

Does Unequal Tax Burden Contribute to Women-Owned Businesses Leaving the Tax Net?

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Abstract

This study investigates gender disparities in the tax burden in Addis Ababa, Ethiopia, using data on 2,320 taxpayers for 2011 and 2012. A quantile regression analysis is employed to control for firm characteristics such as sector, size, and age. The results show that women-owned businesses are more likely to operate in low-profit sectors and report lower sales and tax liabilities than men-owned businesses. However, women-owned businesses pay as much

as men-owned businesses in taxes, suggesting that they are subject to a higher effective tax rate. This, in turn, may lead to women-owned businesses exiting the tax net at a higher rate. These findings suggest that gender disparities in tax compliance are not simply due to differences in firm characteristics but may also be due to biases in tax declaration and enforcement processes.

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1. Introduction

Fairness in a tax system is a fundamental principle (see OECD, 2014). When examining the tax burden through a gender lens, it becomes evident that gender bias can give rise to inequitable tax burdens among taxpayers of different genders. Surprisingly, this issue has received limited attention from researchers and policymakers in developing countries, thereby affecting the core principles of taxation. Moreover, ensuring a just distribution of the tax burden is critical in optimizing the allocation of factors of production, including labor, capital, and land, ultimately enhancing productivity and tax collection. Societal factors such as social roles and norms can wield influence on how men and women interact with the tax system, as driving forces of the unequal tax burdens.

Gender bias in the tax system can result in adverse consequences, including discouraging women's participation in the formal economy, and hindering effective economic involvement, in so doing, reducing the tax base. Against this backdrop, the paper examines gender disparities in the tax burden of self-employed individuals in Ethiopia, placing emphasis on reported business income, income tax declarations and payments, and their implications for existing the formal economy.

Existing literature on taxation and gender identifies explicit and implicit biases in the tax system (i.e., the tax policy and administration) that can either exacerbate or mitigate gender differences. Explicit gender biases emerge when the tax code contains gender-based provisions (see OECD, 2022). Examples of such biases that contribute to gender disparities include requiring the husband's signature on a family return, providing tax credits for men, and imposing a higher tax burden on married women. Explicit bias is now less common, as most countries have reformed their tax system. In fact, some countries use explicit tax policies to reduce gender distortions and promote the inclusion of women in the economy (see OECD, 2022).

Implicit gender bias, on the other hand, may appear neutral on the sur-

face and does not use specific gendered language in the tax system. However, it arises when a tax policy or administration interacts with social arrangements, economic conditions, or behavioral differences between genders, inadvertently leading to a gender-biased tax system (see Barnett and Grown, 2004). Therefore, addressing implicit gender bias is an important area that necessitates further investigation and correction in order to realize the Sustainable Development Goal of gender equality and women's empowerment. Some examples of implicit gender bias in tax systems are higher taxation on goods and services used primarily by women, higher tax rates on second-income earners, and lower capital taxation (see OECD, 2022). Given that gender biases in the tax systems, whether explicit or implicit, runs counter to the fundamental principle of taxation (i.e., fairness), it is important to identify and address them.

The tax burden literature underscores the difficulty in precisely identifying how the profit tax burden is distributed. There is a notion that it often impacts employees, leading to a probable decrease in real wages. This trend is attributed to the mobility of capital, allowing it to relocate from countries with higher profit tax burdens (see Smith, 2015). However, this assumption relies on the presence of near-perfect factor markets for capital where it can easily cross borders while labor movement is restricted. In practice, gender-based disparities in tax burden can be traced to variations in tax compliance, divergent enforcement measures within tax administration, and tax structures that disproportionately affect one gender, among other factors. These discrepancies may stem from differences in income reporting, disparities in deductions claimed, and variances in eligibility for tax credits, all of which may be influenced by gender-related factors. Furthermore, tax administration practices, such as the frequency of audits and collection efforts, may inadvertently impact one gender more than the other. Recognizing and rectifying these gender-based inequities in tax burden is imperative for advancing both tax fairness and gender equality.

Understanding these gender differences in tax burdens and the roles of tax compliance, tax enforcement measures and tax structure in either exacerbating or mitigating gender bias is key to bridging the knowledge gap surrounding gender and taxation. Tax compliance and administration are critical for a robust tax system and have been areas of concern in developing countries (see Slemrod, 2019). The discussion above underscores the importance of data collection to monitor patterns of gender differences in tax compliance and administration. This data can inform efforts to correct biases within the tax system and promote a more equitable distribution of the tax burden.

Prior research has shown that women tend to exhibit higher levels of tax compliance compared to men (see Bruner et al., 2017; Cabral et al., 2021; D’Attoma et al., 2017; D’Attoma et al., 2020; Kastlunger et al., 2010). Grosch and Rau (2017) argue that these gender differences in honesty are influenced by the prosocial behavior of women. Their primary finding suggests a correlation between concern for others and honesty, with women generally displaying greater prosocial tendencies (i.e., showing concern for others) and honesty. Expanding on this, D’Attoma et al. (2020) conducted a laboratory experiment to investigate the role of social values in explaining gender disparities in tax compliance. They found that, while women tend to be more tax-compliant than men, the impact of social values on tax compliance varies from one country to another. They also posited that differences in risk aversion between men and women might be another contributing factor to these gender disparities in tax compliance.¹ Most studies use laboratory experiments to study gender differences in tax compliance. Laboratory experiments are well-suited for designing complex scenarios and are therefore undertaken in controlled environments. However, Kangave et al. (2021) argue that it is important to complement the results of laboratory experiments

¹D’Attoma et al. (2020) found that women, on average, report 73% of their income whereas men report only 48%.

with data from real-world settings. Cabral et al. (2021) used both survey and administrative data to conclude that self-employed people in New Zealand underreport their income by around 20%. They also found that men are more likely to underreport their income than women.

