	-0.005
	(0.018)
Year 1950 × Treat × Age 55+	-0.054**
	(0.022)
Year 1950 × Treat	-0.004
	(0.015)
Observations	109580

Notes: All specifications include Census household weights.
Standard errors (in parentheses) are robust and clustered at state level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To confirm that these heterogeneous effects of joint taxation on labor force participation does

not bias the estimated effects on occupations, I also correct for endogenous selection into the labor force with 3 strategies: Heckman procedures, control functions, and restricting my sample to persistent labor force participants. The subsections that follow show my results from these exercises.

D.2.1 Heckman procedures

First, I explain results when correcting for selection using Heckman (1976). Table 9 shows estimation results of equation 2. The total number of married couples in my sample is 109,931. The coefficient on the exclusion restriction, state-by-year-by-gender labor force participation rate, is positive and statistically significant. This means labor supply is procyclical. The Chi-squared and p-value from Wald test of the exclusion restriction's significance show that this exclusion restriction is a strong instrument.

Table 9 – Probit Results: Heckman First Stage

	LFP
Year 1950	0.082***
	(0.016)
Year 1950 × Treat	-0.005
	(0.011)
Age	0.025***
	(0.001)
Age squared	-0.000***
	(0.000)
White	-0.088***
	(0.012)
Have children under 18	-0.272***
	(0.005)
Spanish ancestry	-0.002
	(0.019)
State-by-Year-by-Gender LFP Rate	0.010***
	(0.002)
State FE	Y
Observations	109931
Chi2	20.222
pvalue	0.000

Notes: Standard errors (in parentheses) are robust and clustered at state level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The coefficient on the difference-in-differences term is small and statistically insignificant, which might suggest that the estimated effect of joint taxation on labor force participation

is sensitive to specification[16].

Table 10 shows results when correcting for selection among wives using Heckman (1976) approach. The number of observations in this table is smaller than in table 9 because I exclude those who do not have an occupational code despite being in the labor force and those who are not in the labor force despite having an occupational code. Since the Census asks all labor force participants, and only them, for occupational information, such cases are likely to be recording errors. They account for about 0.3% of my full sample.

Coefficients on the selection term λ are statistically significant in most specifications, suggesting that selection is meaningfully captured in the first stage. This coefficient is positive in the first two columns, which means that the unobserved factor that induced married women to select into the labor force is positively correlated with the unobserved factor that induced them to sort into higher-paid occupations.

[16] Athey and Imbens (2006), Blundell and Costa Dias (2008), Lechner (2010), and Puhani (2012) point out that it might be invalid to estimate a diff-in-diff with probit or logit because the identification assumption of linear parallel trends in the standard diff-in-diff framework does not apply to nonlinear specifications. In case this causes an issue with the Heckman procedures and control function approaches, I correct for selection by restricting my sample to persistent labor force participants defined as those who worked at least 26 weeks last year. LaLumia (2008) also takes this approach when estimating effects of TRA48 on work hours among married women. The assumption here is that these people would have participated in the labor force regardless of tax policy. One concern with this approach is that since the tax change happened between 1939 and 1949, the composition of wives working at least 26 weeks might have changed differentially across control and treatment groups due to effects of the tax change. Restricting my sample this way does not change any of my results.

