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## The effect of tax preparation expenses for employees: Evidence from Germany

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**The effect of tax preparation expenses for employees:  
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# The effect of tax preparation expenses for employees: evidence from Germany\*

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## Abstract

Tax preparation firms advertise their services as a way to save taxes. To investigate this subject, we use a panel of German income tax accounting data, consisting of employees and other taxpayers with non-business income, to explore the relationship between expenses for tax preparation and tax liabilities. We find a negative link with expenses exceeding estimated tax savings. Specifically, one additional Euro yields an estimated tax savings of 72 cents in an OLS regression and 24 cents in a fixed-effects regression. This finding indicates that cross-section estimates are upward biased. The magnitude of the effect implies that tax preparation expenses are not worthwhile from a tax saving perspective alone. In consideration of time savings, combined tax and time savings also do not exceed expenses for any income quintile. The result is robust to various alternative specifications such that in no setting do the pecuniary and time savings exceed the tax preparation expenses. Overall, our findings suggest an important benefit of tax preparation expenses beyond tax and time savings.

Keywords - response to taxation, tax advisors, tax return preparation, tax preparation expenses

JEL classification: H24, H31

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# 1 Introduction

As the tax season begins, tax preparation firms and tax software providers aggressively advertise their services, claiming that they obtain the best possible deal out of each tax return. These companies' television commercials emphasize a naive calculation of profit: gain equals tax refunds minus fees paid for the tax preparation. In a New York Times article headlined "Turning Tax Time Into Party Time", the marketing chief officer of Jackson Hewitt, the second largest U.S. preparation retailer, claims, along this line, an average return of USD 3,000 for her customers (Vega 2012). Similar arguments are put forward in many countries to pay for tax preparation.

This paper studies the link between expenses for tax preparation and tax liabilities. For U.S. multinational companies, there is strong evidence of a positive return on tax planning expenses such that one dollar of expense is associated with four dollars in tax savings (Mills et al. 1998). There exists, to our knowledge, no comparable analysis regarding expenses of individual taxpayers without business income.

This empirical paper contributes in the following way to the existing literature: First, we study the effect of tax preparation expenses, whereas prior research on individual taxpayers focuses on the effect of a binary variable of paid-preparation vs. self-preparation. This enables us to compare the observed amount spent with the estimated tax saving effect of expenses. Second, we use panel data. The existing empirical studies, with the exception of Frischmann and Frees (1999), rely on cross-sectional variation in tax preparation expenses, and they account for potential endogeneity of paid-preparation using two-stage estimations. The panel data allow us to study the effect of tax preparation expenses while controlling for individual fixed-effects and to comment on the robustness of the magnitude of the tax preparation coefficient in cross-sectional regressions. Moreover, the data permit us to address the time lag of tax preparation as the expenses are itemized in the year paid and thus lagged one period. Third, our non-U.S. empirical evidence contributes a new angle to the literature. We use 2001 to 2005 panel tax accounting data from the official statistics of German taxpayers' returns. International evidence is important to understand the institutional differences between the U.S. tax advisory market and other markets.

The econometric analysis reveals a significant negative link between the level of tax preparation expenses and tax liabilities. The expenses exceed the tax savings such that one additional Euro yields a tax savings of 72 cents in an OLS regression and 24 cents in a fixed-effects regression. Hence, the inclusion of

individual fixed-effects reduces the magnitude of the tax preparation expenses coefficient by two-thirds. This suggests a substantial upward bias in analyses of cross-section data due to omitted variables. A coefficient size below one indicates that benefits beyond tax savings motivate taxpayers to pay for tax preparation. We observe substantial income heterogeneity. However, even considering time savings, when derived in an auxiliary estimation, the combined benefits do not exceed the expenses for any income quintile.

The paper proceeds as follows. The next section provides the institutional background of the German tax preparation market and tax system. Section 3 introduces the related literature. Section 4 specifies our research questions, and section 5 introduces and discusses the data and the sample selection process. Section 6 explains the econometric approach and presents our analysis of the relation between tax preparation expenses and the tax liability through econometric analysis. In section 7, we provide alternative specifications to support our results, and the last section summarizes our results.

## 2 Institutional background

While the extent of regulations with respect to tax preparation services differs substantially from country to country (Thuronyi and Vanistendael 1996), a main attribute of the German tax preparation market is a high level of regulation (comparable with i.a. Austria, China and Japan). For example, there is restricted market access as only three groups are allowed to provide tax advisory services. The first group consists of examined professional tax advisors, most of whom have a university degree in economics or law, have passed a comprehensive exam and have at least two years of experience. The second group is comprised of lawyers and CPAs, and the third group consists of local income tax help organizations. Retail chains such as H&R Block do not operate in Germany as most tax preparers work as freelancers or are associated with private partnerships. Thuronyi and Vanistendael (1996) go so far as to conclude that Germany has established a regulated professional monopoly for tax practice. Contrary to Germany, in the U.S., the level of regulation is substantially lower, particularly with respect to professional training and qualifications.

There are further differences between the countries' tax preparation markets. Regarding product differentiation, in Germany, advertising of tax preparers is allowed only to a very limited extent and refund anticipation loans are non-existent. On the demand side, contrary to self-reporting systems, German taxes are calculated by the fiscal authorities. The taxpayer declares the taxable

earnings and deductions but does not calculate the taxable income and the tax payment. In the US, many low-income filers with children receive a refund due to the earned income tax credit (EITC) (LaLumia 2013) and often pay for tax preparation (Blumenthal et al. 2005). Germany, on the other hand, does not have an EITC as child allowances and other transfer payments are organized and paid almost independently from the tax system.

Overall, the differences between the two countries systems likely change the demand for tax preparation services, and accordingly, the demand for tax preparation service is less in Germany than it is in the U.S. (Blaufus et al. 2013). However, similar to the U.S., the German market for tax preparation services has experienced a remarkable growth trajectory for many decades with a 4% compound annual growth rate in the number of certified tax advisors between 1970 and 2012 (BStBK 2012).

In the following, we briefly explain particular aspects of the German tax system (2001-04) to facilitate the interpretation of our results. The German income tax is a global income tax where freelance, interest and rent income is taxed at the same rate as labor income. However, financial income remains partly tax exempt due to a savings allowance, and capital gains are completely tax-exempt after a one year holding period. The tax liability is calculated according to a progressive tax rate that ranges from 0% to 51.2% (2001-2003) or 47.5% (2004). While joint filing of spouses is voluntary, for the majority of taxpayers, there is a fiscal gain for joint filing because the combined income is halved to calculate the tax rate (which with progressive tax rates results in higher tax savings the higher the income differences between spouses). Tax preparers can assist taxpayers in claiming eligible deductions and expenditures as well as implementing various tax avoidance schemes to modify gross income, for example, by helping taxpayers in income shifting and timing.

German taxation data are well suited to study the tax savings effect of tax preparation because tax preparation expenses are observable when the expenses plus other unconditional special items deductions (such as charity contributions, church taxes, alimony and children's school fees) exceed the low threshold of 36 Euros for single and 72 Euros for married taxpayers. Individual income taxation is complex, and there are various itemized deductions available that are not easily recognized and used by all taxpayers.

The German income tax system emphasizes the so-called net principle, which states that all expenses triggered by employment are deductible. Therefore, relative to other legislations, many expenses are tax deductible. Important work-related deductions include commuting expenses, victuals on business travel and

double household allowances. Other possible partial deductions include tax preparation expenses, educational expenses, alimonies, insurance contributions, costs associated with illness and other extraordinary expenses. In addition, the German income tax code is extensively used for social policy objectives and, therefore, contains further deductions that are not due to the net principle, for example, special deductions for real estate investments, expenses related to care-giving for disabled or sick individuals and charity contributions. Moreover, due to fiscal incentives for low income taxpayers, there are several tax expenditures independent of the tax rate (credits that reduce the tax liability instead of the tax base).

### 3 Related literature

The tax compliance literature reports several associations of personal and tax case characteristics with paid tax preparation. Evidence comes from survey studies, from cross-sectional and panel analyses of tax return data and from laboratory experiments.

Slemrod and Sorum (1984) use survey data to explore determinants of paid preparation such as lower educational attainment, age and self-employment. In principle, survey results of Blumenthal and Slemrod (1992) for the U.S. and of Blaufus et al. (2013) for Germany confirm these results. Collins et al. (1990) use a market segmentation approach to differentiate heterogeneous motivations of taxpayers to pay for tax preparation, namely, decreasing compliance error rates and minimization of tax liabilities. They also provide evidence that taxpayer characteristics differ between the two groups. Dubin et al. (1992), Christian (1993), Erard (1993) and Ashley and Segal (1997) use tax return data to produce further evidence of the association of paid tax preparer usage with personal characteristics such as level of education, marriage, children and age as well as several tax case characteristics such as income level, income components and number of forms. Dubin et al. (1992) and Erard (1993) consider a multi-stage decision between different forms of paid preparation to demonstrate that effects of determinants differ between different groups of expenses.