In the context of developing countries, there may be implicit gender biases in tax administration that affect how tax administrators interact with women-owned businesses. These biases can lead to differential treatment, such as intense scrutiny in assessment or women-owned business may face challenges in accessing tax incentives. Moreover, a well-established pattern suggests that women are less likely to resort to bribery when dealing with government employees to influence their decisions, according to Agerberg (2014). This will likely be the case even in tax-related affairs. This observation highlights the importance of looking deeper into the gender-based dynamics at play in such contexts. We could not find studies that investigate the presence of differential treatment by tax administrators of women-owned businesses in tax enforcement, but we consider it as a potential source of distortion in the tax burden.

In the context of Ethiopia, Yimam and Asmare (2020) found that women-owned businesses are less likely to be penalized for tax evasion after audit than male-owned businesses, indicating that women are more tax compliant. On the other hand, Ambel et al. (2021) conducted the first gender disaggregated business income taxation survey on households in Ethiopia. They found that women pay lower business income tax than men, but the study did not distinguish between taxpayers whose tax liability is determined by the authority and those who self-report their income and tax liabilities. In contrast, Mascagni and Mengistu (2016) and Bachas et al. (2022) focus on the tax burden without considering gender.

A significant gap remains in understanding the distribution of tax burden by gender. This paper addresses the under-explored issue of gender bias in business taxation for self-employed individuals, which is particularly relevant

in developing countries. The paper makes two contributions to the literature on gender and taxation. First, it provides a more comprehensive analysis of gender differences in business income tax burden by focusing on a broader set of indicators, including taxpayer behavior (declarations) and payments. This is made possible because of a rich set of administrative data on business characteristics, reported income and liabilities, and tax payments. This allows the paper to answer the question of whether the business income tax burden differs for men and women due to their own choices (as shown in their declarations) or as a result of tax enforcement decisions. Second, the paper examines gender differences in exiting the tax net for the first time, which can be linked to the tax burden. Future research can fill the gap by explaining the reasons for the differences in tax declarations and payments.

The paper is organized as follows. Section 2 reviews the structure of Ethiopia's tax policy and its implication for gender differences relying on the literature on gender and taxation. Section 3 discusses the data. Section 4 presents multivariate analysis results. Section 5 concludes.

2. The Structure of the Tax System and Its Implications for Gender

According to Ethiopian law, the business income tax applies to self-employed individuals. As per the law, businesses generate income from conducting business, operation, stock disposal, and services provision (see FDRE, 2016a). Self-employed individuals are liable to pay income tax on profits, which is the income left after deducting the cost of goods and services sold, as well as other expenses.

An important aspect of the Ethiopian business income tax administration is segmentation, a common approach to simplify tax administration in many countries (see Cleary et al., 2017). In Ethiopia, taxpayers are categorized into three groups, known as registration categories A, B, and C, based on their expected annual gross income (turnover) when they start their businesses. These categories are updated as new data becomes available:

- Category-A taxpayers are businesses with an annual gross income of 1,000, 000 ETB (Ethiopian birr) and above.
- Category-B taxpayers have an annual gross income between 1,000,000 and 500,000 ETB.
- Category-C taxpayers have an annual gross income of less than 500,000 ETB.

Each category is subject to varying reporting and tax payment requirements. For example, Category A taxpayers must maintain detailed accounting records following financial reporting standards. They are required to record business assets and liabilities, including acquisition date, costs, and current book values. They must also keep records of daily income and expenditure, sales and purchases of goods and services with names and Tax Identification Number (TIN), and relevant documents. Category B taxpayers have less stringent reporting requirements, primarily maintaining records of daily revenue and expenses, as well as purchase and sale records. Category C taxpayers may maintain records of gross income and other necessary information. In most cases, the information for Category C taxpayers will not be sufficient to determine the liabilities based on the documents kept by the taxpayer, hence, they are liable to presumptive income tax.

A taxpayer is required to submit their income tax self-assessment declarations within a specified time-frame as outlined by the tax authority.² The deadlines for tax declarations vary: four months from the end of the tax year for category A and two months for category B. The tax office has the authority to modify assessments based on available information, at any time in cases of fraud and willful neglect, and within five years for other instances.

Another aspect of the business tax structure with implications for gender equality is the progressivity of the tax code. A progressive tax system is

²This directive is in accordance with the Federal Tax Administration Proclamation No. 983/2016 (see FDRE, 2016b) and the Income Tax Proclamation (see FDRE, 2016a).

recognized for its potential to mitigate gender bias in taxation (see Coelho et al.,2022). Table 1 outlines the business income tax rates applicable to individuals based on their income levels. The statutory tax system exhibits progressivity by requiring individuals with higher taxable income to contribute a larger portion of their earnings. However, it is important to note that the actual tax paid as a percentage of revenue may deviate from what is anticipated under tax policy. Our dataset provides the opportunity to examine whether the tax paid as a percentage of sales revenue aligns with the progressive tax structure, and this will be explored in detail later in the study.