Table 10 – Effects of Joint Taxation on Occupations of Wives: Heckman Procedure

	Log(Income)	Log(Wage)	% Full-time	Routine Manual	Nonroutine Manual	Routine Cognitive	Nonroutine Interactive	Nonroutine Analytical
Year 1950	0.065***	0.048***	0.034***	6.584***	-1.851***	11.562***	-0.708	3.421***
	(0.008)	(0.007)	(0.002)	(0.581)	(0.353)	(0.715)	(0.501)	(0.904)
Year 1950 × Treat	-0.035***	-0.032***	-0.004	-1.567***	0.403	-2.503***	0.192	-0.306
	(0.010)	(0.009)	(0.004)	(0.369)	(0.400)	(0.877)	(0.536)	(0.847)
Age	0.014***	0.012***	-0.001	0.392***	-0.009	-0.196	0.110	1.216***
	(0.002)	(0.002)	(0.001)	(0.137)	(0.083)	(0.207)	(0.093)	(0.104)
Age squared	-0.000***	-0.000***	-0.000	-0.011***	0.002	-0.008***	0.001	-0.017***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)	(0.003)	(0.001)	(0.002)
Have children under 18	-0.098***	-0.069***	-0.048***	-10.056***	3.268***	-9.226***	-0.436	-9.121***
	(0.009)	(0.008)	(0.004)	(0.963)	(0.213)	(1.433)	(0.297)	(0.806)
White	0.335***	0.269***	0.095***	9.073***	-5.016***	25.465***	-7.028***	6.168***
	(0.028)	(0.026)	(0.010)	(0.661)	(0.479)	(2.506)	(0.636)	(0.795)
Spanish ancestry	-0.048**	-0.034**	-0.021	-1.340	0.902	0.182	-1.769	-2.781**
	(0.023)	(0.016)	(0.015)	(1.039)	(1.048)	(3.573)	(1.625)	(1.216)
State FE	Y	Y	Y	Y	Y	Y	Y	Y
lambda	0.011	0.009	0.006	8.709	-0.273	1.093	-0.204	9.563
selambda	0.003	0.002	0.003	1.577	0.165	1.333	0.219	0.810
N	109580	109578	109580	108203	108203	108203	108203	108203

Notes: All specifications include Census household weights. Standard errors (in parentheses) are robust and clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Coefficients on the diff-in-diff term Year 1950 × Treat show that the endogenous selection of married women into the labor force does not cause bias in the estimated effects of joint taxation on occupations. Results in the first column of table 10 indicate that after joint taxation replaced separate taxation, married women in the treatment group worked in occupations paying 3.5% lower in median annual income relative to married women in the control group. This decline in median annual income was driven almost entirely by the drop in median weekly wage of the occupations that married women chose to hold. Joint taxation did not seem to induce married women to work in occupations with different levels of full-time work. Joint taxation induced married women to choose occupations with lower intensity in routine manual and routine cognitive tasks.

Overall, results in table 10 show that the estimated effects of joint taxation on occupations among wives are robust to controlling for selection into the labor force using Heckman procedures. Joint taxation induced married women to choose occupations that paid lower wage, required lower effort, but involved the same level of full-time work.

D.2.2 Control Functions

Since Heckman's selection correction method relies on joint normality assumption of the error terms in the first and second stages, which is key to identification and may affect the estimated results, here I re-estimate effects of joint taxation on occupations of married women using control function approaches that relax this assumption. These aprpoaches are

developed in Lee (1983), Dubin and McFadden (1984), Bourguignon et al. (2007), and Dahl (2002).

Similar to Heckman (1976), these control function approaches set up the selection problem with a 2-stage model and rely on having an exclusion restriction in the first stage. Unlike Heckman (1976), they estimate the first stage with a logit, and then construct the equivalent of the inverse Mills ratio in Heckman's procedure to include in the second stage. In implementing these control function procedures I use the same exclusion restriction described in section 4.1. I bootstrap standard errors for consistency. In all specifications, I include Census household weights and cluster standard errors at state level. Results are shown in table 11. Each row corresponds to an outcome variable. Each column corresponds to a control function approach. Each cell shows the coefficient on the diff-in-diff for the outcome indicated by the row, estimated using the control function approach indicated by the column.

Table 11 – Effects of Joint Taxation on Occupations of Wives: Control Function Procedures

	Lee(1983)	DMF(1984)	BFG(2007)	Dahl(2002)
Log(Income)	-0.037***	-0.029**	-0.034**	-0.027**
	(0.013)	(0.012)	(0.017)	(0.013)
Log(Wage)	-0.037***	-0.028**	-0.034**	-0.028**
	(0.010)	(0.014)	(0.013)	(0.011)
% Full-time	-0.005	-0.003	-0.004	-0.002
	(0.008)	(0.005)	(0.006)	(0.006)
Routine Manual	-1.275*	-1.210**	-1.187*	-1.095*
	(0.695)	(0.481)	(0.619)	(0.606)
Routine Cognitive	-2.302	-2.269***	-2.163	-2.030
	(1.705)	(0.853)	(2.101)	(1.745)
Observations	24586	24586	24586	24586