The empirical studies most closely related to our work are Long and Caudill (1987), Christian et al. (1994) and Frischmann and Frees (1999), all of which use U.S. tax return data to study effects of paid preparation. Long and Caudill use a 1983 tax return cross-section to provide evidence that taxpayers who hire a tax advisor have lower tax liabilities. They account for endogeneity of the tax preparer choice by estimating a first-stage probit model and using the results

to account for potential sample selection in a regression of tax liability on paid preparation. The study only investigates the effect of paid-preparation as a binary choice because expenses data were not available. Christian et al. also use 1983 tax return data to produce evidence that the use of paid preparation affects the tax pre-payment position and increases tax refunds. They also rely on a two-stage model to account for potential sample selection. In detail, they estimate a switching regression with a probit model that differs between a paid and a self-prepared return in the first stage. Frischmann and Frees use 1982-84 and 1986-88 taxpayer data to construct a panel and conduct a longitudinal analysis that allows controlling for individual fixed-effects. Their data also allow accounting for the time lag of tax preparation as the expenses are itemized in the year paid. However, the tax preparation expenses data of Frischmann and Frees are censored because expenses are only observable if taxpayers have a high overall level of tax deductions and decide to itemize or if tax advisors voluntarily record them. Therefore, their analysis relies on a binary variable of paid-preparation. In a regression of tax liabilities on a tax preparation dummy, they find that paid-preparation decreases tax liabilities. An additional regression that includes various interaction terms with the paid-preparation dummy provides evidence of heterogeneous effects, such as paid preparation reduces tax liabilities only for old, affluent and self-employed taxpayers.

Previous research suggests multiple motivations to pay for tax preparation. These include time savings, tax savings and reductions in uncertainty / enhancement of tax compliance (Frischmann and Frees 1999). Slemrod (1989) models tax deductions as a function that positively depends on inputs in the tax filing process, such as the time spent on tax return preparation and fees paid to tax advisors. With respect to potential tax savings accrued from tax preparation, several channels exist. First, some taxpayers are unable to understand the tax code and are therefore missing out on eligible deductions without professional advice (Kirchler 2007). Second, cautious minimization of taxes is a significant motivation to hire tax advisors (Hite and McGill 1992; Sakurai and Braithwaite 2003). Third, responses to tax authority appeals differ between self-prepared and professionally prepared tax returns (Hasseldine et al. 2007). Fourth, tax preparers are able to exploit tax ambiguities and find tax loopholes (e.g., Klepper and Nagin 1989; Spilker et al. 1999; Cords 2009; Leviner 2012).

Further studies highlight additional motivations to pay for tax preparation. Consulting a tax preparer is associated with solving uncertainty regarding tax matters induced by tax complexities (Scotchmer 1989), and it signals compliance to tax authorities (Beck et al. 1996). Klepper and Nagin (1989) use U.S.



individual tax return data to compare reported and IRS corrected income by income lines. Their results suggest that tax preparers enforce unambiguous tax requirements but exploit ambiguities. Consistent with this finding, Klepper et al. (1991) develop a model of the decision to engage a professional tax preparer, which separates noncompliance on ambiguous and unambiguous income. The penalty on detected noncompliance regarding ambiguous income is a function of the preparation mode. Tax preparer fees are paid based on time and noncompliance efforts. The model predicts that attractiveness of tax preparation depends on the fraction of fees paid for noncompliance.

Jackson et al. (2005) argue that taxpayers perceive refunds as a proxy of tax savings and discuss the motivation to overpay for tax advice to increase tax refunds. Consistent with this thinking, they use 1986-89 U.S. tax return data to run a repeated cross-sectional regression of tax preparation fees on the prepayment position and demonstrate a positive link. In a laboratory experiment, Hatfield et al. (2008) find that tax refunds positively affect preparation fees. Beck et al. (1996), finding another channel of overpayment in tax preparation services, experimentally show that taxpayers more often purchase tax advice than predicted by its benefits and often pay for tax advice that they ignore. Further, for U.S. saver's credits in retirement savings plans, the use of tax preparers is associated with higher take-up rates (Ramnath 2013). In a regression between U.S. state averages, Long and Caudill (1993) find evidence of a positive influence of audit rates and audit penalties on paid preparation. Blumenthal et al. (2005) analyze administrative tax data and provide evidence of higher demand for professional assistance among taxpayers with high estimated tax filing completion times (based on weighting of completed forms) and among those eligible for the EITC.

The question of income heterogeneity on the effect of tax preparation expenses arises from the results of Lang et al. (1997) and Burman et al. (2008) regarding a disproportionate increase in itemized deductions with increasing income. Feenberg and Poterba (1993) and Gruber and Saez (2002) provide related evidence of a larger tax base elasticity associated with high income taxpayers. Only Long and Caudill (1987) attempt to quantify the pecuniary benefits of the binary decision on paying for tax advisors for different income groups. Their results suggest that tax savings effects increase with taxpayer income. There are several potential explanations for such income heterogeneity, including the tax rate effect whereby a certain level of deductions results in higher tax savings for higher income groups due to the progressive income tax scales. Further, income may be correlated with the quality of tax preparers, and the opportunities to

claim deductions may be heterogeneous in income.

## 4 Research questions

A tax saving effect of pecuniary tax preparation expenses is assumed by Slemrod (1989) as a general compliance technology that embodies a positive relationship between inputs in the tax filing process and itemized deductions as well as tax exemptions. This is based on the presumption that expenses provide better information that lead to ex ante tax induced behavior, not missing out on eligible deductions and the use of ambiguity and loopholes. Therefore, our first research question is how much tax savings accrue from tax preparation expenses. To investigate this question, we analyze variations in tax liabilities conditional on the gross income before deductions (total positive income). This paper does not cover any tax burden reductions by legally or illegally changing gross income, for example, concealment of income, timing of compensation, income shifting, reduction of labor hours or migration. Previous literature shows that, in particular, highly affluent individuals avoid taxes by tax flight and income shifting (e.g., Young and Varner 2011; Goolsbee 2000).

As tax savings from deductions are heterogeneous between income groups (Lang et al. 1997), heterogeneity in the tax preparation effect is also likely. First, there is a tax base effect whereby the eligibility for some deductions increases in income, for example, deductions for charity contributions (Bönke et al. 2013). Second, as a consequence of progressive income tax scales, there is a tax rate effect whereby tax savings at a certain level of deductions increase with increasing income and marginal tax rates. Accordingly, we investigate as a second research question whether the link between preparation expenses and tax savings is conditional on the distribution of income.

The econometric analysis in this study focuses on the direct cash impact, i.e., tax savings. Additionally, there are other advantages from tax preparation expenses. In an additional analysis, we investigate time savings - the substitution of time spent on tax preparation by means of expenses for professional advice. Our third research question focuses on how much combined time and tax savings accrue from tax preparation expenses.

## 5 Data and sample

### 5.1 Data set

We employ tax accounting data from the German wage and income tax statistics provided by the Federal Office of Statistics. The full data set includes anonymized observations of all payers of German individual income tax. It consists of information gathered from tax returns (e.g., basic socio-demographic characteristics, wage income, deductions, tax credits and exemptions, taxable income, tax liability). Its usage, therefore, avoids issues with survey sampling. Each observation includes the tax filing data of either a taxpaying individual or a married couple that opted to file jointly. We use the term taxpayer to refer to an observation.

We use two different versions. Mainly, we employ the *German Taxpayer Panel*. The balanced panel links annual tax returns over time based on tax ID numbers and indirect identifiers. The panel contains yearly income tax returns of approximately 19 million taxpayers. Observations are lost if information was only available for a subset of years and observations cannot be tracked over time. This partly occurs due to marriage, divorce or moving to another federal state. The scientific-use version of the panel contains a 5 percent weighted sample with observations of approximately 0.95 million taxpayers. These data are available to researchers only through remote data access. We use data from 2001, the first available year, to 2005, the last year with observable tax preparation expenses. The advantage of this data set is the opportunity to exploit the panel structure. A disadvantage is that selection whether a taxpayer is included is non-random, particularly as taxpayers at the beginning and end of work life are under-represented.

Accordingly, we use for comparison the 2004 scientific-use version of the income tax statistic (*Einkommensteuerstatistik*), which is a cross-section of taxpayers. It contains a 10 percent weighted sample with approximately 3.5 million observations of the German taxpayer population. Its main advantage is that it provides a rich number of observations that represent a balanced sample of the German taxpayer population.

Our data include comprehensive information about paid tax preparation expenses. This complements previous studies, such as Long and Caudill (1987), Christian et al. (1994) and Frischmann and Frees (1999), that use only a dummy variable to study the tax saving effect of paid-preparation. Similar to Frischmann and Frees (1999), we use panel data that accounts for unobservable individual heterogeneity and accounts for the time lag of tax preparation expenses, which

are itemized in the year paid.

## 5.2 Sample

This paper focuses on a subset of individual income taxpayers - individual taxpayers with no form of business income. The rationale for this exclusion is threefold. First, there is the motivational difference with some sort of business income in that the borderline between financial accounting and tax preparation is not clear-cut and the complexity of business taxation makes it compulsory to use professional tax assistance, at least partly, in many cases. A combined analysis likely overestimates effects of one group relative to the other. Second, for taxpayers with business income, the German tax statistics track only profits (the income after deductions). For these taxpayers, the control variable total positive income must include some deductions, which are arguably an effect of the independent variable tax preparation expenses.<sup>1</sup> On the other hand, for taxpayers with employed and financial income, we are able to observe the total positive income as well as the deductions and earnings.

