Tax Policy and Gender Inequality: Assessing the gendered effects of Argentina's 2013 personal income tax reform

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MSc in Public Administration

Economics and Governance

MASTER THESIS

Tax Policy and Gender Inequality: Assessing the gendered effects of Argentina's 2013 personal income tax reform

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3-01-2025

Abstract

Despite significant progress in gender equality, gender gaps in wages and labour supply persist globally, driven by occupational segregation, caregiving responsibilities, and systemic discrimination (Budig & England, 2001; Dorius & Firebaugh 2010; Blau & Kahn, 2017; Castellano & Roca, 2020). Tax policies have recently emerged as a potential tool to address these disparities, with progressive systems shown to reduce income inequality (Bargain *et al.*, 2019; Christofides *et al.*, 2013; Olivetti & Petrongolo, 2017) and women's labour supply considered more responsive to tax reforms (Borjas, 2005; Evers *et al.*, 2008, Eissa *et al.*, 2008; Keane, 2011; Meghir & Phillips; 2010). This thesis examines the gendered effects of Argentina's 2013 Personal Income Tax (PIT) reform, which introduced significant tax relief for workers earning below AR$15.000 (approximately USD 3.000) monthly. While the reform aimed to alleviate the tax burden on middle-income workers, its impacts on wage inequality and labour supply, particularly for women, remain underexplored.

Using data from Argentina's Longitudinal Sample of Registered Employment (MLER) and a regression discontinuity design (RDD), this study investigates the reform's effects on two dimensions: (i) gendered impacts on net earnings and (ii) labour supply adjustments at the intensive margin. The results reveal that the tax reform had a mechanical impact on workers' net earnings, with a small but significant local effect. However, there were no significant gender differences in the reform's impact on the tax burden or labour supply. While the results do not demonstrate significant gendered effects, the study's limitations—particularly the absence of detailed data on family composition, caregiving responsibilities, and work effort—preclude definitive conclusions. These limitations highlight the importance of richer datasets and more nuanced methodologies to fully understand how income taxes influence labor market dynamics for men and women.

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1. Introduction

Despite significant progress in gender equality, the gender gaps in wages and labour supply persists globally, driven by occupational segregation, caregiving responsibilities, and systemic discrimination (Budig & England, 2001; Dorius & Firebaugh 2010; Blau & Kahn, 2017; Castellano & Roca, 2020). Institutions such as trade unions and policies like minimum wage laws and work-family reconciliation initiatives have been shown to reduce gender gaps in wages, working hours, and overall income (Bargain *et al.*, 2019; Christofides *et al.*, 2013; Olivetti & Petrongolo, 2017). More recently, research has highlighted the potential of tax policies to play a role in addressing gender inequality. On one hand, the literature suggests that progressive tax systems tend to reduce the tax burden on lower-income groups, where women are often overrepresented, thereby narrowing the gaps in disposable income (Grown, 2010; Richards-Melamdir, 2021; Doorley & Keane, 2023). On the other hand, women's labor supply is generally regarded as more elastic to tax reforms (Borjas, 2005; Evers *et al.*, 2008, Eissa *et al.*, 2008; Keane, 2011; Meghir & Phillips; 2010), presenting an opportunity to reduce the gap in hours worked between men and women.

This study builds on this literature to examine the effects of a major reform to Argentina's Personal Income Tax (PIT) on gender gaps. The income tax is one of Argentina's primary fiscal tools for income redistribution and financing public expenditure. The fourth tax category, levied on income from salaried work, has been central to tax policy debates, particularly in response to high inflation rates and demands for greater fiscal fairness (Afonso, 2023). Among the various reforms implemented, the 2013 PIT reform stands out for its significant tax break, which applied to workers whose maximum monthly gross salary between January and August 2013 was below AR$15.000 (approximately USD 3.000). While this policy aimed to alleviate the tax burden on middle-income workers, it may have had uneven effects across different workforce segments, potentially exacerbating or mitigating gender disparities in income and labour incentives.