Notes: All specifications include Census household weights.
Standard errors (in parentheses) are robust and clustered at state level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The first column shows results using Lee (1983), which allows the error terms in the first and second stages to have any marginal and joint distributions but keeps the Heckman's assmption that the covariance of the two error terms is independent of exogenous variables in the selection equation. Such covariance assumption is further relaxed in Dubin and McFadden (1984), which I use to get results in the second column. In lieu of this covariance assumption, Dubin and McFadden impose a linearity assumption on these errors. Bourguignon et al. (2007) proposes a variant that replaces the linearity assumption on error terms with a linearity assumption on normalized error terms. Results from this approach are shown in the third column. Lastly, Dahl (2002) proposes a semi-parametric approach that relies on an index sufficiency assumption, which essentially states that the covariance between error terms in the outcome and selection equation is a function of a restricted subset of all possible choice probabilities. In my context, this means the covariance between the error terms in the first and second stages is a function of the probability of being in the labor force.

Results in table 11 show that estimated effects of joint taxation on occupations among wives are generally robust to the choice of selection correction method. The main story still holds: after joint taxation replaced separate taxation, married women in the treatment group took lower paid occupations relative to those in the control group, and they chose occupations that paid lower wage rates instead of occupations with less full-time work. It also seems that they chose occupations that required lower effort, as measured by routine manual task intensity, even though the estimated effects are only significant at 10% significance level for some specificiations.

D.2.3 Conclusion on Selection into the Labor Force

Tables 10 and 11 suggest that endogeneous selection into the labor force does not bias my results of joint taxation's effects on occupations among wives. In the subsequent robustness checks for results on occupations, I show estimates from Heckman procedures. I do this in section D.3 to show results when the short-term local business cycle captured by my exclusion restriction must not be correlated with any major non-tax event that might induce individuals to switch careers. These exercises help mitigate the concern that short-term local business cycles as captured by my exclusion restriction (state-by-year-by-gender labor force participation rate) could still be correlated with something that induces career changes. I also estimate Heckman procedures in section D.4 since my approaches to rule out tax events as potential confounders require changing samples, for whom selection into the labor force might affect results.

D.3 Non-tax Events in the 1940s

Section 5 describes the non-tax events happening in the 1940s could have differentially affected labor force participation and occupations of married women across control and treatment groups. In this subsection, I discuss results when controlling for WWII mobilization rates, industrial composition, migration, and regional trends, as laid out in section 5.

Table 12 – Effects of Joint Taxation on Wives: Controlling for Non-tax Events

	Baseline	WWII mobilization	Industrial composition	Migration	Regional trends
Labor Force Participation	-0.024**	-0.021**	-0.003	-0.002	-0.007
	(0.010)	(0.010)	(0.012)	(0.012)	(0.014)
Log(Income)	-0.035***	-0.038***	-0.030*	-0.032**	-0.033*
	(0.010)	(0.011)	(0.016)	(0.016)	(0.018)
Log(Wage)	-0.032***	-0.034***	-0.029**	-0.031**	-0.036**
	(0.009)	(0.010)	(0.015)	(0.015)	(0.017)
% Full-time	-0.004	-0.004	0.001	0.001	0.001
	(0.004)	(0.005)	(0.007)	(0.007)	(0.008)
Routine Manual	-1.567***	-1.398***	-1.190**	-1.233**	-1.315**
	(0.369)	(0.412)	(0.510)	(0.502)	(0.616)
Routine Cognitive	-0.250***	-0.187*	-0.144	-0.152	-0.154
	(0.088)	(0.100)	(0.170)	(0.168)	(0.167)

Table 12 above show results from these robustness checks. Each row corresponds to an outcome. Results on occupations come from Heckman procedures. The first column shows coefficients on the diff-in-diff terms for baseline specifications without controlling for non-tax events. The second column shows these coefficients when I add controls for World War II mobilization rates. In column 3, I add controls for industrial composition on top of the WWII controls. Column 4 indicates results when I also add controls for migration. Lastly, coefficients in column 5 are obtained from specifications with the full set of controls, including regional trends captured by Census region by year fixed effects.