Third, the tax code alternatively allows for the itemization of tax preparation expenses among income-related deductions, which makes the expenses unobservable in our data set. This is common for many taxpayers with business and freelance income that include the expenses in their accounts. In addition, the itemization of tax preparation expenses among income-related deductions is economically favorable in the case of a negative income due to a favorable tax loss carried forward. Accordingly, we also exclude taxpayers with negative income. Concerning all other taxpayers, we presume that most taxpayers itemize their tax preparation expenses as observable special items deductions.<sup>2</sup>

To shed light on a potential measurement error of tax preparation expenses, we compare the average tax preparation expenses in the panel and the cross-sectional data set with the survey evidence documented in Blaufus et al. (2013). This self-assessment of tax preparation expenses was raised in 2008/09 in face-to-face interviews of respondents contacted based on a quota plan of the German

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<sup>1</sup>In general, this objection also holds for rent income. We, therefore, conducted additional analyses using a sample that excludes taxpayers with rent income. We obtain qualitatively unchanged results.

<sup>2</sup>The taxpayers who do not itemize employment related deductions (i.e., whose deductions fall below the standard deductions of 920 Euro for single filers and 1,840 Euro for joint filers in case of double employment income) have a strong incentive to itemize tax preparation expenses as unspecified special item deductions. This is due to the lower level of standard deductions (36/72 Euro). In addition, there is a psychological incentive that tax advisors itemize them as unspecified special item deductions. In this case, the deductibility of expenses is transparent for taxpayers, which presumably reduces perceived fees.

taxpayer population. For the paid preparers in the survey, the ratio between expenses of freelancers and non-freelancers is 5:1. On the contrary, for the panel, the ratio between expenses of freelancers and non-freelancers is only 2.3:1. For the cross-section, the same ratio is also 2.3:1. This indicates for freelancers a potential measurement error for the tax preparation observation in the official statistics. Although we cannot rule out that our tests do not include the complete sample of taxpayers with positive tax preparation expenses, the potential measurement error is likely small for employees.

In sum, our baseline sample excludes taxpayers with business income (from either agriculture and forestry, trade or freelance activity) in at least one year and taxpayers with negative income in at least one year.<sup>3</sup> We include the remaining taxpayers with income from either employee compensation, financial assets, renting and leasing or miscellaneous income.<sup>4</sup> The sample sizes are 222,584 taxpayer×year observations (panel)<sup>5</sup> and 423,279 observations (cross-section).

### 5.3 Variable setting

Our dependent variable is the individual tax liability.<sup>6</sup> The conditional variation includes variations in deductions, tax credits and exemptions, tax rate effect (the tax rate changes with a changing tax base) as well as the deductibility of tax preparation expenses. Therefore, we estimate a global proxy of the tax saving effect.

The independent variable of main interest is the individual expense for tax preparation. We define tax preparation expenses as all monetary expenses incurred to file tax returns. This means it encompasses monetary tax compliance costs, and it also includes the part of expenses that taxpayers incur solely to fulfil their legal obligations – or to reduce their time or complexity burdens required by this obligation. Any pecuniary expense substitutes for non-pecuniary costs, particularly with respect to self-preparation time. The expenses are tax deductible until 2005 (paid in 2005 for tax preparation regarding the fiscal year 2004) as unspecified special item deductions, and they are typically lagged one year. This arises as tax preparation expenses are itemized in the year paid, which is the year in which taxpayers commonly prepare their income tax returns for

<sup>3</sup>Our results are robust to samples including freelancers. Regression tables can be obtained from the authors on request.

<sup>4</sup>Miscellaneous income includes pensions, received alimony and capital gains of short-term trading.

<sup>5</sup>15% paid preparers among 1,534,416 taxpayer×year observations with positive total positive income and no business or freelance income.

<sup>6</sup>The variable includes the individual income tax liability and the so-called solidarity surcharge on top of the income tax liability.

the previous year. Therefore, in the panel analysis, we use as a lagged variable the tax preparation expenses of the following year for 2001 to 2004. The tax code definition for deductible tax preparation expenses is broad as it includes tax preparer fees, incidental expenses, expenses for other types of advice, membership fees for tax help associations as well as expenses for tax preparation software and tax guides. The standard deduction for unspecified special items deductions is low at 36 Euros for single filers and 72 Euros for joint filers. Itemization of this special expense group is unrelated to the option to itemize other expenses from other groups. This means that the expenses are observable in the data set, in case the added other unconditional special items deductions (such as charity contributions, church taxes, alimony and children’s school fees) exceed 36/72 Euros.

We use a vector of total positive income variables as the independent variables. Other covariates include taxpayer characteristics, such as age cohort, joint or separate filing, single earner or double income, public employee or non-public employee, church affiliation, number of children, receiving of miscellaneous income, financial or renting and leasing income and an indicator whether employee compensation constitutes less than half of the total income and receiving of tax exempted social transfers.<sup>7</sup> We also control whether a taxpayer lives in West or East Germany, which relates to the pre-1990 division of a democratic and communist Germany. As we are careful to control only for variables that are not themselves outcomes of tax preparation decisions, all of our covariates have been determined at the time the decision is made.<sup>8</sup>

Table 1 displays descriptive statistics of the tax return schemes of our sample. For comparison, we also display the subset of all taxpayers with and without tax preparation expenses. Table 2 displays an overview of covariates used. Table 3 displays correlations.

[table 1 about here] [table 2 about here] [table 3 about here]

In our sample of those who are paid preparers in every year, the average expenses are 241 Euros, and the median expense is 143 Euros compared to a median yearly total positive income (TPI) of 38,700 Euros. The autocorrelation of tax preparation expenses is 55%. The expenses increase with income (correlation  $r = .24$ , partial correlation  $r = .19$ ). All other partial correlations with the

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<sup>7</sup>Surrogates for wage income to individuals who currently do not work due to unemployment, motherhood, pregnancy or illness.

<sup>8</sup>With respect to rent and financial income, there may be an effect of tax preparers’ advice on investment or income shifting. However, we consider this share as negligible. Our results are robust to samples that exclude taxpayers with financial and rent income.

expenses are substantially lower, the largest being the income dummy variables: .09 for income from renting and leasing, .04 for income from financial assets and .11 for a low share of non-labor income of total income. Of paid preparers, 43% have income-related deductions that exceed the standard deductions.

Tax preparation expenses are potentially an endogenous variable due to their correlation with omitted variables. The decision how much to spend on tax advice depends on a number of factors, including the opportunity / eligibility set of taxpayers. Further, taxpayers with high wealth, income or income complexity may be willing to pay more than other taxpayers. Personal characteristics such as risk aversion and perception of taxes may also affect the tax preparation choice and tax liabilities. Omitted variables likely imply an upward omitted variable bias of the absolute value of the estimated effect between taxpayers. That is, the most likely correlation pattern of the opportunity set is a positive correlation with tax preparation expenses and tax savings. There is also a likely positive correlation between complexity and tax savings as well as between complexity and expenses. Accordingly, the estimated coefficient includes two effects - the effect of tax preparation and the proxy effect for eligibility.

Additionally, there is a potential reverse causality. Perhaps, tax preparation will become more expensive in the event that individuals have high tax savings. Hatfield et al. (2008), in a experiment with tax professionals, provide evidence of a related link with tax professionals in that tax accountants are inclined to charge higher fees in treatments of taxpayers receiving a tax refund than in treatments of owing taxes. However, the freedom of choice is limited in practice. In Germany, tax advice fees are legally stipulated by the services taxpayers seek, though there is some leeway. It is, however, explicitly off-limits to agree on contingency fees, i.e., to link tax fees to tax refunds or tax savings. Reverse causality would also result in an upward bias of the estimated effect of tax planning. This means that the absolute value would overstate the marginal effect of tax preparation expenses.

We address the endogeneity concern in four ways. First, we include various covariates that approximate complexity of the tax case and eligibility for deductions. For example, with joint filing, we control for the effect of marital status relief, and with number of children, we control for child raising allowances. Second, we focus on a subset of those taxpayers with positive tax preparation expenses and interpret the results only for this subset. In an alternative specification, which includes taxpayers with zero expenses, we account for an endogenous choice of paid preparation using a two-stage sample selection model. Third, we include individual fixed effects and investigate variation over time within tax-

payers. The fixed-effects estimate solves endogeneity concerns with respect to unobserved heterogeneity of taxpayers and tax cases. To understand the difference between the estimated effects with and without control for individual heterogeneity, we also estimate OLS with the absence of individual fixed effects. In the latter case, we interpret the absolute value of the estimated effect as an upper bound estimate of the real effect. Finally, we provide estimates of an instrumental variable regression using exogenous variation in the German child care environment.

## 6 Econometric analysis

### 6.1 Tax saving effects in the baseline regression

The baseline specification studies the marginal effect of the level of tax preparation expenses for the subsample of those taxpayers with positive expenses. We use the subset of taxpayers with positive pecuniary expenses across all years. In the alternative specification section, we investigate a larger sample that includes self-preparers and those who switch between self-preparation and paid preparation. We estimate a regression of the following form:

$$Tax_{i,t} = \beta_0 + \beta_1 TP_{i,t+1} + \beta_2 Inc_{i,t} + \beta_3 X_{i,t} + \delta_t + \lambda_i + u_{i,t} \quad (1)$$

where the dependent variable  $Tax_{i,t}$  represents the tax liability of taxpayer  $i$  in year  $t$ .  $TP_{i,t+1}$  measures pecuniary tax preparation expenses with corresponding coefficient  $\beta_1$ , and  $Inc_{i,t}$  is a vector of variables based on  $i$ 's TPI with corresponding vector of coefficients  $\beta_2$ . To account for non-linearities in the relationship between the dependent variables and income, the analysis includes the first, second and third-degree of TPI and the hypothetical marginal tax rate based on TPI as control variables. The coefficient of interest  $\beta_1$  measures the effect of tax preparation expenses on tax liabilities conditional on income.  $X_{i,t}$  is a vector of covariates with a corresponding vector of coefficients  $\beta_3$ .  $\delta_t$  captures year fixed-effects and  $\lambda_i$  captures individual fixed-effects. In the cross-sectional regression we substitute  $TP_{i,t+1}$  with  $TP_{i,t}$ .