Although prior studies have examined the broader impacts of Argentina's PIT system and its reforms on income distribution (Gasparini, 1998; Quaglia, 2013; Beveraggi & Ghilardi, 2015; Tortarolo, 2018; Afonso, 2023), there is limited empirical evidence on how these reforms influence labour market outcomes and tax burdens, particularly along gender lines. A notable study by Tortarolo *et. al* (2020) evaluates the labour supply responses to the 2013 reform using

a regression discontinuity design (RDD) and administrative data. Their results highlight a measurable but modest adjustment in labour supply. The study also identifies more elastic responses among workers with flexible schedules but does not explore gender-specific effects. This thesis builds on Tortarolo *et al.*'s framework to investigate whether similar or larger responses occur among women, given the broader literature's consistent findings of higher elasticities for female labour supply.

Against this backdrop, this thesis addresses this gap in the literature by investigating whether Argentina's 2013 PIT reform affected wage inequality between men and women and its influence on women's participation in the labour market. In summary, this research seeks to answer the question: **To what extent did Argentina's 2013 income tax reform affect the gender gaps in the formal sector?** Specifically, the study focuses on two key dimensions:
(i) Gendered impact on net earnings: how did this reform affect the earnings of women and men?
(ii) Effect on labour supply at the intensive margin: how did the reform affect the hours worked by women?

At the heart of this study is a broader exploration of how tax systems affect gender gaps in income and labour force participation - whether they perpetuate existing inequalities or contribute to reducing them (Richards-Melamdir, 2021). From a policy perspective, understanding this dynamic is crucial for designing tax policies that balance equity and efficiency.

This research utilizes data from the Longitudinal Sample of Registered Employment (MLER), which provides monthly information on registered employees in Argentina's private sector. The MLER contains essential information on gross salaries, employment duration, and worker demographics. To estimate the causal impact of the reform on gender wage disparities and labour force participation, this research applies a regression discontinuity design (RDD) centred around the income threshold defined by the tax reform.

The results show that the reform had an impact on net wages through increased tax liabilities, reflecting its mechanical effects. However, despite expectations that women, who are over-represented in lower income groups, would benefit more, the results do not reveal significant gender differences in the impact of the reform on after-tax wages. Similarly, despite the expectation that women would have a higher labour supply elasticity, this study finds no evidence of significant labour supply adjustments in the context of the 2013 reform.

The remainder of this thesis is structured as follows: Section 2 provides institutional background on Argentina's PIT system and the 2013 reform, along with a summary of gender gaps in the labour market. Section 3 reviews the literature, presents the theoretical and conceptual framework, and formulates hypotheses. Section 4 details the data, empirical strategy, and key descriptive statistics. Section 5 presents the results and analysis. Finally, Section 6 concludes with a discussion of the findings, limitations and policy implications.

2. Institutional background

2.1. The Personal Income Tax (PIT): main characteristics

Argentina's Personal Income Tax (PIT) was established in 1973 through Law 20.628 and has undergone more than 360 amendments since then (InfoLeg - Información Legislativa, 2024). The PIT is levied on the total profits earned by a natural or legal person during the tax year, and it is one of Argentina's primary fiscal tools. In 2013, the year of the reform under study, the PIT accounted for 19,5% of total revenue collection (AFIP, 2014). This figure has remained consistent, with the tax representing 20,1% of total revenue in 2023 (MECON, 2024).

The law defines four sources of taxable income: 1) land income (1st category), the income generated from the use of urban or rural real estate; 2) capital income (2nd category), comprises the returns from shares, interest, dividends, and similar sources; 3) corporate profits (3rd category), corresponds to profits generated by companies, partnerships, or sole proprietorships; and 4) personal work income (4th category), corresponds to profits from salaried work.

At the same time, Argentina's PIT system for work income is segmented into three categories: salaried workers, high-income self-employed, and low-income self-employed (known as *"monotributistas"*). Each group is subject to distinct thresholds and deductions. This study focuses on the 4th category for salaried workers, as they were the only group affected by the 2013 reform.

Several characteristics of the tax system are particularly relevant to this study. The PIT primarily targets relatively high-income workers, with studies indicating that its burden is generally progressive and concentrated within the top decile of income earners (Gasparini, 1998; Gaggero & Rossignolo, 2011). Moreover, the PIT operates on an individual basis, since each taxpayer pays taxes based on their own income, regardless of marital status. This individual-based characteristic has been noted for its beneficial gender implications, as joint

filing systems are often associated with disincentives for secondary earners—typically women (Rodríguez Enríquez et al., 2010; Richards-Melamdir, 2021).