The effect of joint taxation on labor force participation rates becomes insignificant when I control for industrial composition. In LaLumia's paper, the author replaces state fixed effects with a treatment dummy when controlling for industrial composition. If I follow her approach, the effect of joint taxation on labor force participation rates remains significant when controlling for industrial composition, but still becomes insignificant when regional trends are included. Therefore, even though it seems that joint taxation reduced labor force participation rates among married women, the estimate seems sensitive to specifications.

The effects of joint taxation on log(income) and log(wage) are generally robust across all specifications. The coefficients reflecting these effects for each type of specification are also quite close, suggesting that the negative effect of joint taxation on log(income) is mostly driven by the negative effect on log(wage). Joint taxation had no effect on full-time work requirement, regardless of specification. Meanwhile, it had a robust negative effect on routine manual task intensity. The effect of joint taxation on routine cognitive task intensity is not robust, becoming insignificant once I control for industrial composition.

Overall, results in table 12 confirm that joint taxation induced married women to choose occupations that paid lower wage, required lower effort, but involve the same level of full-time work. They also reveal that the effects of joint taxation on occupations seem to be more robust than the effect on labor force participation.

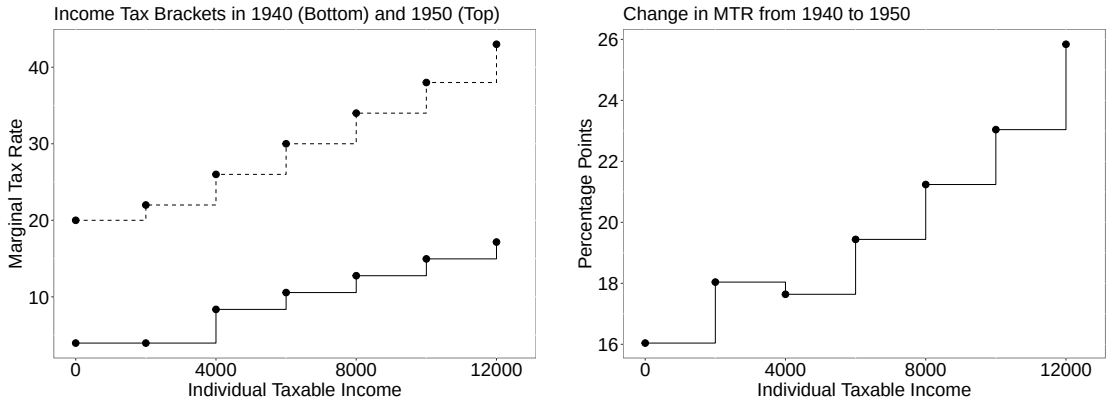
Since the effects of joint taxation on labor force participation and routine cognitive task intensity seem quite sensitive to specifications, the robustness checks that follow do not examine sensitivity of these results anymore. Instead, they investigate whether any concurrent tax events during the 1940s may explain confound my estimates of negative effects of joint taxation on log(income), log(wage), and routine manual task intensity. In all of these robustness checks, I also show results when gradually including controls for the non-tax events discussed in this subsection.

D.4 Tax Events in the 1940s

D.4.1 Changes in Progressivity at the Federal Level

Section 5 points out that from 1940 to 1950, the federal income tax code became more progressive. Marginal tax rates were higher in 1950 than in 1940 for all income levels, but the increase in marginal tax rates was generally larger at higher incomes. The figures below

show differences in the 1940 and 1950 federal tax codes in more details[17].



Note: Author's calculations of marginal tax rates based on IRS instructions of federal tax returns in 1940 and 1950.

Since married women in the treatment group seemed to earn higher income than their counterparts in the control group in 1940 as indicated in table 3, it is likely that they also faced a larger increase in marginal tax rates from 1940 to 1950. This larger increase in tax rates might have discouraged them from taking high-paid occupations, relative to their counterparts in the control group.