Table 4 presents the OLS results. Column (1) displays the 2004 cross-sectional regression, column (2) displays the panel regression without individual fixed effects and column (3) displays the fixed-effects regression. The estimated coefficient of interest is significantly negative ( $\beta_1 < 0$ ) in all regressions.

[table 4 about here]



Without the individual fixed effect, an increase of tax preparation expenses by 1 Euro predicts as an upper bound, *ceteris paribus*, a decrease in tax liabilities of .68 or .72 Euros.<sup>9</sup> The magnitude of the tax preparation effects differs between within- and between-taxpayer variations such that the control for individual fixed-effects reduces the magnitude by approximately two-thirds. The difference between the coefficients implies a correlation between unobserved fixed effects and tax preparation expenses and suggests that cross-sectional estimates of the relationship between tax preparation expenses and tax liabilities may be subject to upward bias.

We use the OLS estimator of the panel regression to calculate the difference between the predicted tax liability using equation (1) conditional on zero tax preparation expenses and the actual tax liabilities observed in the sample. This difference represents the upper bound of predicted tax savings conditional on the actual observed level of tax preparation. Of course, estimators of regression coefficients and derived predictions should be interpreted with caution. Nonetheless, this approach provides a straightforward and easily interpretable measure of the upper bound marginal tax preparation effect. The calculated tax savings are subsequently compared to the actual expenses, while using both factors enables the calculation of the net cash position. The average predicted conditional tax liability is 8,104 Euros across the full sample (without fixed effects). The corresponding actual average tax liability is 7,930 Euros. Thus, the estimate predicts tax savings of 174 Euros derived from taxpayers' actual tax preparation expenses. In contrast, the average expenses are 241 Euros, which implies that, on average, tax preparation must have benefits of at least 67 Euros beyond tax savings. Of course, the corresponding estimate for the fixed-effect estimator is much higher.

We split our sample by income quintiles to examine the heterogeneity of the tax preparation effect among income groups. The sample is divided into five mutually exclusive TPI subsamples. The first subsample includes the 20 percent of taxpayers with the lowest income, the second subsample includes taxpayers with income between 20 percent and 40 percent, and so forth. To make the income of single and joint filers comparable, we use the halved TPI of joint filers. The total positive incomes of the quintiles are 15,068 Euros, 21,905 Euros, 29,026 Euros and 39,112 Euros. We run the regressions separately for the subsamples. The OLS estimates for tax preparation by quintile are -.30, -.34, -.55, -.50 and

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<sup>9</sup>We calculate beta coefficients to standardize the coefficient of tax preparation expenses. An increase of tax preparation expenses in the panel data set by 1 standard deviation reduces tax liabilities by 2.4% standard deviations. In addition to the income vector, we observe the largest effect for joint filing (-13%), double income (-4.7%) and surrogate income (4%).

-0.67, all significant at a 1% level. Large differences between subsample estimates point toward income heterogeneity of the tax preparation expenses effect as the estimator of preparation decreases with increasing income. This suggests that high income taxpayers profit more from tax preparation expenses than low income taxpayers. The tax saving effect is strongest for the top income quintile. However, because tax savings never exceed expenses, we do not observe a break-even for any quintile.

The fixed-effects estimates for the effect of tax preparation are only significantly different from zero in the top quintile (-0.23, p-value < 1%). This indicates large heterogeneity and further suggests that the within-effect is completely driven by the top income quintile. Note that a tax rate effect alone can result in income-dependency of the tax preparation expenses effect in that a certain level of deductions results in higher tax savings for higher income groups due to the progressive income tax scales.

## 6.2 Tax and time saving effect

Our analysis heretofore has been based on the pecuniary effects of tax preparation, i.e., the tax saving effect. An additional advantage of paid preparation is time savings – pecuniary preparation substitutes time spent on tax planning. Hence, we obtain two additional effects - the foregone benefits and costs of time spent on tax preparation. The foregone costs are the individual opportunity costs of time, which the tax compliance costs literature commonly approximates with after-tax labor wages (Slemrod and Sorum 1984; Blumenthal and Slemrod 1992; Tran-Nam et al. 2000). In the following, we conduct an auxiliary analysis on time savings and a corresponding value estimate.<sup>10</sup>

As the official tax statistics do not include any data on the time burden (and there is no other official estimate available), the subsequent analysis is based on a different data set - the tax compliance survey of German taxpayers, which covers the time spent on preparing tax returns. It is extensively described in the tax compliance study of Blaufus et al. (2013). The estimation employs a subsample thereof that excludes self-employed taxpayers, non-preparers and unpaid third-party preparers. The sample includes 340 observations. Table 5 presents an overview of the data.

[table 5 about here]

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<sup>10</sup>Substitution of time spent with expenses expels the potential benefit of tax savings generated by time spent. Due to a lack of data on the relation between tax savings and tax preparation time, we assume zero benefit at this point. Any tax savings generated by time spent decrease the value of time savings and, therefore, decrease the return on expenses.

We estimate an OLS regression of the following form:

$$H_i = \alpha_0 + \alpha_1 D_i + \alpha_2 X_i + u_i \tag{2}$$

where the dependent variable  $H_i$  measures the self-assessed number of hours spent on tax preparation for taxpayer  $i$ . It also includes early stage time effort such as collecting receipts and is therefore non-zero for all taxpayers who prepare a tax return.  $D_i$  is a dummy variable capturing the use of tax advice. It is 1 when a taxpayer seeks paid tax advice, and 0 in the case of self-preparation.  $X_i$  is a vector of covariates with the corresponding vector of coefficients  $\alpha_2$ . We control for gross income tertiles separated between married and single taxpayers. This follows from the survey structure because respondents were asked about their personal income, and income of their spouse, rather than household income. Consistent with Blaufus et al. (2013), we use survey weights.

Table 6 displays the regression estimates. Controlling for  $X_j$ , the significant marginal effect of professional tax advice on the time burden is -5.0. This means paid preparation reduces on average the time burden by approximately five hours. This estimate is consistent with the simple difference of the average time burden of 4.9 hours (taxpayers with professional tax advice have on average a time burden of 6.3 hours while taxpayers without professional tax advice have on average a time burden of 11.2 hours). In regressions including the interaction terms, we do not find a significant joint effect of tax preparation expenses and income.

[table 6 about here]

We use the coefficients in Table 6 and apply them to our taxpayer panel data to obtain an individual time burden estimate. Further, we calculate for all paid preparers a counterfactual time burden estimate predicted conditional on self-preparation. The difference between the prediction and the counterfactual prediction is used to approximate individual time savings through paid preparation. The average estimated time savings is 4.6 hours.

To analyze income heterogeneity of the tax preparation effect, we calculate the average predicted tax and time savings separately for the different income subsamples. For this purpose, we use for the effect of tax preparation on tax savings the linear OLS estimates calculated in the separate subsample regressions. Time savings are calculated as above but separately for the quintiles. For a valuation of time savings, we multiply the predicted time savings with a proxy of the hourly after-tax wage rate. The wage rate is derived from the taxable income minus tax liability derived from the tax statistics and the average num-

ber of yearly labor hours in Germany, which is 1,365 hours.<sup>11</sup> The mean of the derived hourly wage proxy is 12.53 Euros. This results in an average value of time savings of 58 Euros.

[table 7 about here]

We observe heterogeneous effects in that all costs and benefits, tax preparation expenses, tax savings and valued time savings increase with increasing income. Note, however, that for time savings, this depends, to a major extent, on the assumption of increasing opportunity cost of time in proportion to increasing income. Considering average time savings and the estimated upper-bound tax saving effect, tax preparation expenses exceed the combined tax and time saving effect for all quintiles. This implies that, based on tax and time savings, tax preparation expenses are not worthwhile across the income distribution, a result that suggests important benefits beyond tax and time savings that motivate taxpayers to pay for tax advice.

## 7 Alternative specifications

### 7.1 Full sample including self-preparers and paid preparers while controlling for sample selection bias

In the previous section, we study a sample of paid preparers. Now, we take one step back and analyze a larger subsample with positive non-business income that also includes those with zero pecuniary tax preparation expenses – self-preparers. In our data set, 15% of taxpayers report tax preparation expenses every year, and 75 to 78% of taxpayers with expenses in year  $t$  also have positive expenses in year  $t + 1$ .

Being a self-preparer or a paid preparer is a choice. Taxpayers make the binary decision  $D_i$  whether they want to pay for tax preparation. Only with  $D_i = 1$ , do taxpayers decide on the level of expenses. Conditional on  $D_i = 0$ , self-preparation efforts are not observed. This means that there are two regimes - treatment ( $D_i = 1, TP_i > 0$ ) and nontreatment ( $D_i = 0, TP_i = 0$ ). The dependent variable tax liability is always observed. As long as we interpret estimates only as the effect for the subsample with  $D_i = 1$ , we do not have to be concerned with this selection bias as  $TP_i$  is plausibly exogenous in this subsample. However, if we want to estimate effects for all taxpayers, including self-preparers, we

<sup>11</sup>In case of joint filing, we use 2,730 hours, i.e., we assume that in case one spouse does not work at all, it works the same number of hours in home production / household work and that this time is equally valued as labor hours of the employed spouse.

use two different approaches to account for the potentially endogenous choice between self-preparation and paid preparation. First, we estimate a fixed-effects panel regression on the full sample. Second, we estimate a two-stage treatment effects model, which is, in principal, parallel to the analysis of Long and Caudill (1987). Because an extension of the sample correction with individual fixed effects requires a different econometric approach with additional assumptions (see Vella 1998 for an overview), we estimate, following previous literature, the two-stage model without individual fixed effects.