For salaried workers, taxes are withheld through a Pay-As-You-Earn (PAYE) system (Tortarolo *et al*, 2020). Therefore, employers calculate taxable income monthly by subtracting social contributions and deductions from gross wages to determine the tax liability, as detailed in the following sections.

2.2. Determination of PIT liability

The amount an individual pays in Personal Income Tax (PIT) is determined by three primary factors: (i) gross salary, (ii) applicable deductions, and (iii) the tax rate thresholds outlined in the tax schedule. To determine whether an individual is liable for income tax and, if so, the amount due, the taxable income must first be determined through a series of steps.

First, the calculation of net salary begins with the deduction of social contributions from gross salary. In Argentina, these contributions represent 17% of gross salary, allocated as follows: 11% for pension contributions, 3% for social security contributions, and 3% for trade union contributions (Beveraggi & Ghilardi, 2015). These percentages are established in Article 9 of Law 24.241/93 and its subsequent amendments. Once these deductions are subtracted from gross salary, the resulting net salary serves as the basis for further tax calculations.

Second, the income tax mechanism allows several deductions to be made from the net salary, ultimately resulting in the taxable base. The most relevant deductions include the following: (i) the non-taxable minimum, which represents a fixed amount exempted from taxation to ensure that individuals with lower incomes are not subject to income tax; (ii) a special deduction applicable to all salaried employees in formal employment, designed to account for general work-related expenses; and (iii) deductions for dependents, which provide tax relief for individuals supporting a spouse or children (Tortarolo, 2018). The deduction amounts applicable during the period under study are detailed in **Tables 1 and 2.** Once social contributions and these deductions are subtracted from the net salary, the taxable base is obtained.

Table 1. PIT Deductions for all income categories. Period: January 2012 - August 2013

Period	Non-Taxable Income	Special Deduction	Spouse	Child
January 2012 - February 2013	1080	5184	1200	600
March 2013- August 2013	1296	6220	1440	720

Note: Based on Law 20.628, Law 26.731, and Decree 244/2013, this table outlines the deductions applicable between January 2012 and August 2013. Under this scheme, individuals with taxable income less than or equal to zero are exempt from paying income tax.

Table 2. Deductions for each income category. Period: September 2013 to December 2014

Income Category (Jan-Aug 2013)	Category	Non-Taxable Income	Special Deduction	Spouse	Child
Less than AR$ 15000			**Exempt**		
Between AR$ 15,000 and AR$ 25000	Patagonia (+30%)	1684	8087	1872	936
Between AR$ 15000 and AR$ 25000	Rest of the Country (+20%)	1555	7465	1728	864
More than AR$ 25000	Standard Deduction	1296	6220	1440	720

Note: Based on Decree 1242/2013 and General Resolution 3525, which established a tax break for individuals who earned less than AR$15.000 the reference period. Applicable between September 2013 and December 2014.

Third, for individuals with a positive taxable income (greater than zero), the tax base is subjected to a progressive schedule **(Table 3)** consisting of seven income brackets with rates ranging from 9% to 35%. This schedule is used to determine the final tax liability. Each bracket specifies a base tax amount, with an additional marginal rate applied to income exceeding the lower limit of the bracket (Quaglia, 2013). Individuals with a taxable income of zero or less are exempt from paying income tax. Established under Law 20.628, this schedule remained structurally unchanged from 2000 to 2016, with reforms during this period focusing primarily

on adjustments to deductions rather than modifications to the tax brackets themselves. Further details on the changes introduced by the 2013 reform are provided in Subsection 2.3.

Table 3: Schedule used by employers to compute monthly withholdings

Taxable Income		Cumulated Tax		
From ARS	To ARS	ARS	+	over ARS
0	833	0	9%	0
833	1667	75	14%	833
1667	2500	191,67	19%	1667
2500	5000	350	23%	2500
5000	7500	925	27%	5000
7500	10000	1600	31%	7500
10000		2375	35%	10000

Note: This table shows the personal income tax schedule used by the employers to withhold the tax according to Law 20.628. This schedule was in place during the period 2000-2016.