Table 1: Individual Business Income Tax rates in Ethiopia

Taxable Income (Per Year)	Income Tax Rate
0-7,200	0%
7,201-19,800	10%
19,801-38,400	15%
38,401-63,000	20%
63,001-93,600	25%
93,601-130,800	30%
Over 130,8000	35%

Source: FDRE (2016a)

Another gender-relevant structural aspect of the business tax system pertains to whether the tax system is global or schedular. In a global system, taxpayers aggregate their income from all sources and apply a uniform set of tax rates. For instance, if a taxpayer has income from two different business sources, that income is combined, and a uniform tax rate is applied. Consequently, this approach may result in a higher tax rate if there are exemptions at lower income levels. In contrast, a schedular system taxes various income sources separately or at distinct rates. Both systems have their own advantages and disadvantages.

The global system ensures improved horizontal equity because individuals with one or multiple income sources are treated equally. However, it presents challenges in administration, particularly in developing countries with limited third-party reporting. On the other hand, a schedular system treats each income source individually, making it easier to implement and administer. Nevertheless, ensuring horizontal equity can be challenging in this system, as taxpayers with multiple income sources may be taxed differently for the same level of income compared to those with a single income source.

The impact of global and schedular tax systems on tax fairness (unequal distribution of tax burdens) hinges on the number of income sources a taxpayer has. However, it is essential to note that we did not encounter conclusive evidence pointing definitively in one direction or the other in reviewing the literature with regard to the number of income sources and gender. Furthermore, delving into this issue would extend beyond the scope of our current study, which centers exclusively on business income taxes (and does not extend to other income sources and how they are taxed).

Lastly, when a country adopts joint filing for married couples, women can face a higher marginal tax rate than if they filed their tax returns separately. This bias towards women is due to their lower income in most cases (see Capraro, 2014). Joint filing is an aspect that previous research has identified as particularly susceptible to explicit gender bias (see Barnett and Grown, 2004; OECD, 2022; Stotsky, 1997). The Ethiopian system does not provide for joint filing; therefore, it is not expected to be affected by such bias.

3. Data

The data for this paper comes from the Ministry of Revenue (formerly the Ethiopian Revenue and Customs Authority). This administrative database offers a wealth of information, encompassing declared sales, costs of goods sold, expenses, profit, tax payable, deductions for losses, and profit tax due. A business's total sales and other income contribute to its overall business

income. From this income, gross profit is derived by deducting the cost of goods sold, and net profit is calculated by further deducting allowable depreciation expenses, interest, and other expenses. Moreover, businesses have the option to deduct losses carried forward or backward from their net income to determine their taxable income. Subsequently, tax rates are applied to this taxable income to ascertain their tax liabilities. It is important to note that even if a business generates substantial revenue, its reported tax liabilities may appear lower if it reports higher costs of goods and services. As an illustrative example, Cronin et al. (2023) demonstrates that deductible expenses can vary based on demographic factors such as race. Given the potential for variation in reported deductible expenses by gender, this comprehensive dataset enables us to not only investigate the presence of gender disparities in reported expenses but also to explore gender differences in reported income and costs. Additionally, the data employed for this study covers a span of two years (2011 and 2012).

It is worth noting that this administrative data source does not explicitly indicate the gender of business owners. Instead, gender assignments were made by merging this administrative data with survey data collected through a field experiment, which collected information on the business owner by Shimeles et al. (2017). The study targeted 5,400 randomly selected taxpayers from approximately 86,000 taxpayers in Addis Ababa for the fiscal year 2013/2014.³ The sampling approach employed a stratified random sampling method based on geographic location, known as sub-city, and economic sectors. The study included an equal number of taxpayers from three major sectors: wholesalers, agro-processing and manufacturing, and other services. These taxpayers were drawn from five of the ten sub-cities in Addis Ababa, where the majority of taxpayers operate. Specifically, the study encompassed 1,350 taxpayers from each of the following sub-cities: Addis Ketema, Bole,

³The Ethiopian fiscal year starts on July 8th and ends on July 7th.

and Kiros, which are prominent business districts, and 1,350 taxpayers from the mixed sub-cities of Gulele and Nifas Silk Lafto. The study covers both individual and corporate businesses.⁴ The focus of this study is on a sub-sample of individual businesses. Corporate businesses are not considered. As a result, we are left with a final sample of 2,320 taxpayers with accessible tax returns for our analysis. This specific focus on individually-owned businesses enables us to explore gender differences in the tax burden. We restrict the analysis to 2011 and 2012, the pre-treatment period, to avoid the potential impact of the treatment, which might interact with gender.

Table 2: Number of Observations and Taxpayers

	Unbalanced Panel	Balanced Panel
Number of observations	4048	2130
Number of Firms	2320	1065

It is also crucial to recognize that this dataset exhibits an unbalanced nature as shown in Table 2. This is because certain taxpayers may be absent from the dataset for specific years and then reappear in subsequent years. The tax authority also maintains records indicating the business’s activity status, including dates when they ceased operations. We leverage this information to examine whether patterns of business presence in the tax net vary based on the gender of the business owner.

On average, men own 71% of sole proprietorships in Ethiopia, with women accounting for the remaining 29%. Notably, the proportion of women-owned businesses remained stable in 2011 and 2012. However, the substantial gender gap in business ownership within the tax net underscores the ongoing challenge of achieving gender equality in economic participation. Several factors may contribute to these observations, including a significant pres-

⁴The sample excludes large taxpayers with an annual turnover exceeding 1.25 million USD. It is worth noting that there are approximately 1,000 businesses falling into the latter category.