Using a fixed-effects regression, the sample selection does not result in biased estimates as long as the omitted taxpayer and tax case characteristics that affect the preparation mode change between but not within taxpayers. In this case, the individual-specific component captures the omitted variables, which is plausible for many reasons, such as tax skills, risk aversion, wealth and perceived inconvenience of time spent on taxes. However, this approach is arguably unable to address the complexity of the tax case.

To address this limitation, we control for several observable tax case characteristics, but we cannot rule out the effects of one-time unobservable tax case characteristics. Table 8 displays the regression results for three different regressions. We use three different independent variables to measure the effect on tax liability. These three variables include a dummy if paid preparation expenses are reported (column 1), a dummy if paid preparation expenses exceed 100 Euros (column 2) and the continuous measure of tax preparation expenses as reported in the tax return column (3).

[table 8 about here]

Again, all three tax preparation variables have a significantly negative effect on tax liabilities. Both binary paid preparation measures predict considerable reductions of tax liabilities with paid preparation predicting 64 Euros in tax savings and paid preparation with expenses above 100 Euros predicting tax savings of 121 Euros. The results with tax preparation expenses as the independent variable (column 3) are consistent with our baseline estimate. That is, for this broader sample, there is still a significant negative link between tax preparation expenses and tax liabilities. However, the effect is lower on a lower p-value than in the baseline estimate, and thus, the results suggest that a 1 Euro tax preparation expense decreases tax liabilities by 0.08 Euros, which is significantly different from zero with a p-value of 2.5%. This points towards a lower effect of additional tax preparation expenses among all taxpayers than among paid preparers. Nevertheless, the results are still in line with our prior outcomes.

To strengthen the former results, we run, as a second approach, a two-stage estimation to account for sample selection. There are two ways to model the sample selection equation, either with a probit model with  $D_i$  as an endogenous binary treatment variable or as a tobit model with  $TP_i$  as an endogenous continuous treatment variable. For a comparison with previous literature, in particular Long and Caudill (1987), and as the more parsimonious representation, we employ  $D_i$  as an endogenous binary treatment variable. The first stage estimates the probability of using paid preparation. In the second stage, with tax liability as the dependent variable, the estimates are obtained augmenting (1) with the estimated inverse Mills ratio. This is known as an endogenous treatment model, which is closely related to the Heckman sample selection model (Vella 1998). Using maximum likelihood, the tax liability equation is jointly estimated with the probit model of self-preparation vs. paid preparation. As complexity is a main factor in the tax preparation choice, we include a complexity proxy in the selection equation as an exogenous covariate, which affects  $D_i$  but only indirectly affects tax liabilities. Therefore, we do not have to rely solely on the functional form for identification. We use the number of tax forms filled out by the taxpayer as complexity proxy. This variable can be calculated because the tax statistics include a complete list of items in taxpayers' tax accounts. Such a proxy has previously been used by, for example, Christian et al. (1993). The advantage of this model is that it provides a between taxpayer analysis that takes into account sample selection through a separate estimation using exogenous variation in tax complexity. The disadvantages are that it does not exploit the panel structure of our data set and that it is based on a specific structural form of tax preparation choice.

To achieve convergence of the model with the large number observations, we exclude the top and bottom centile of tax liabilities and total positive income. Table 9 displays the results.

[table 9 about here]

The results support our previous results and the findings of Long and Caudill (1987) of a negative link between paid tax preparation and tax liabilities. A likelihood ratio test suggests the appropriateness of the two-stage model. The results of the selection equation suggest that tax complexity is a main factor in the choice of paid preparation. Further, the income level, diversity in types of income, church membership and age positively affect paid preparation, while marriage, children and status as a public employee encourage self-preparation.

## 7.2 Alternative tax liability measures

In the following, we present a complimentary analysis of the panel data using two alternative tax liability measures.

First, we calculate a counterfactual tax liability simulating the case of non-deductibility of tax preparation expenses. This measure has the advantage of being able to disentangle the effect of the deductibility of tax preparation expenses from other effects. Notably, there is no time lag in the deductibility effect as tax preparation expenses save taxes in the year paid and itemized in the tax return. Hence, the tax saving effect of paid preparation and the deductibility of tax preparation expenses affect the tax liability in different years.

Second, we include the church tax in the tax liability. The tax authorities collect the church tax jointly with the income tax in case the taxpayer is a member of one of the Christian churches entitled to levy the tax. The church tax liability is calculated by a regionally varying percentage of the income tax liability. It can be avoided by officially leaving the community, which is followed by the subsequent excommunication from the church. The previous analysis excludes the church tax due to its quasi-voluntary nature. However, reducing church tax liabilities may be an additional motivation for some taxpayers to pay for tax preparation.

Table 10 displays the results. Columns (1) and (2) display the regression results using the counterfactual tax liability as a dependent variable in the cross sectional and panel model. An increase of tax preparation expenses by 1 Euro predicts a decrease of the counterfactual tax liability by .57 Euros (OLS) or .27 (fixed effects). This result, in accordance with the baseline estimate, illustrates that accounting for the deductibility of tax preparation expenses does not alter the significance of the estimated tax saving effect. Analyzing the quintile subsamples, we obtain income-increasing OLS estimates for the 1st to 5th quintiles (-.25, -.23, -.36, -.33, -.52, respectively, and all significant at a 1% level). For the fixed-effects regression, only the effect for the top-income quintile is significant (-.25, p-value<1%). The effect is similar to the baseline estimates across income groups.

[table 10 about here]

Columns (3) and (4) display the regression results using the tax liability including the church tax as a dependent variable. An increase in tax preparation expenses by 1 Euro predicts a decrease of the tax liability by .77 Euros (OLS) or .28 (fixed effects). This implies a slightly higher benefit associated with tax preparation

if one also considers the church tax. Across income quintiles, we obtain parallel results to the baseline estimate.

### 7.3 Instrumental variable regressions

In the following, we address the endogeneity concerns by proposing an instrumental variable (IV) approach. An IV has two attributes. First, it has an effect on tax preparation expenses. This is the relevance condition. Second, it has no effect on tax liabilities other than through an effect on tax preparation. This is the exclusion restriction. An IV approach allows us to exploit exogenous variation to identify the effect of tax preparation expenses on tax liabilities. It complements our previous analyses because it permits us to address potential endogeneity of tax preparation expenses within taxpayers, for example, due to reverse causality. A disadvantage of this approach is that it allows only to identify the average effect of tax preparation expenses for those who change their behavior for a change in the IV.

Our mean idea behind the IV-approach is to exploit an exogenous variation in the institutional environment of early childcare. In Germany, childcare below the age of three is predominantly performed at home. This changes when children enter kindergarten, the German community-based preschool educational institution which usually begins at the age of three. In Germany, attending a kindergarten is not mandatory, but it is partly or wholly funded and there is a legal entitlement. The official statistics report an eight percent ratio of children between the ages of one and three in available day care sites. In contrast, the ratio is 90 percent for children between the ages of three and six in available day care locations (Destatis 2004).

As an IV, we propose to use a binary variable that captures whether the individual has at least one child aged two years or younger (6.0 percent of our sample). To capture variations in the childcare, we add an additional control variable, i.e., whether the taxpayer has children six years of age or younger (11.7 percent of our sample). The significant gap in childcare between very young children and children aged three years or beyond implies a substantial variation in parental time. A reduction in remaining leisure time positively affects the individual valuation to pay for time savings. This eventually affects the tax preparation expense decision because it exchanges a time burden with a pecuniary burden. The partial correlation coefficient between tax preparation expense and the IV is positive and weakly significant at a 10% level.

Regarding the exclusion restriction, we adjust the dependent variable by calculating a counterfactual tax liability and excluding all deductions potentially



related to having very young children. This includes deductions of extraordinary expenses for child care, deductible alimony payments, household help and other unspecified extraordinary expenses. Accordingly, we remove the direct link between the dependent variable and the instrument, and we control for indirect links between observable characteristics, such as the positive correlation between the IV and being younger than 30 years of age (partial  $r=.07$ ) or being married (partial  $r = .04$ ) as well as the near non-correlation with income. The gap in child day care between age groups implies a different time and pecuniary environment, while taxpayers are likely similar on other dimensions given that they differ solely by a time lag of a maximum of four years in the decision to give birth. This implies a nearly random assignment to groups and exogeneity regarding the conditional tax liability.

In a 2SLS regression on our panel data, displayed in table 11 , we yield an insignificant estimate of effect of tax preparation coefficient. This suggests no local effect of tax preparation expenses on tax liabilities. Note that our IV approach identifies the average effect of tax preparation only for those induced to account in their behavior for a change of the IV. Interpreting the 2SLS results as the marginal effect for the full sample requires that there is no heterogeneity in tax preparation behavior between the subsample and the full sample. The IV analysis should, therefore, be viewed exploratory and, as such be interpreted cautiously.