2.3. The 2013 PIT reform

2.3.1. The reform background: PIT and inflation

Following a major economic collapse in 2001, Argentina's inflation levels have steadily risen, averaging an annual rate of 25% between 2000 and 2016 (Afonso, 2023; Tortarolo *et al.*, 2020). This inflationary environment significantly impacted the components that determine tax liability. While wage increases generally kept pace with inflation, they systematically outpaced the adjustments to the non-taxable minimum and other deductions used to calculate taxable income (Quaglia, 2013). Compounding this disparity, the tax thresholds that define each marginal tax rate **(Table 3)** remained largely unchanged in nominal terms from 1997 to 2016 (Tortarolo *et al*., 2020).

As a result, an increasing number of workers became subject to income tax each year, not due to increased purchasing power but because stagnant thresholds eroded the tax's progressivity. Between 2008 and 2019, the number of tax returns filed increased by 60% (Rodríguez Enríquez & Méndez Santolaria, 2021), incorporating a growing share of low- and middle-income earners into the tax base (Tortarolo, 2018). Thus, the tax lost its equalising power (Quaglia, 2013; Beveraggi & Ghilardi, 2015).

This phenomenon was exacerbated by an interrelated issue known as “bracket creep” (Saez, 2003). Inflation eroded the real value of tax thresholds, pushing an increasing number of

workers into higher tax brackets. As a result, workers with significantly different earnings were subjected to the same top marginal tax rate (Tortarolo *et al.*, 2020). This effect disproportionately impacted women, who are underrepresented in higher income categories and therefore more vulnerable to the regressive implications of bracket creep (Rodríguez Enríquez & Méndez Santolaria, 2021).

2.3.2. The 2013 PIT reform specifics

In response to the growing tax burden on middle-income workers caused by stagnant thresholds and inflation, trade unions exerted pressure on the government to implement relief measures (Quaglia, 2013). To address these concerns, Argentina's Executive branch introduced discretionary increases to the non-taxable minimum and allowable deductions under the PIT, culminating in the significant reform of 2013.

The 2013 PIT reform, enacted through Decree 1242/2013, introduced a substantial tax break targeted at wage earners whose maximum gross monthly income between January and August 2013 did not exceed AR$15.000 (approximately USD 3,000). Workers meeting this criterion became entirely exempt from paying income tax on earnings accrued after September 1, 2013. This policy was explicitly designed as an immediate tax relief measure to strengthen the purchasing power of workers and counteract the erosion of progressivity caused by inflation.

The tax break was announced on August 28, 2013, just two days before it came into effect. Eligibility was determined based on employer-reported wage records submitted monthly to the Government, minimizing the potential for manipulation (Tortarolo *et al.*, 2020). Upon its announcement, the head of Argentina's tax authority (AFIP) estimated that approximately 1.4 million workers would no longer be subject to income tax (Tortarolo *et al.*, 2020).

For the non-exempt employees, the reform introduced differentiated treatment for workers according to their income brackets. Employees earning more than AR$15.000 but less than AR$25.000 saw a 20% increase in personal deductions. For workers residing in the Patagonian region, the deductions were increased by an additional 10% to account for the higher cost of essential goods in that area (Beveraggi & Ghilardi, 2015). For employees earning more than AR$25.000, the pre-existing deductions and tax rules continued without modification (See **Tables 1** and **2**).

The reform created a sharp eligibility cutoff at the AR$15.000 threshold, generating a clear division between two distinct groups: workers earning below the threshold, who received full

tax exemption, and those earning above the threshold, who continued to pay tax based on the pre-existing rules. This sharp discontinuity offers a unique opportunity to study the effect of the income tax on labour outcomes. By examining the impact on workers near the eligibility threshold, this study sheds light on how targeted income tax relief interacts with structural disparities in the labour market, particularly along gender lines.

The tax break remained in force for nearly two and a half years. In 2016, with Decree 394/2016, the new administration, which had taken power in 2015, repealed the 2013 exemption and raised the minimum non-taxable income thresholds to approximately AR$30.000 for a married person with dependents and AR$22.750 for a single individual.