To evaluate the validity of this concern, I examine whether within the control group, higher-income wives chose to take lower-paid occupations relative to lower-income wives. If changes in income tax progressivity at the federal level caused married women in the treatment group to take lower-paid occupations relative to their counterparts in the control group because those in the treatment group earned higher income, these changes in federal tax progressivity should also cause high-income wives in the control group to take lower-paid occupations relative to low-income wives in this same group. The rationale behind this approach and empiricial details are laid out in section 5. Table 13 below shows results.

Table 13 – Robustness Checks: Progressivity Changes at the Federal Level

	Baseline	WWII mobilization	Industrial composition	Migration	Regional trends
Log(Income)	-0.105	-0.092	0.013	0.013	0.014
	(0.086)	(0.086)	(0.061)	(0.061)	(0.062)
Log(Wage)	-0.105	-0.095	-0.020	-0.020	-0.018
	(0.073)	(0.072)	(0.058)	(0.058)	(0.059)
% Full-time	-0.105	-0.092	0.013	0.013	0.014
	(0.086)	(0.086)	(0.061)	(0.061)	(0.062)
Routine Manual	0.308***	0.305***	0.311***	0.311***	0.312***
	(0.107)	(0.107)	(0.107)	(0.107)	(0.109)

[17]The highest income tax bracket started at $5,000,000 in 1940 and at $200,000 in 1950. According to the 1940 and 1950 Censuses, which top code total family income at $10,000, only 5% of families had at least $10,000 in total income. Therefore, I only illustrate tax brackets up to $12,000 in taxable income.

Each row corresponds to an outcome. The first column shows results when I do not control for nontax events. In the subsequent columns, I gradually include controls for WWII mobilization, industrial composition, migration, and regional trends. Each cell shows the coefficient on the interaction term Year 1950 $\times$ High Income of equation 5 for the outcome indicated by the row and for the specification indicated by the column. These coefficients show whether high-income wives chose different occupations relative to low-income wives.

The first two rows suggest that high-income wives did not choose lower-paid occupations relative to low-income wives. Therefore, it is unlikely that changes in income tax progressivity at the federal level could have driven married women in the treatment group, who seemed to earn higher income than their counterparts in the control group, to take lower-paid occupations. In other words, my findings of joint taxation's negative effects on occupational earnings among married women should not be confounded by the concurrent changes in federal tax progressivity.

The third row shows that high-income wives did not choose occupations with different full-time work requirements relative to low-income wives. The last row indicates that high-income wives seemed to work in occupations with higher routine manual task intensity. These results do not confound my findings of joint taxation's negative effects on routine manual task intensity. If anything, they suggest that joint taxation might have had stronger negative effects on routine manual task intensity if changes in federal tax progressivity could be controlled for.

In summary, results in table 13 show that changes in federal tax progressivity cannot explain the effects of joint taxation on occupations among married women. The main story still holds: joint taxation induced married women to choose occupations with lower wages and lower effort.

D.4.2 Differential Changes in Progressivity at the State Level

From 1940 to 1950, some states also changed the progressivity of their tax codes. As explained in section 5, income tax codes in the control states generally became less progressive, while those in the treatment states generally became more progressive. These changes might have caused married women in the treatment states to choose lower-paid occupations relative to their counterparts in the control states, since the increase in progressivity of the state income tax codes punished them more for generating higher income.

To examine whether my results were driven by changes in income tax progressivity at the state level, I dropped the states that experienced these changes and re-estimate the effects of joint taxation on occupations of married women. Results are shown in table 14.

Table 14 – Robustness Checks: Progressivity Changes at the State Level

	Baseline	WWII mobilization	Industrial composition	Migration	Regional trends
Log(Income)	-0.041**	-0.044**	-0.033**	-0.034**	-0.045**
	(0.017)	(0.018)	(0.015)	(0.016)	(0.021)
Log(Wage)	-0.038***	-0.039**	-0.029**	-0.030**	-0.035*
	(0.014)	(0.016)	(0.013)	(0.014)	(0.018)
% Full-time	-0.004	-0.005	-0.002	-0.001	-0.001
	(0.004)	(0.005)	(0.005)	(0.005)	(0.007)
Routine Manual	-1.997***	-1.931***	-1.795***	-1.690***	-1.752**
	(0.456)	(0.482)	(0.616)	(0.623)	(0.718)

This table has the same structure as table 13, except that each cell indicates the coefficient estimate on the diff-in-diff term Year 1950 $\times$ Treat in equation 3 when I drop states that change the progressivity of their income tax code. As evident in this table, dropping these states does not change my results. Joint taxation was associated with about 3.3% to 4.5% decline in median annual income, which was driven mostly by a reduction in median weekly wages. This tax change had no effect on full-time work requirement, but induced married women to choose occupations that required lower effort, as measured by routine manual task intensity.