Table 3: Number and Percentage of Taxpayers by Gender and Year

	2011	2012	Total
Men	1308	1582	2890
	71	71	71
Women	524	634	1158
	29	29	29
Total	1832	2216	4048
	100	100	100

Note: The percentage by gender is displayed below the number of taxpayers or observations.

ence of women in informal businesses and various barriers limiting women’s economic engagement.

Furthermore, beyond the variables mentioned earlier, the data-set encompasses additional information such as industrial classifications, taxpayer categories, and the adoption of sales registry machines. This supplementary information offers control variables to isolate gender disparities in tax declarations and payments.

4. Empirical Evidence of Gender Difference in the Tax Burden

4.1. Descriptive Statistics

4.1.1. Profitability, Tax Declarations and Income Tax Burden by Gender

Table 4 presents the disparities between businesses owned by men and women using tax declaration indicators and payment. The differences in financial statements and tax liability declarations for businesses owned by men and women will be interpreted as differences stemming from the taxpayers’ behaviors. Conversely, a difference in tax payment will be interpreted as a tax enforcement differences. The first and third columns of Table 4 present the mean values for businesses owned by men and women, respectively. The fifth column displays the difference between the mean values for men and women, along with whether the difference is statistically significant. When

Table 4: Financial Statement, Tax Declarations and Payment by Men and Women-owned Businesses for 2011 and 2012

	Men		Women		Differences	
	Mean	Obs	Mean	Obs	Differences	P-value
Annual Turnover	2,284,017	2,890	1,900,778	1,158	383,239	0.156
Other Income	14,212	2,890	1,265	1,158	12,947	0.171
Business Income	2,269,856	2,890	1,899,516	1,158	370,340	0.169
Cost of Goods Sold	1,875,880	2,890	1,620,070	1,158	255,810	0.288
Gross Profit	408,053	2,890	280,850	1,158	127,204***	0.007
Total Expense	209,083	2,890	109,710	1,158	99,372***	0.000
Net Profit or Loss	199,077	2,890	170,479	1,158	28,598	0.328
Taxable Income	209,268	2,890	173,951	1,158	35,316	0.219
Tax payable	68,129	2,890	55,894	1,158	12,235	0.223
Tax to be paid	54,726	2,890	45,060	1,158	9,666	0.313
Tax paid	59,384	2,349	47,968	998	11,416	0.157

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: We have presented the means for both men and women, along with associated differences and p-values obtained from independent sample t-tests. While the statistic above represents data pooled across all years, this pattern remains consistent when estimated for individual years, albeit with reduced statistical power.

comparing simple averages, we find that women-owned businesses have lower sales compared to their male counterparts, although the difference is not statistically significant. At the same time, men also report higher costs of goods sold and other expenses such as interest and depreciation expenses. Consequently, net profit and tax declarations (payable and to be paid) are not statistically different across genders.⁵

When we consider the actual magnitude, men-owned businesses have, on average, 20% higher sales (see Table 4). This figure is significantly lower than what has been reported by World Bank (2019). The study, which is based on the Ethiopian Socio-Economic survey, reports a 79% difference in sales between women and men-managed businesses. However, World Bank (2019) primarily covers small and informal businesses.

Looking at the other side of the equation, the cost of goods sold by men-owned businesses is also higher than those of their women counterparts by about 16%. Moreover, reported expenses by men and women are statistically different and high (where expense reported by men is almost double). As a result, the difference in reported tax liabilities between men and women is much smaller than the difference in sales. Finally, the difference in tax payment by men and women—a variable influenced by enforcement measure—is negligible and is also not statistically significant.

The fact that men reported the same tax liabilities, despite substantial differences in gross profits, highlights gender disparities in tax declaration behaviors. Inflating costs and expenses is a well-documented strategy for reducing tax liabilities (as observed in Mascagni et al., 2021; Slemrod et al., 2017). Our analysis reveals that men tend to report considerably higher expenses compared to women-owned businesses, and this difference is statistically significant.

⁵Tax payable and tax due are closely related but distinct measures of income tax liabilities. These measures differ due to the presence of tax credits and are defined in Table A.1 in the Appendix.

Next, we examined income tax progressivity, measured as tax payments as a percentage of gross profit, a metric similar to the one used by Bachas et al. (2023) for estimating the average effective tax rate. Despite the inherently progressive nature of tax laws, our findings reveal that tax payments have not exhibited progressivity (Table 5). This lack of progressivity can be attributed to various factors, including deductible expenses, the utilization of loss carry-forwards and carry-backwards, and tax credits. An intriguing question arises when we consider why businesses with higher sales tend to report greater expenses, losses, and tax credits. This phenomenon may be linked to smaller firms’ difficulties in claiming deductions, stemming from their inability to maintain the necessary records required by tax authorities. Consequently, they might lose the right to claim these deductions. This observation has the potential to shed light on gender-based disparities in tax burden, particularly because women-owned businesses are more prevalent in smaller enterprises. It is important to highlight that progressivity in tax payments differs by gender (see Appendix Tables A.2 and A.3 for gender dis-aggregated effective tax rate). For 2012, the tax burden decreased for women in the lowest quantile but increased for men.