2.4. Participation and wage gender gaps in Argentina. Income tax and gender gaps.

Recent research highlights that gender gaps in labour markets -primarily the gaps in participation and the wage gaps- are narrowing in many countries, as women close the gap with men in education and skills acquisition (Blau & Kahn, 2017). However, significant disparities persist, primarily driven by occupational segregation, career interruptions, and persistent discrimination (Budig & England, 2001; Dorius & Firebaugh, 2010; Blau & Kahn, 2017; Castellano & Roca, 2020). Women are less likely to participate in the labour market and, when they do, they tend to work fewer hours on average than men. The combined effect of the gender participation gap and the gender wage gap results in a significant earnings disparity between men and women (Doorley & Keane, 2023).

The interaction between gender gaps and income tax is particularly significant, as the gender pay gap at the upper end of the wage distribution has narrowed much more slowly compared to other segments. This is primarily due to the underrepresentation of women in senior positions (Blau & Kahn, 2017; Atkinson *et al*., 2018).

Following these trends, gender gaps in Argentina remain persistent. In 2023, the economic participation rate stood at 56,8% for women compared to 74,5% for men, while the average time devoted to paid work per week was 19,3 hours for women and 36,6 hours for men (ECLAC, 2023). Several factors contribute to this disparity. A primary cause is the unequal distribution of unpaid care work within households, which limits women's ability to enter or remain in paid employment and restricts opportunities for upward career mobility (Micha *et*

al., 2019; Berniell *et al*., 2019). In Argentina, parental leave policies focus almost exclusively on women, leading to career interruptions and reinforcing caregiving responsibilities.

Regarding income gaps, in the second quarter of 2023, the gender gap in total earnings in Argentina stood at 27,7% (INDEC, 2023). This metric encompasses not only wages but also other sources of income and has shown relative stability in recent years, indicating persistent inequality in overall earnings between men and women. The literature has approached the study of gender wage gaps through multivariate regression analyses that control for observable factors typically collected in household surveys (Marchionni *et al.,* 2019). Applying this methodology, Esquivel (2007) finds that the wage gap ranged between 11% and 18% during 2003-2006, varying by labour market segment. Similarly, Paz (2019) estimates the gender hourly wage gap at approximately 13%.

Other analyses highlight the importance of the pay gap at the top of the distribution. Trombetta and Cabezón Cruz (2020) apply quantile regression methods to analyze the gender gap across wage percentiles. Their findings reveal a U-shaped pattern consistent with broader Latin American trends (Carrillo *et al.*, 2014): the gap ranges from 12-13% at the lower percentiles, decreases to 10% in the middle, and rises again to 11-12% at the upper percentiles. These results align with the "glass ceiling" hypothesis, which posits that women face greater barriers to advancement into higher-paying positions (Carrillo *et al.*, 2014).

A number of characteristics of Argentina's labour market suggest that vertical segregation – barriers to advancement in organisational hierarchies – may be a more significant driver of gender wage gaps than horizontal segregation (segregation by occupation). Argentina has a strong tradition of labour regulation, including the presence of collective bargaining agreements and trade unions, which limit employers' ability to discriminate on the basis of pay (Trombetta & Cabezón Cruz, 2020). However, no regulations requiring gender quotas in managerial or similar positions were identified during the period under study, nor were there any significant changes in institutions such as trade unions, minimum wage policies or measures to reconcile work and family life, all of which have been shown to reduce gender gaps in labour markets (Bargain *et al.*, 2019; Christofides *et al.*, 2013; Olivetti & Petrongolo, 2017). This highlights the importance of studying the impact of taxation on these gaps.

In terms of income taxation, the system in place in Argentina presents some strengths with regard to the promotion of gender equality. The individual taxation principle is a salient strength of the system, as it does not inherently deter women from earning income (Rodríguez

Enríquez *et al.*, 2010; Richards-Melamdir, 2021). Additionally, the system ensures equal treatment of women and men regarding deductions and exemptions. An important issue is that for a married couple, each spouse is entitled to claim the deductions for their joint children (Rodríguez Enríquez *et al.*, 2010).