Overall, results in table 14 show that changes in income tax progressivity at the state level did not drive my results of joint taxation's effects on occupations among married women.

D.4.3 Differential Changes in Joint Taxation at the State Level

After joint taxation was adopted at the federal level in 1948, Kansas, Oklahoma, and Oregon also allowed their married residents to file taxes jointly. Since these states were among the treatment states, the changes in joint taxation that they adopted might also cause married women in the treatment states to take lower-paid occupations relative to their counterparts in the control states. In that case, my results of joint taxation's effects on occupations of married women might overestimate the negative effects on occupational earnings of the switch from separate to joint taxation at the federal level.

To examine whether the changes in joint taxation at the state level affected occupations of married women, I restrict my sample to wives in the treatment group and examine whether married women in Kansas, Oklahoma, and Oregon chose different occupations compared to those in other states. Essentially I estimate Heckman procedures as shown in equations 2 and 3, except that now treatment states include Kansas, Oklahoma, and Oregon, and the sample is restricted to non-community property states. Results are shown in table 15.

Table 15 – Robustness Checks: Joint Taxation at the State Level

	Baseline	WWII mobilization	Industrial composition	Migration	Regional trends
Log(Income)	-0.011	0.000	0.007	0.006	0.009
	(0.026)	(0.029)	(0.041)	(0.041)	(0.040)
Log(Wage)	-0.025	-0.019	-0.020	-0.020	-0.016
	(0.024)	(0.026)	(0.035)	(0.035)	(0.034)
% Full-time	0.009	0.008	0.010	0.010	0.013
	(0.015)	(0.016)	(0.022)	(0.022)	(0.020)
Routine Manual	0.100	0.077	0.170	0.161	0.145
	(0.076)	(0.083)	(0.128)	(0.128)	(0.129)

Again, this table has similar structure to tables 14 and 13. All coefficients are statistically insignificant, suggesting that the switch to joint taxation in Kansas, Oklahoma, and Oregon did not induce married women in these states to choose different occupations compared to their counterparts in other states who were all affected by the shift from separate to joint taxation at the federal level.

In summary, table 15 suggests that changes in joint taxation at the state level should not account for the fact that married women in the treatment group chose lower-paid occupations relative to their counterparts in the control group after 1948. These results confirm that joint taxation induced wives to choose lower-paid lower-effort occupations.

D.4.4 Conclusion on Tax Events

In this section, I have shown my robustness checks to examine whether any major concurrent tax event could account for the differential trends in occupations among married women across control and treatment states from 1940 to 1950. These events include: changes in federal tax progressivity, changes in state tax progressivity, and changes in joint taxation at the state level. None of these events seems to explain the trends. Therefore, my main story still holds: the switch from separate to joint taxation at the federal level in 1948 induced married women to take occupations that paid lower wages, required lower effort, but involved the same level of full-time work.

E Effects of Joint Taxation on Husbands

Table 16 shows summary statistics among husbands in my sample. Many demographic characteristics among husbands in the control and treatment groups were statistically different at the baseline, but these differences did not change significantly from 1940 to 1950, which suggests that there is unlikely any differential trend in observables that might have affected occupations among husbands in the labor force. Compared to wives, differences in log(median annual income) and log(median weekly wage) among husbands were a lot more muted. These differences also did not change significantly from 1940 to 1950, suggesting

that the switch from separate to joint taxation might not have induced husbands to choose higher- or lower-paid occupations. Not shown in this table are labor force participation rates among all husbands, which were about 95% and did not differ significantly across control and treatment states.