Table 5: Average Effective Tax Rate Per Quintiles of Sales

	First	Second	Third	Fourth	Fifth
2011	0.20	0.16	0.19	0.17	0.16
2012	0.24	0.21	0.20	0.17	0.15

4.1.2. Entry and Exit

In this section, we present summary statistics for business entries and exits categorized by gender. We have defined *exit* as firms that exited as of April 30, 2019, although it is worth noting that the observed pattern remains consistent with varying cutoff dates.⁶ It is noteworthy that while women account for 27% of the taxpayers in our sample, they represent 40% of the firms categorized as *exits* (see Table 6). In the upcoming section, we will explore the key questions: Is the gender disparity in exit status a consistent trend within our dataset, and to what degree is it associated with variations in the tax burden between genders?

Table 6: Number and Percentage of Taxpayers by Gender and Exit Status

	Active Businesses		Closed Businesses		Total	
	Num.	Pct.	Num.	Pct.	Num.	Pct.
Men	1453	73	201	60	1654	71
Women	534	27	132	40	666	29
Total	1987	100	333	100	2320	100

Furthermore, we examined the share of taxpayers that entered the business landscape in 2011 and 2012, which aligns with our data collection period. Similarly, women comprise 33% of the entrants during this specific timeframe, in contrast to their 27% representation among those who remained in business. In summary, the data reveals that women not only demonstrate higher exit rates but also higher entry rates when compared to their male counterparts, ultimately contributing to the stable representation of women within the taxpayers' pool (see Table 7).

⁶The data is flexible in terms of the cutoff date and yields essentially the same pattern.

Table 7: Number and Percentage of Taxpayers by Gender and Entry Status

	Exiting Business		Enterant		Total	
	Num.	Pct.	Num.	Pct.	Num.	Pct.
Men	1262	73	392	67	1654	71
Women	473	27	193	33	666	29
Total	1735	100	585	100	2320	100

4.1.3. Business Category

The study now delves into an examination of the challenges faced by women-owned businesses within the tax system. It is crucial for businesses to make an initial decision regarding Value Added Tax (VAT) registration, and this choice can significantly impact their growth trajectory as they navigate the complexities of the VAT system. In Ethiopia, VAT registration status is contingent upon the categorization of businesses as either category A or B.⁷

As elaborated in Section Two, Ethiopian authorities impose distinct requirements on category A, necessitating more extensive documentation and a compulsory VAT registration process. Moreover, VAT registration has the potential to influence tax compliance behaviors due to its stringent record-keeping requirements, as discussed by Pomeranz (2015). On the other hand, VAT registration can offer benefits to eligible taxpayers who can seek refunds for VAT paid on inputs. Currently, there is no conclusive evidence to suggest whether businesses perceive category A registration as either burdensome or advantageous for their growth within the Ethiopian business landscape.

Taxpayers may opt to mitigate their tax burdens and circumvent the complexities associated with Value Added Tax (VAT) reporting by ensuring that their annual turnover remains below the VAT registration threshold. In such cases, a substantial proportion of taxpayers will report sales below

⁷Our study exclusively focuses on category A and B taxpayers. Category C taxpayers are also not mandated to register for VAT.

this threshold. This phenomenon, known as 'bunching' in the literature, has been a subject of investigation by Saez (2010). However, recent research by Mascagni and Molla (2018) reveals that there is no noticeable bunching effect below the VAT registration threshold.

Subsequently, we examine the gendered distribution of taxpayers within the categories of 'A' (potential VAT registrants) and 'B.' The actual disparity in registering for Category A is relatively minor, with 81% of businesses owned by men registering for category A and 79% representing women. Notably, the difference is not statistically significant, as indicated in Table 8.

Table 8: Share of Individuals by Gender and Tax Category

	Men	Women	Differences
Share of Category A TP	0.81	0.79	0.016
	0.01	0.02	0.881
Share of Category B TP	0.19	0.21	-0.016
	0.01	0.02	-0.881
Number of Observations	1,654	666	.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

We report standard errors below the proportion estimate and z-statistics below the difference.

4.1.4. Industrial Classification

Examining industrial classification is vital, as it may have a close connection with gender. Our administrative data provides the industrial classification of businesses, based on the Ethiopian Standard Industrial Classification Rev. 1.⁸

The summary statistics reveal that women-owned businesses represent a significant share of the taxpayers in specific sectors, including hotels and

⁸It is important to note that, within our dataset, approximately 30% of the taxpayers did not disclose their industrial classification in their tax registry.