Disparities emerge in terms of the number of men and women subject to the tax. An analysis of personal income tax filings reveals that in 2020, women filed 191.355 tax returns with assessed taxes, whereas men filed 473.760 (Larios & Mendez Santolaria, 2024). This discrepancy can be attributed to gender disparities in employment, yet the interplay between the income tax and the wage and participation gaps remains underexplored as it will be developed in the following section.

3. Theory and conceptual framework

3.1. Literature review

Recent research examines how tax reforms influence gender dynamics in the labour market. While the gender gaps are predominantly driven by non-tax factors, tax systems play a critical role in either amplifying or mitigating these disparities. They achieve this through explicit differential treatments or implicit biases, which can affect post-tax inequality and, more significantly, alter economic incentives (Coelho *et al.*, 2024). The intersection of tax reform and gender equality involves a complex interplay of factors that have garnered significant scholarly attention, including the connections between taxation and the gender wage gap, labour force participation rates, occupational segregation, caregiving responsibilities, and the feminization of poverty (Suryani, 2022).

The present literature review has been organised in accordance with the focal points of this study, which pertain to the effects of an income tax reform on wages and labour supply outcomes for men and women. The initial section undertakes an examination of the literature pertaining to income tax systems and their interaction with gender disparities in wages, while the subsequent section undertakes a review of the literature pertaining to the impact of taxation on labour supply, with a particular emphasis on studies that investigate the differential responses of men and women to fiscal policies.

3.1.1. Income tax and gender wage gap

Recent studies have examined the role of tax policies in either reinforcing or mitigating gender wage disparities. This literature highlights progressive taxation as a potential mechanism to reduce income disparities (Richards-Melamdir, 2021; Grown, 2010). By imposing higher tax rates on higher-income individuals, typically male, progressive tax systems have the potential to redistribute income more equitably between genders.

Some cross-national empirical studies directly test the impact of progressivity on post-tax gender income gap, providing evidence for its redistributive potential. Using Hierarchical Linear Modeling (HLM) and data from the Luxembourg Income Study Database (LIS), Richards-Melamdir (2021) investigates the impact of tax progressivity on the post-tax gender income gap in 27 countries. The study finds that progressive taxation disproportionately taxes men where pre-tax income gaps favor them, thereby narrowing post-tax income disparities. Conversely, less progressive systems produce similar tax rates for men and women regardless of the income gap, undermining redistribution. Similarly, Coelho *et al.* (2014) employs LIS data to show that in advanced economies, net income gender gaps are approximately 1,5 percentage points narrower than gross income gaps, whereas the impact in emerging economies is negligible. Avram and Popova (2021) analyze the gendered redistributive effects of taxes and transfers in eight European countries, employing microsimulation techniques and intra-household income splitting rules. Their findings reveal that while taxes and transfers partially equalize gender earnings disparities, they cannot fully compensate for structural income gaps.

More recently, Doorley and Keane (2023) further extend these analyses by estimating the EU-wide distribution of gender gaps in market and disposable incomes. Using a novel decomposition method, they disentangle the contributions of taxes and benefits to the gap between market and disposable income. Their findings underscore the pivotal role of progressive taxation in reducing disposable income gaps, with benefits playing a secondary role.

Country-specific studies reinforce these findings. In Austria, Eder (2016) shows that progressive income taxes reduce gender earnings gaps. Using stratified quantile-based regression analysis to calculate gender-specific tax burdens in Turkey, Karababa and Lmaz (2023), find that women face higher relative tax burdens than men despite earning less, particularly in middle-income groups. In Canada, Lahey (2015) evaluates the redistributive

effects of structural detaxation, tax expenditures, and joint tax systems, revealing that men disproportionately benefit from structural tax cuts. In Mexico, Rembao *et al.* (2019) apply non-parametric techniques to analyze the effects of income taxes on wages, finding that men bear higher tax burdens than women due to systemic wage gaps and differences in labour supply.

Regarding the empirical methods utilized in the literature, tax incidence analysis is a predominant approach for evaluating the distributional impact of tax policies and understanding their influence on gender disparities. Only a limited portion of the literature examining the effect of taxes on gender income inequality employs advanced econometric techniques, such as regression analysis and microsimulation modeling, to construct counterfactual income distributions for men and women with and without the tax system (Doorley & Keane, 2023).