[table 11 about here]

#### 7.4 Persistent effects of tax preparation expenses

A potential concern with regression (1) is that it captures only the effect of expenses for the related tax return and does not capture effects of tax preparation expenses for the following years. For example, a taxpayer may use the information acquired by paid preparation for self-preparation in the following year. Another aspect is that experience in repeated paid preparation may result in change fees over time even though the preparation process remains identical. Moreover, the deductibility of tax preparation expenses is applicable to the year paid, which does not match with the prepared return for which the expenses are incurred. To assess persistent effects of tax preparation expenses, we estimate (1) with the tax preparation expenses of one year before the actual fiscal year as an additional regressor. We obtain neither a significant OLS nor a fixed-effects result. This suggests that it is really the tax preparation expense incurred for the respective return that has an effect on tax liabilities.

## 7.5 Effects of different tax assistance types

We address the concerns that our results differ between taxpayers hiring a professional tax advisor and those investing in membership fees of wage tax help associations or simply buying tax software. Therefore, we construct a subsample that includes only taxpayers with tax preparation expenses above 100 Euros. This analysis presumably includes all taxpayers who seek professional tax advice from licensed tax advisors and excludes taxpayers who only take assistance from semi-professional advisors or from tools such as handbooks or software. The cutoff reduces the sample size to 165,569 observations. The estimated coefficient of tax preparation is  $-.83$  in the OLS regression, which represents an increase over the baseline result. The fixed-effects estimate is  $-.22$ , i.e., virtually unchanged. This result remains also robust for higher cut-off points. For a cut-off of 200 Euros and 120,774 observations, we obtain an estimate of  $-.79$  (OLS) and  $-.21$  (fixed effects).

## 7.6 Transformation of main variables

Because our results may be affected by the distribution of income and tax expenses, we re-run regression (1) using transformed measures of tax liabilities, tax preparation expenses and total positive TPI. Specifically, we use the centile categories of the three variables. In this way, we account for outliers and long tails and have better control over the variances. The disadvantage is losing the interval property of measurement and the emphasis on differences in the middle of the distribution, while the influence of differences in the tails is minimized. The predicted OLS effect is  $-.028$ . Increasing the centile of tax preparation expenses by 1 predicts a decrease in the tax liability of  $-.028$  centiles. Within taxpayers, the predicted effect is  $-.009$ . Both regressions yield significant estimates, thus illustrating the robustness of our results to outliers.

## 7.7 Taxpayer types

To address the concerns of an effect of taxpayer heterogeneity on the effect of tax planning, we run separate regressions by taxpayer type. We differentiate eight mutually exclusive types determined by three variables: (1) income (above vs. below median income), (2) income from renting and leasing (non-zero vs. zero), and (3) income from financial assets (non-zero vs. zero). In all eight OLS regressions, we observe a significant tax saving effect of tax preparation expenses. In the OLS, we obtain the strongest effect for taxpayers with zero income from financial assets as well as zero income from renting and leasing. Despite the

small sample size limitations, we obtain a significant tax saving effect in the fixed-effects regression for three of the eight groups – zero rent and financial income with income below the median, zero rent and financial income with income above the median, and positive rent and financial income with income above the median.

## 8 Conclusion

Using German tax return data, we study the link between tax preparation expenses and tax savings. In contrast to most previous research, we control for unobserved differences between taxpayers by studying a panel data set. We find a significant negative link between tax preparation expenses and estimated tax savings. Specifically, one additional Euro yields estimated tax savings of 72 cents in an OLS regression and 24 cents in a fixed-effects regression. The inclusion of individual fixed effects reduces the magnitude of the tax preparation expenses coefficient by two-thirds, which indicates a substantial upward bias in analyses based on the cross-section data. Income dependence of tax and time saving benefits are the result of a combination of deductibility of tax preparation expenses, progressive income tax scales and income-dependent valuation of opportunity cost. However, combined tax and time savings do not exceed expenses for any income quintile. To comment on the advertising claims in the first paragraph of this paper, the combination of tax and time savings alone renders the expenses not worthwhile.

This indicates that in addition to the tax saving effect, there are other important factors driving the tax preparation choice. It is a limitation of our approach that we cannot distinguish between different components of observed tax preparation expenses. A rational story explaining the result is the compliance function of tax preparation. Benefits beyond tax and time savings include, for example, a reduction in informational barriers, avoidance of compliance errors and uncertainty in preparing an accurate return. Further, perception of time spent on tax matters and the inconvenience involved are subjective and may vary considerably across taxpayers. Therefore, the individual value of time savings may often exceed labor wages. Further, some of the financial benefits of tax preparation expenses may be obtained in future years and tax preparation may also affect income shifting. A behavioral story with reference to Prospect Theory is that taxpayers may see tax savings as a loss reduction and accordingly attach a high importance to them (Lozza et al. 2010). Taken together, our results point toward heterogeneous motivations.

It is important to note that the econometric findings are based on the German institutional context. As there are certain institutional differences between the European and North American tax preparation service markets, our analysis of tax preparation expenses adds a new angle to the existing U.S.-based literature. It remains a task for future research to study the effects of preparation expenses in other institutional contexts, as it would be interesting to see whether the effects we observe also hold in other markets.

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Table 1: Summary statistics of German tax return data [thousand of Euro]

	Mean	Std. Dev.	25% Perc.	Median	75% Perc.	Observations
<b>Dataset 1: Panel 2001-04 German Taxpayer Panel</b>						
Weighted sample, positive TPI, without business or freelance income:						
Total positive income (TPI)	39.1	28.4	23.3	34.0	49.7	1,534,416
<i>employed labor</i>	37.3	26.8	21.6	33.0	48.9	1,534,416
<i>financial assets</i>	0.9	9.6	0.0	0.0	0.0	1,534,416
<i>renting and leasing</i>	0.2	6.1	0.0	0.0	0.0	1,534,416
<i>miscellaneous</i>	0.7	2.8	0.0	0.0	0.0	1,534,416
Tax liability*	6.2	10.1	1.2	4.1	8.2	1,534,416
Tax preparation expenses	0.05	0.23	0.0	0.0	0.0	1,534,416
Weighted sample, positive TPI and tax preparation expenses, without business or freelance income:						
Total positive income (TPI)	45.9	38.7	26.0	38.7	57.4	222,584
<i>employed labor</i>	41.1	34.5	21.3	35.9	55.3	222,584
<i>financial assets</i>	2.4	17.9	0.0	0.0	1.7	222,584
<i>renting and leasing</i>	0.9	12.0	0.0	0.0	0.0	222,584
<i>miscellaneous</i>	1.5	4.2	0.0	0.0	1.3	222,584
Tax liability*	7.9	15.1	1.5	5.0	10.0	222,584
Tax preparation expenses	0.24	0.51	0.08	0.14	0.27	222,584
<b>Dataset 2: Cross-section 2004</b>						
Weighted sample, positive TPI, without business or freelance income:						
Total positive income (TPI)	35.1	26.9	18.0	30.1	45.7	2,019,255
<i>employed labor</i>	33.4	27.0	15.8	29.2	44.9	2,019,255
<i>financial assets</i>	0.7	4.0	0.0	0.0	0.0	2,019,255
<i>renting and leasing</i>	0.2	5.4	0.0	0.0	0.0	2,019,255
<i>miscellaneous</i>	0.8	2.6	0.0	0.0	0.0	2,019,255
Tax liability*	5.3	8.3	0.3	3.1	7.1	2,019,255
Tax preparation expenses	0.04	0.25	0.0	0.0	0.0	2,019,255
Weighted sample, positive TPI and tax preparation expenses, without business or freelance income:						
Total positive income (TPI)	42.0	32.5	22.4	34.9	53.3	423,279
<i>employed labor</i>	38.4	32.7	18.3	32.9	51.5	423,279
<i>financial assets</i>	1.5	7.0	0.0	0.0	0.4	423,279
<i>renting and leasing</i>	0.8	9.2	0.0	0.0	0.0	423,279
<i>miscellaneous</i>	1.3	3.6	0.0	0.0	0.0	423,279
Tax liability*	6.9	11.1	0.8	4.0	8.8	423,279
Tax preparation expenses	0.22	0.52	0.05	0.12	0.24	423,279

\* income tax liability including solidarity surcharge

Table 2: Overview of covariates and sample mean (German Taxpayer Panel)

Short name	Description	Mean (panel)
Tax preparation	Monetary expenses itemized as tax preparation costs in the tax return as special items expenses. This includes monetary tax compliance costs, tax preparer fees, incidental expenses, fees for other tax advice and expenses for tax software and guides [thousand of Euro].	.241
TPI	Total positive income of individuals subject to income taxation before itemizing deductions, standard deductions or other tax expenditures [thousand of Euro].	45.9
TPI <sup>2</sup>	Squared TPI variable [in hundred of Euro].	21.1
TPI <sup>3</sup>	Cubic TPI variable [in ten thousand of Euro].	9.7
MTR	Hypothetical marginal tax rate calculated with TPI as tax base.	.33
Financial income	Dummy variable indicating if the taxpayer received non-zero income from financial assets, includes dividends and interest rate income.	.39
Misc. income	Dummy variable indicating if the taxpayer received non-zero miscellaneous income, includes pensions, received alimony and capital gains of short-term trading.	.29
Rent income	Dummy variable indicating if the taxpayer received non-zero income from renting and leasing.	.36
Mainly non-labor	Dummy variable indicating whether labor income (including wages and other compensation payments) is less than 50% of TPI.	.14
Joint	Dummy variable indicating if the taxpayer uses joint filing rather than single filing.	.62
Double income	Dummy variable indicating if the taxpayer receives double employee compensation (filer and spouse).	.32
Children	Categorical variable number of children (with maximum 4 children).	.64
Surrogate income	Dummy variable indicating if the taxpayers receives surrogate income such as unemployment or short-time worker benefits or maternity and sickness allowances.	.18
Public employee	Dummy variable indicating if one of the persons of joint filing or the single filing taxpayer works as a public employee.	.30
Church member	Dummy variable indicating if one of the persons of joint filing or the single filing taxpayer is member of a Christian church entitled to levy church tax.	.74
East Germany	Dummy variable indicating if the taxpayer lives in East Germany including Berlin.	.12
Female	Dummy variable indicating if the filing taxpayer is female	.21
Age<30	Dummy variable indicating if the filing taxpayer is younger than 30 years.	.04
30≤age<40	Dummy variable indicating if the filing taxpayer is between 31 and 40 years.	.16
50≤age<60	Dummy variable indicating if the filing taxpayer is between 51 and 60 years.	.25
Age≥60	Dummy variable indicating if the filing taxpayer is older than 61 years.	.31