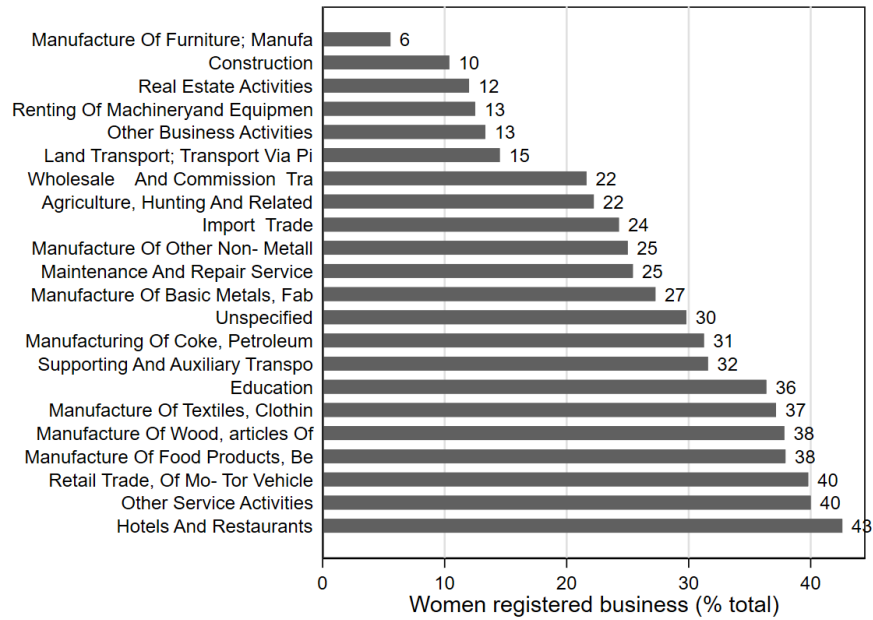


Figure 1: Share of Women-owned Businesses in total Businesses

restaurants, retail trade, and other service activities comprising two in five of the total taxpayers within these categories. In contrast, their presence is notably smaller in sectors such as furniture manufacturing, construction, real estate, and renting machinery. It is worth noting that this variation in industrial classification, as shown in Figure 1, will be an essential control variable in our regression analysis to account for its influence on gender-related differences.

4.1.5. Technology Adoption

Next, men and women owned business are compared in relation to the use of electronic fiscal devices by gender. In Ethiopia, the revenue authority required taxpayers to adopt sales register machines beginning 2008, which has been implemented gradually. The device records the sales of businesses when they issue receipt to the customer and sends a daily report to the central system of the Ministry of Revenue. At the end of each day, business

owners are expected to send a summary of their sales report to the system (see Ali et al., 2021). Businesses are also required to submit annual summary reports to the tax authority when declaring their tax liabilities. While the adoption of the machine is mandatory for business categories A and B, there are implementation gaps. As of 2011, the shares of businesses that did not have the machine are 12% and 9% of women and men taxpayers, respectively.

4.1.6. Nil-filers

Next, we examined the prevalence of nil filers based on gender. Nil-filing is the practice of declaring zeroes in all fields of the tax declaration forms. While such nil-declarations could stem from truthful reporting, they might also serve as a tax evasion strategy. A study conducted by Mascagni and Nell (2021) investigated this issue in Rwanda and found that zero declarations are often indicative of tax evasion. Consequently, we examined the disparities in zero declarations between businesses owned by men and those owned by women. We explored all declaration variables, including sales, profit, tax payable, and tax due.

The results, as depicted in Table 9, reveal that men-owned businesses consistently report higher instances of zero or even negative liabilities across all declaration variables compared to businesses owned by women. This suggests that men are more likely to engage in practices that could potentially lead to tax evasion. However, a notable finding is that there is no significant difference in zero tax payments between businesses owned by men and those owned by women. This observation implies that the tax authority's assessment and scrutiny may effectively correct for such discrepancies in tax reporting.

Table 9: Share of Nil filers by Gender of the Business Owner

	Men		Women		Diff	P-val
	Pct	Obs	Pct	Obs		
Zero annual turnover	0.12	2,890	0.11	1,158	0.01	0.552
Zero or negative gross profit	0.13	2,890	0.12	1,158	0.01	0.292
Zero or negative net profit	0.17	2,890	0.15	1,158	0.02*	0.099
Zero tax payable	0.18	2,890	0.16	1,158	0.02	0.102
Zero or negative tax to be paid	0.23	2,890	0.18	1,158	0.05***	0.001
Zero tax payment	0.00	2,349	0.00	998	-0.00	0.940

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2. Regression Analysis

4.2.1. Tax Declarations and Payment

Quantile regression is used because it is less sensitive to outliers. In our case, there is a high density of zero values in the tax declaration figures, which further skews the mean. Quantile regression can help us to understand the relationship between tax declarations and payments more accurately by providing us with a more representative picture of the data. Pomeranz (2015) use quantile regression to address the high density of zero values in their data. In standard regression, the conditional mean of the independent variable is estimated, while in quantile regression, the conditional median or other quantiles are estimated. The median is less sensitive to extreme values than the mean. Therefore, we follow the same approach and estimate the following equation for the median:

$$Q_{\tau}(y_{i,t}) = \alpha_{\tau} + \beta_{\tau} \cdot (W_i) + \gamma_{\tau}(X_i) + \delta_{\tau}t_t + e_{i,t} \quad (1)$$

$Q_{\tau}(y_{i,t})$ represents the τ^{th} quantile of the log of the monetary value of sales, tax payable, or tax payments for a specific entity at time t . $y_{i,t}$ is the log monetary value for entity i at time t . W_i is an indicator variable that takes the value of one if the business owner is a woman and zero otherwise. X_i represents a set of control variables that account for various firm character-

istics. α_τ , β_τ , γ_τ , and δ_τ are coefficients specific to the τ^{th} quantile, and t_t represents time to account for time fixed effects. It is important to note that this specification doesn't include a firm fixed effect, as any gender-related impact is captured by the gender indicator variable (W_i).