Table 16 – Summary Statistics of Husbands in the Labor Force

	1940			1950		
	Treatment mean	Control mean	Diff b	Treatment mean	Control mean	Diff b
Occupational Characteristics						
Log(median annual income)	8.04	8.02	-0.01**	8.04	8.02	-0.02***
Log(median weekly wage)	4.19	4.18	-0.01*	4.19	4.17	-0.02***
Share Full-time	0.75	0.74	-0.01***	0.75	0.74	-0.01***
Nonroutine Manual	14.41	15.14	0.72***	15.27	15.89	0.57***
Routine Manual	39.55	39.04	-0.52*	40.28	40.03	-0.15
Nonroutine Interactive	22.50	20.41	-2.10***	21.82	19.47	-2.55***
Routine Cognitive	41.02	41.49	0.47	47.38	48.03	0.74
Nonroutine Analytical	41.15	39.32	-1.83***	40.98	40.24	-0.71***
Demographics						
Age	38.05	37.95	-0.11	38.49	38.46	-0.22*
White	0.98	0.97	-0.01*	0.97	0.97	-0.00
Hispanic	0.00	0.02	0.01***	0.01	0.02	0.02***
Spanish ancestry	0.00	0.01	0.01***	0.00	0.01	0.01***
Have children under 18	0.46	0.42	-0.03***	0.52	0.49	-0.02***
No. own kids in household	0.87	0.76	-0.11***	0.95	0.87	-0.10***
No. kids under 5y/o	0.28	0.25	-0.03***	0.41	0.37	-0.03***
Observations	31794	7102	38896	53683	13400	67083

In table 17 below, I show results when estimating equation 1 for my sample of husbands. Coefficients on the diff-in-diff term Year 1950 × Treat are mostly insignificant. Joint taxation did not seem to have an effect on husbands' labor force participation rates or occupations. As discussed in section 2, the switch from separate to joint taxation in 1948 induced an income effect and a substitution effect that worked in opposite direction for husbands. Thus, the null effects of joint taxation shown in this table are consistent with the ambiguous theoretical net effect.

I have also conducted similar robustness checks as discussed in section D for husbands. Effects of joint taxation on husbands' labor force participation and occupation remain insignificant. Therefore, joint taxation had no effects on husbands.

Table 17 – Effects of Joint Taxation on Husbands

	LFP	Log(Income)	Log(Wage)	% Full-time	Routine Manual	Nonroutine Manual	Routine Cognitive	Nonroutine Interactive	Nonroutine Analytical
Year 1950	-0.018***	-0.006	-0.010**	-0.003	0.944**	0.691***	6.559***	-0.964	0.892***
	(0.002)	(0.005)	(0.004)	(0.006)	(0.360)	(0.212)	(0.589)	(0.926)	(0.214)
Year 1950 × Treat	0.001	0.008	0.008	0.003	-0.272	0.136	-0.302	0.344	-1.052***
	(0.002)	(0.006)	(0.005)	(0.006)	(0.380)	(0.252)	(0.664)	(0.971)	(0.267)
Age	0.014***	0.028***	0.024***	0.009***	0.135***	-0.355***	-0.348***	0.832***	0.900***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.038)	(0.044)	(0.128)	(0.083)	(0.045)
Age squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.002***	0.003***	0.000	-0.006***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)
White	0.008	0.248***	0.213***	0.093***	4.241***	-2.610***	8.709***	9.592***	12.626***
	(0.005)	(0.009)	(0.008)	(0.006)	(0.402)	(0.348)	(1.092)	(0.975)	(0.611)
Have children under 18	0.016***	-0.012***	-0.011***	-0.000	-0.282***	1.189***	-1.195***	1.758***	0.314**
	(0.001)	(0.003)	(0.003)	(0.001)	(0.088)	(0.128)	(0.330)	(0.310)	(0.129)
Spanish ancestry	0.006	-0.042**	-0.029*	-0.031***	1.012	-0.187	2.681	-5.753***	-4.835***
	(0.008)	(0.017)	(0.016)	(0.006)	(0.745)	(0.405)	(1.936)	(1.346)	(1.250)
State FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	109605	105979	105979	105979	83364	83364	83364	83364	83364