Table 3: Correlation table of covariates (German Taxpayer Panel)

	Tax	TP	MTR	TPI	TPI <sup>2</sup>	TPI <sup>3</sup>	Fin	Mis	Ren	Lab	Joi	Chi	Surr	Dln	Chu	Pub	Eas	Fem	A30	3040	5060	
Tax liability	1.00																					
Tax preparation	0.23	1.00																				
MTR	0.09	0.02	1.00																			
TPI	0.95	0.24	0.11	1.00																		
TPI <sup>2</sup>	0.50	0.12	0.01	0.49	1.00																	
TPI <sup>3</sup>	0.29	0.06	0.00	0.31	0.93	1.00																
Financial income	0.07	0.21	0.01	0.08	0.01	0.00	1.00															
Misc. Income	-0.18	0.14	-0.06	-0.22	-0.01	0.00	0.32	1.00														
Rent income	0.09	0.22	0.01	0.10	0.01	0.00	0.27	0.16	1.00													
Mainly non-labor	-0.11	0.20	-0.06	-0.18	0.00	0.00	0.35	0.57	0.26	1.00												
Joint	0.10	-0.01	-0.03	0.27	0.01	0.00	-0.10	0.04	0.04	-0.15	1.00											
Children	0.10	-0.06	0.02	0.18	0.01	0.00	-0.19	-0.35	-0.07	-0.25	0.31	1.00										
Surrogate income	-0.07	-0.06	-0.03	-0.09	-0.01	0.00	-0.11	-0.14	-0.07	-0.13	0.16	0.04	1.00									
Double income	0.16	-0.05	0.02	0.29	0.01	0.00	-0.14	-0.28	-0.04	-0.25	0.53	0.21	0.16	1.00								
Church member	-0.01	0.00	0.00	0.02	0.00	0.00	0.04	0.01	0.06	0.02	0.06	-0.01	-0.06	0.02	1.00							
Public employee	-0.04	0.03	0.00	0.00	0.00	0.00	0.17	0.31	0.04	0.02	0.02	-0.13	-0.15	0.01	0.04	1.00						
East Germany	0.10	0.00	-0.01	0.06	0.03	0.01	-0.08	-0.03	-0.07	-0.06	0.03	0.04	0.12	0.07	-0.24	-0.10	1.00					
Female	-0.11	0.05	0.00	-0.22	-0.01	0.00	0.15	0.26	0.01	0.24	-0.63	-0.22	-0.14	-0.35	-0.02	0.08	-0.02	1.00				
Age<30	-0.05	-0.05	-0.01	-0.09	-0.01	0.00	-0.09	-0.13	-0.11	-0.07	-0.19	-0.10	0.01	-0.10	0.01	-0.10	-0.01	0.04	1.00			
30≤age<40	0.01	-0.07	0.02	0.00	0.00	0.00	-0.14	-0.26	-0.11	-0.17	-0.06	0.16	0.03	0.00	-0.01	-0.17	0.00	-0.06	-0.09	1.00		
50≤age<60	0.08	-0.02	0.02	0.11	0.01	0.00	-0.07	-0.19	0.00	-0.17	0.13	-0.02	0.11	0.15	-0.03	-0.07	0.05	-0.08	-0.12	-0.25	1.00	
Age≥60	-0.13	0.16	-0.05	-0.16	0.00	0.00	0.36	0.72	0.20	0.52	-0.06	-0.39	-0.12	-0.24	0.04	0.41	-0.08	0.20	-0.14	-0.29	-0.38	1.00

Table 4: Baseline regression estimates, sample only paid-preparers

Column:	(1)		(2)		(3)	
Data:	Cross section 04		Panel 2001-04		Panel 2001-04	
Dependent variable:	Tax liability		Tax liability		Tax liability	
Type:	OLS		OLS		OLS	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Tax preparation	-0.676**	0.032	-0.721**	0.123	-0.243*	0.097
TPI	0.319**	0.007	0.376**	0.006	0.391**	0.006
TPI <sup>2</sup>	0.045**	0.004	0.005**	0.002	0.004**	0.001
TPI <sup>3</sup>	-0.004**	0.001	-0.000*	0.000	-0.000**	0.000
MTR	-0.158**	0.006	-0.348**	0.125	-0.100**	0.037
Financial income	-0.327**	0.010	-0.825**	0.050	-0.404**	0.019
Misc. income	-0.407**	0.015	0.440**	0.058	0.012	0.060
Rent income	0.028**	0.011	-0.057	0.034	-0.039	0.046
Mainly non-labor	0.232**	0.019	2.098**	0.083	2.280**	0.110
Joint	-5.002**	0.064	-4.081**	0.050	-3.868**	0.082
Children	-0.274**	0.005	-0.405**	0.012	-0.266**	0.023
Surrogate income	0.592**	0.016	1.589**	0.072	1.029**	0.038
Double income	-0.791**	0.019	-1.529**	0.070	-1.619**	0.067
Church member	-0.340**	0.012	-0.216**	0.014	-0.021	0.064
Public employee	-0.711**	0.010	-0.724**	0.015	0.036	0.049
East Germany	0.047**	0.009	1.379**	0.036	0.309	0.421
Female	-0.169**	0.013	-0.042	0.024		
Age<30	0.610**	0.016	0.327**	0.054	0.225**	0.061
30≤age<40	0.651**	0.017	0.027	0.021	0.060	0.031
50≤age<60	0.591**	0.016	-0.051*	0.019	-0.118**	0.027
Age≥60	0.721**	0.017	-0.401**	0.026	0.090	0.047
Constant	0.557**	0.031	-6.310**	0.212	-7.715**	0.247
Year fixed effect	No		Yes		Yes	
Individual fixed effect	No		No		Yes	
Observations	423,279		222,305		222,305	
R-squared	0.968		0.945		0.933	

Robust standard errors, in the fixed-effects regression clustered at the individual level. \*\* p<.01, \* p<.05

Table 5: Tax compliance survey sample based on Blaufus et al. (2013), overview of outcome variable and covariates

Short name	Description	Mean
Time burden	Number of hours an individual spends on the preparation of his tax return including collection of receipts.	9.01
Dummy professional tax advice	Dummy variable indicating if a taxpayers uses professional tax advice.	.44
Mid income & single	Dummy variable indicating if the taxpayers is single and receives a monthly taxable income in the mid tertile.	.18
High income & single	Dummy variable indicating if the taxpayers is single and receives a monthly taxable income in the top tertile.	.08
Low income & married	Dummy variable indicating if the taxpayers is married and receives a monthly taxable income in the lowest tertile.	.22
Mid income & married	Dummy variable indicating if the taxpayers is married and receives a monthly taxable income in the mid tertile.	.17
High income & married	Dummy variable indicating if the taxpayers is married and receives a monthly taxable income in the top tertile.	.19
Age<30	Dummy variable indicating if the filing taxpayer is younger than 30 years.	.07
30≤age<40	Dummy variable indicating if the filing taxpayer is between 31 and 40 years.	.23
50≤age<60	Dummy variable indicating if the filing taxpayer is between 51 and 60 years.	.29
Age≥60	Dummy variable indicating if the filing taxpayer is older than 61 years.	.08
Female	Dummy variable indicating if a taxpayer is female.	.43
Child	Dummy variable indicating if a taxpayer has children.	.35
East Germany	Dummy variable indicating if the taxpayer lives in East Germany including Berlin.	.47

Weighted-averages as in Blaufus et al. (2013), weights adjust attributes of the survey sample regarding the German statistical yearbook 2008.

Table 6: Regression estimates equation (2) for paid preparation on tax preparation time burden, survey sample based on Blaufus et al. (2013)

Dependent variable: Type:	Time burden [hours]	
	OLS	
	Coeff.	SE
Dummy professional tax advice	-4.981***	1.341
Mid income & single	0.958	2.312
High income & single	3.276	2.913
Low income & married	1.410	2.088
Mid income & married	3.079	2.457
High income & married	3.575	2.300
Age<30	-4.882**	1.976
30≤age<40	-2.499	1.701
50≤age<60	-1.576	1.900
Age≥60	-0.867	3.194
Female	-1.097	1.376
Child	-0.613	1.691
East Germany	0.844	1.365
Constant	11.034***	2.535
Observations		337
R-squared		.08

Robust standard errors in parentheses, \*\*\* p<.01, \*\* p<.05, \* p<.1  
Weighted as in Blaufus et al. (2013).