Table 10: Quantile Regression Result for Tax Declarations and Payment Indicators

	(1)	(2)	(3)
	Sales	Tax payable	Tax payment
Women-owned	-0.266*** (-4.61)	-0.212** (-2.88)	-0.0991 (-1.57)
Constant	11.99*** (143.99)	7.974*** (79.56)	8.318*** (88.83)
Pseudo R2	.16	.12	.12
Observations	3347	3347	3347

t statistics in parentheses

All of the regression models above include a time dummy.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10 delves into the insights derived from the analysis of pooled quantile regression at the median, focusing on the tax declarations and payment indicators while accounting for various firm characteristics. The analysis, as depicted in Table 10, incorporates potential controls, including the sector of operation (Agriculture, Industry, and Service), the year of adopting sales register machines, business categorization (A or B), geographical location, and temporal trends. These controls enable us to reduce the risk of picking up other explanations as gender-based disparities in taxation.

The findings would shine a light on distinct gender differences in sales and tax payable. It is important to note that the findings underscore no significant differences in tax payments between men and women. In simpler terms, when it comes to the actual amount businesses remit to the tax authorities, gender ceases to be a differentiating factor. The implications of these findings warrant careful consideration. Women-owned businesses have

significantly lower reported sales and tax payable compared to their male counterparts. The observed discrepancies of 27% and 21%, in sales and tax payable respectively, raise questions regarding the underlying factors driving these differences.

The results indicate a remarkable convergence in tax payment, where both male and female-owned businesses make comparable actual tax payments to the authorities. This observation requires further investigation into the factors that contribute to these reported disparities and the resulting similarities in tax payments. Several potential explanations emerge: First, it may be that women-owned businesses truthfully report lower sales, but the information might not appear credible to the tax authorities. Another possibility is that women-owned businesses tend to under-report their sales intentionally, which can be indicative of a broader tax avoidance strategy. Subsequent sections of our analysis will delve deeper into these dimensions, shedding light on what may explain the inconsistencies we've observed.

In particular, we will examine the phenomenon of positive tax liability filing and explore its implications, as it becomes evident that nil filing may be a means of tax avoidance. Additionally, we will investigate the longevity of existing businesses, as a significant tax burden could potentially pose challenges for women-owned businesses in sustaining their operations over extended periods.

4.2.2. Reporting Positive Tax Liabilities

One way to assess the role of tax compliance in explaining the inconsistency between tax declarations and payments is to closely examine whether taxpayers declare a positive (non-zero) amount. This can indicate tax compliance behavior, as shown by Mascagni et al. (2020). So far, we have focused on the amount paid, while the decision of whether to pay a tax in the first instance has remained secondary. For example, we have used quantile regression to deal with the high reporting of zero tax liabilities. We now move on to analyzing whether gender is associated with declaring a positive amount.

This measure is similar to the measure Dwenger et al. (2016) used to distinguish tax compliance response at the extensive margin. At the intensive margin, we examine disparities in the magnitude of reported income or taxes, which is consistent with how we have measured reported tax liabilities thus far.

In this section, we define tax compliance at the extensive margin as the likelihood of filing a positive tax liability or payment. We are therefore venturing into reporting on the distinctions in tax liabilities at the extensive margins. This expansion into the extensive margins is significant for several reasons. First and foremost, it bridges a measurement gap in our understanding of tax compliance. Additionally, the behavior and outcomes associated with tax liabilities at the extensive margins can be distinct from those at the intensive margins, as research by Alm and Malézieux (2021) highlights.

To capture the extensive margins of tax liabilities, we examine the probability of nil sales declaration, as well as the likelihood of making a zero tax payable declaration. Our analysis also extends to tax payments at the extensive margins, as we investigate the probability of making zero payments. In essence, this shift to the extensive margins of tax liabilities adds a multi-faceted layer to our understanding of tax compliance, encompassing not only the amount but also the probabilities and behavioral aspects that underpin the tax reporting and payment process.

The analysis uses the following linear probability model:

$$I_{i,t} = \alpha + \beta \cdot W_i + X_i + t_t + e_{i,t} \quad (2)$$

Where $I_{i,t}$ denotes one of the following three dependent variables: (1) if a business has declared a zero sales, (2) if a business has declared zero tax payable, and (3) if a business has paid a zero tax; α is a constant, W_i is the indicator of women's ownership, X_i controls for sectors, sub-city, categories, and sales registry machine adoption, e_i is an error term, i is an indicator of businesses, and t is a time dummy. β measures the percentage point

increase/decrease in the probability of declaring an amount equal to zero associated with women-owned businesses.

The results presented in Table 11 reveals that women-owned businesses are less likely to report zero sales, zero tax payable, and zero tax payment compared to men-owned businesses, after controlling for time, location, sector, adoption of the electronic sales registry machine, and the category of the taxpayer. Based on the above result, it does not seem that women-owned businesses are engaging in intentionally avoiding their tax obligations through underreporting their income.

Table 11: Linear Probability Model for Reporting Zero Sales, Tax Liabilities, and Payment

	(1)	(2)	(3)
	Sales	Tax payable	Tax payment
Women-owned	-0.00103 (-0.12)	-0.00431 (-0.41)	0.000649 (0.27)
Constant	0.0735*** (6.18)	0.0945*** (6.67)	0.00222 (0.84)
R2	0.00544	0.00506	0.00792
Observations	3347	3347	3347

t statistics in parentheses

All of the regression models above include a time dummy.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

If indeed women-owned businesses are reporting truthfully, the expectation is that they would struggle to keep their business afloat after paying almost the same amount as men. To assess this possibility, we compare the probability of exiting the tax net by gender next.