Table 7: Subsamples by income group - average predicted return on investments in tax planning

	Total:	Subsamples by income group:				
		<.20	.20-.40	.40-.60	.60-.80	>.80
Average pecuniary tax planning	240.72	217.14	.200.24	202.11	217.30	366.81
Estimations based on equation (1):						
Tax preparation expenses	-721** (.123)	-.303** (.052)	-.342** (.044)	-.547** (.052)	-.503** (.072)	-.667** (.260)
Observations (weighted)	222,584	46,112	32,760	29,310	29,956	84,167
Tax savings [Euro]*	173.55	65.90	68.49	110.62	109.40	244.56
Implied net financial position	-67.1	-151.25	-131.76	-91.49	-107.90	-122.24
Time savings [hours]**	4.56	4.26	4.65	4.56	4.62	4.73
Average hourly wage†	12.73	5.14	8.77	11.90	14.99	22.87
Time savings [Euro]	58.11	21.90	40.73	54.29	69.21	108.21

Overall net effect: -9.06 -129.35 -91.02 -37.20 -38.69 -14.04

Robust standard errors in parentheses, \*\*\* p<.01, \*\* p<.05, \* p<.1

\* Average of predicted tax savings, using the subsample estimates of the effect of tax planning investment in equation (1) multiplied with subsample average pecuniary investments.

\*\* Average of predicted time savings, using the subsample average of estimated hourly wages using the coefficients of (2) on the panel data set.

† Average of individual after-tax income divided by 1,365 (single filers) or 2,730 (joint filers) - corresponds to average yearly working hours

Table 8: Fixed-effects panel regression estimates, sample including self-preparers and paid-preparers

Column	(1)		(2)		(3)	
Data	Panel 2001-04		Panel 2001-04		Panel 2001-04	
Dependent variable:	Tax liability		Tax liability		Tax liability	
Type:	OLS		OLS		OLS	
Indep. variable	Coeff.	SE	Coeff.	SE	Coeff.	SE
Dummy paid preparation	-0.064**	0.006				
Dummy tax preparation > 100 Euro			-0.121**	0.008		
Tax preparation					-0.085*	0.038
TPI	0.364**	0.004	0.364**	0.004	0.364**	0.004
TPI <sup>2</sup>	0.002**	0.001	0.002**	0.001	0.003**	0.001
TPI <sup>3</sup>	0.000**	0.000	0.000**	0.000	0.000**	0.000
MTR	-0.111**	0.016	-0.111**	0.016	-0.111**	0.016
Financial income	-0.334**	0.007	-0.333**	0.007	-0.334**	0.007
Misc. Income	0.120**	0.027	0.121**	0.027	0.120**	0.027
Rent income	-0.038**	0.015	-0.034*	0.015	-0.039**	0.015
Mainly non-labor	2.549**	0.054	2.548**	0.054	2.550**	0.054
Joint	-3.535**	0.038	-3.536**	0.038	-3.535**	0.038
Children	-0.198**	0.006	-0.198**	0.006	-0.199**	0.006
Surrogate income	0.927**	0.022	0.927**	0.022	0.927**	0.022
Double income	-1.419**	0.039	-1.419**	0.039	-1.419**	0.039
Church member	-0.021	0.013	-0.021	0.013	-0.022	0.013
Public employee	0.039**	0.015	0.039**	0.015	0.039**	0.015
East Germany	-0.171**	0.032	-0.171**	0.032	-0.170**	0.032
Age<30	-0.019	0.016	-0.019	0.016	-0.019	0.016
30≤age<40	-0.052**	0.009	-0.051**	0.009	-0.052**	0.009
50≤age<60	0.013	0.009	0.013	0.009	0.013	0.009
Age≥60	0.210**	0.020	0.210**	0.020	0.210**	0.020
Constant	-6.118**	0.138	-6.118**	0.138	-6.127**	0.138
Year fixed effect	Yes		Yes		Yes	
Individual fixed effect	Yes		Yes		Yes	
Observations	1,530,245		1,530,245		1,530,245	
R-squared	0.918		0.918		0.918	

Robust standard errors, clustered at the individual level. \*\* p<.01, \* p<.05

Table 9: Treatment effects regression maximum likelihood estimation, accounting for self-selection of paid-preparation

Data Dependent variable: Indep. variable	<b>Second stage</b>		<b>Selection stage</b>	
	Panel 2001-04 Tax liability		Panel 2001-04 Dummy tax prep.	
	Coeff.	SE	Coeff.	SE
Dummy tax preparation	-0.576**	0.009		
Number of forms			0.127**	0.002
TPI	0.087**	0.001	0.023**	0.001
TPI <sup>2</sup>	0.003**	0.000	-0.000**	0.000
TPI <sup>3</sup>	-0.000**	0.000	0.000**	0.000
MTR	0.001	0.005	0.004	0.002
Financial income	-0.333**	0.004	0.085**	0.004
Misc. Income	-0.254**	0.005	0.065**	0.006
Rent income	0.001	0.004	0.243**	0.004
Mainly non-labor	0.590**	0.006	0.262**	0.006
Joint	-2.968**	0.004	-0.112**	0.005
Children	-0.284**	0.002	-0.027**	0.002
Surrogate income	0.459**	0.003	0.120**	0.004
Double income	-0.605**	0.004	-0.008*	0.004
Church member	-0.115**	0.003	0.206**	0.003
Public employee	-0.469**	0.003	-0.020**	0.004
East Germany	-0.223**	0.003	-0.129**	0.004
Female	-0.209**	0.004	-0.005	0.004
Age<30	-0.544**	0.004	-0.130**	0.006
30≤age<40	-0.038**	0.003	-0.061**	0.004
50≤age<60	-0.031**	0.004	0.086**	0.004
Age≥60	-0.394**	0.006	0.126**	0.006
Constant	-0.017*	0.009	-1.920**	0.011
Lambda	0.243**	0.005		
Rho	0.191**	0.004		
Observations		1,355,244		

Robust standard errors, \*\*p<.01, \* p<.05



Table 10: Regression estimates of (1) using alternative dependent variables itemized deductions, counterfactual tax liability with no deductibility of tax planning expenses and tax liability including church tax liability

Data Dependent variable: Type: Column:	Panel 2001-04				Panel 2001-04			
	Simulated tax liability				TL incl. church tax			
	OLS		OLS		OLS		OLS	
	(1)		(2)		(3)		(4)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Tax preparation	-0.566**	0.090	-0.269**	0.088	-0.767**	0.118	-0.282*	0.116
TPI	0.379**	0.006	0.392**	0.006	0.391**	0.006	0.406**	0.006
TPI <sup>2</sup>	0.005**	0.002	0.004**	0.001	0.005**	0.002	0.004**	0.001
TPI <sup>3</sup>	-0.000*	0.000	-0.000**	0.000	-0.000*	0.000	-0.000**	0.000
MTR	-0.348**	0.125	-0.100**	0.037	-0.350**	0.129	-0.102**	0.038
Financial income	-0.823**	0.050	-0.404**	0.019	-0.851**	0.050	-0.419**	0.019
Misc. Income	0.448**	0.058	0.016	0.060	0.434**	0.058	0.002	0.062
Rent income	-0.039	0.033	-0.026	0.046	-0.066	0.034	-0.045	0.048
Mainly non-labor	2.110**	0.081	2.277**	0.110	2.164**	0.083	2.374**	0.115
Joint	-4.116**	0.050	-3.885**	0.082	-4.239**	0.050	-4.024**	0.084
Children	-0.407**	0.012	-0.266**	0.023	-0.459**	0.012	-0.323**	0.024
Surrogate income	1.608**	0.072	1.035**	0.039	1.641**	0.072	1.063**	0.039
Double income	-1.547**	0.070	-1.628**	0.068	-1.577**	0.070	-1.669**	0.069
Church member	-0.214**	0.014	-0.018	0.064	0.052**	0.014	0.214**	0.066
Public employee	-0.725**	0.015	0.036	0.049	-0.733**	0.016	0.037	0.051
East Germany	1.386**	0.037	0.292	0.422	1.456**	0.037	0.313	0.427
Female	-0.032	0.024			-0.037	0.024		
Age<30	0.332**	0.055	0.223**	0.061	0.315**	0.055	0.228**	0.064
30≤age<40	0.027	0.021	0.059	0.031	0.026	0.022	0.063	0.032
50≤age<60	-0.049**	0.019	-0.117	0.027	-0.034	0.019	-0.131**	0.028
Age≥60	-0.390**	0.025	0.094*	0.047	-0.387**	0.027	0.082	0.049
Constant	-6.375**	0.214	-7.714**	0.253	-6.742**	0.212	-8.129**	0.255
Year fixed effect	Yes		Yes		Yes		Yes	
Individual fixed effect	No		Yes		No		Yes	
Observations	222,305		222,305		222,305		222,305	
R-squared	0.945		0.933		0.946		0.931	

Robust standard errors, in the fixed-effects regression clustered at the individual level.

\*\* p<.01, \* p<.05

Table 11: IV-Regression estimates equation (1) using binary variable having a child $\leq 2$  years as instrument

Dependent variable:	First stage regression Tax preparation expenses	IV-regression Counterfactual tax liability
IV: having a child $\leq 2$ years	0.0066* 0.0036	
Tax preparation		6.576 (6.449)
Controls <sup>†</sup>	Yes	Yes
Year fixed effects	Yes	Yes
Observations	222,305	222,305
R-squared	0.151	0.895

<sup>†</sup> Same control variables as in table 4.

Robust standard errors in parentheses, \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

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