4.2.3. *The Probability of Exit*

Given that women pay the same tax level despite reporting lower sales, we delved into whether this phenomenon has played a role in women leaving the formal sector. To explore this, we constructed an equation in which exiting the tax net is a function of gender, a metric of the tax burden, machine

adoption, and an interaction term. Additionally, we controlled for the same variables as in the previous equation, encompassing location, business sector, time dummies, and business category. The equation is presented below.

$$E_i = \alpha + \beta \cdot W_i + \gamma W_i * TB_{i,t} + X_i + t_t + e_{i,t} \quad (3)$$

In the equation: E_i represents businesses exiting the tax net by the end of April 2019; α is a constant. W_i is an indicator of women's ownership; $TB_{i,t}$ represents the tax burden, calculated as the ratio of tax paid to annual sales; X_i includes control variables for sectors, sub-city, categories, and sales registry machine adoption; e_i accounts for the error term, i is an indicator for individual businesses, t is a time dummy/ β measures the percentage point increase/decrease in the probability of women-owned businesses exiting the formal tax system; and γ represents the differential impact of the tax burden on women exiting the tax system.

Table 12 presents the results obtained from a pooled ordinary least square regression using a linear probability model. The data reveals that the probability of women-owned businesses exiting the tax net is around seven percentage points higher than that of men, which stands at 29%. However, the data does not provide evidence that is caused by the the tax burden, as the interaction term between gender and tax burden is not statistically significant.

Table 12: Linear Probability Model for Exiting the Formal Tax System

	(1)	(2)
	Exit	Exit interacted with Tax burden
Women-owned	0.0644*** (5.05)	0.0755*** (4.95)
Women * Tax paid/Sales		0.000112 (0.12)
Tax paid/Sales		-0.000000101*** (-6.81)
Constant	0.282*** (14.92)	0.286*** (13.54)
R2	0.0578	0.0604
Observations	4048	3172

t statistics in parentheses

All of the regression models above include a time dummy.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Conclusions

In conclusion, this research examined the gender implications of tax policies, firm characteristics, and variations in tax declaration behaviors and payments for businesses in Addis Ababa, Ethiopia. Using data collected from 2,320 taxpayers for 2011 and 2012, the study uncovered valuable insights into the dynamics of the tax system.

The findings suggest that while the tax policy itself is not explicitly biased, gender disparities in tax declaration and enforcement processes have emerged. These disparities could contribute to an unequal tax burden, which could have significant and far-reaching consequences for the affected parties.

One particularly notable finding is that women report significantly lower sales, with a substantial 27-percentage point difference in reported sales compared to their male counterparts. Similarly, women report reduced business income tax liabilities, with a 21-percentage point difference compared to men-owned businesses. These differences in reporting appear to be due to truthful representation of their businesses, as women-owned businesses do not engage in zero or negative tax liability reporting, which is a well-known tax avoidance behavior in the African context.

Despite reporting lower tax liabilities, there are no discernible gender differences in terms of business income tax payments. This is because men-owned businesses have higher expenses and costs of goods and services, which reduce the difference in net profit between male and female-owned businesses. As a result, women end up paying nearly identical amounts in taxes as men, despite initially submitting lower tax liabilities.

Although we do not claim that this difference we see is solely due to gender (as there are factors correlated with gender that we have not controlled for or addressed in our methodology), we believe that the finding that women shoulder a higher burden is still noteworthy, with far-reaching policy implications. This suggests potential disparities in business expenses and challenges faced by women entrepreneurs that warrant further investigation and policy

consideration.

It is essential to unravel the factors contributing to these observed disparities and the reasons behind the subsequent parity in tax payments. The study explored various dimensions to shed light on what may explain the inconsistencies, including the phenomena of positive tax liability filing and the probability of existing businesses in the face of a potentially higher tax burden.

The finding that women-owned businesses do not engage in reporting zero tax liabilities any more than men do reveals that the difference in reporting is less likely associated with underreporting sales. This suggests that self-employed women bear a disproportionately heavy tax burden compared to men.

The study also reveals that women-owned businesses have a higher probability of exiting the tax net compared to their male counterparts. While the average exit rate for men-owned businesses was 29%, it soared to 36% for women-owned businesses. However, there is no evidence to suggest that this is caused by an increased tax burden.

More effort is required to understand the tax compliance difference between men and women and the impact of the tax burden on women. While exiting the tax system could be one result, it could also lead to reduced growth opportunities, which should be examined.

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Appendix A. Appendix

Table A.1: Reported items in tax declarations and descriptions

Reporting item	Description
Business income	Annual sales plus other income
Gross profit/loss	Business income minus the cost of goods sold
Net profit/loss	Gross profit/loss minus total expenses (e.g., interest expense, depreciation expense, etc.)
Taxable income	Net profit/loss minus loss carried forward or backward if it is zero or positive or zero
Tax payable	The tax rate applied to the taxable income
Tax due	Tax payable net of withholding and foreign tax credits

Table A.2: Average Effective Tax Rate Per Quintiles of Sales for Men-owned Businesses

	First	Second	Third	Fourth	Fifth
2011	0.19	0.16	0.19	0.17	0.16
2012	0.27	0.21	0.19	0.17	0.16

Table A.3: Average Effective Tax Rate Per Quintiles of Sales for Women-owned Businesses

	First	Second	Third	Fourth	Fifth
2011	0.21	0.15	0.20	0.16	0.17
2012	0.16	0.20	0.21	0.16	0.14