In that line, the prevailing research on income tax in Argentina has focused largely on assessing the distributional effects of the income tax and its reforms over time, with most studies using tax incidence analysis and relying on data from household and expenditure surveys. Findings generally underscore the progressive nature of Argentina's personal income tax, although inflation and successive reforms have sometimes diluted this effect (Gasparini, 1998; Gaggero & Rossignolo, 2011; Quaglia, 2013; Beveraggi & Ghilardi, 2015; Valente, 2016; Tortarolo, 2018). For instance, Gasparini (1998) shows that income tax is highly progressive, with the wealthiest decile contributing the majority of revenue, while Beveraggi and Ghilardi (2015) reveal that the stagnant tax scales led a larger proportion of wage earners into the highest tax categories. This effect, referred to as "bracket creep", ultimately reduced the progressive nature of the tax. Afonso (2023) assesses pre- and post-tax income inequality over a two-decade span from 1996 to 2015 confirms the tax's effectiveness in reducing post-tax inequality but highlights distortive reforms that temporarily weakened this impact.

While much of the Argentine literature has explored income tax progressivity and its general impact on inequality across different income groups, relatively few studies explicitly examine gender disparities in the tax system. Notable gender-focused analyses include Gherardi and Rodríguez Enríquez (2008), who identify differential impacts of the income tax system based on income type, family composition, and employment status, disproportionately affecting women, especially low-income self-employed workers. Further extending this analysis, Rodríguez Enríquez *et al.* (2010) evaluate personal income tax payments across different household types and demonstrate that single-income female breadwinner households and dual-

income households experience unequal tax burden, with *"monotributistas"* (low-income self-employed)—a group overrepresented by women—facing significant disadvantages. Rossignolo (2018) also incorporates gender dynamics into tax incidence analysis, showing that families with children experience the highest burdens.

Most recently, Larios and Méndez Santolaria (2024) reveal that the PIT loses progressivity for women in higher income brackets. Specifically, the top income segment for men contributes approximately 60,5% of total taxes paid by men, whereas the equivalent segment for women contributes only 44% of the total taxes paid by women. This discrepancy is attributed to two factors: first, the lower representation of women in top income brackets, with only 15,9% of high-income taxpayers being women, compared to 28,6% in lower income brackets; second, women utilize family-related deductions less frequently than men.

Collectively, the studies reviewed in this section draw attention to the plausible interaction of income tax and the relative tax burden by gender, which ultimately results in the exacerbation or deepening of the wage gap. However, this interaction with the wage gap has not yet been studied by quasi-experimental methods in Argentina. This study seeks to fill this gap, providing new insights into the gendered effects of income tax reforms in Argentina.

3.1.2. Labour supply responses to income taxation

An extensive body of literature examines how labour supply responds to income taxation, focusing on its impact on individuals' decisions to participate in the labour market (extensive margin) and the number of hours worked (intensive margin). Researchers frequently estimate elasticities to assess the sensitivity of labour supply to changes in taxation. However, findings are mixed, with significant variation across studies. While part of the evidence suggests that labour supply elasticities are generally low (Borjas, 2005; Saez *et al*., 2012), indicating limited responsiveness to tax changes, some studies challenge this consensus. Keane (2011) argues that discrepancies in findings may result from identification issues and dataset limitations, which hinder accurate measurement of labour supply responses.

To obtain reliable elasticity estimates, researchers often exploit exogenous changes brought about by tax policy reforms (Evers *et al.*, 2008). Bianchi *et al.* (2001) exploit the one year tax holiday in Iceland and report large effects along the extensive margin. Martinez *et al.* (2021) estimate the intertemporal labor supply elasticity of substitution by exploiting an unusual tax holiday in Switzerland. Their findings reveal no evidence of labor supply responses along the

extensive margin but indicate significant, albeit quantitatively small, responses in earnings, reflecting a labor supply elasticity at the intensive margin.

Although most studies find moderate responsiveness in labour supply to tax changes, certain subgroups display larger effects (Hayo & Uhl, 2015). Notably, a typical finding is that women's labour supply elasticities often exceed men's (Borjas, 2005; Evers *et al.*, 2008, Eissa *et al*., 2008; Keane, 2011; Meghir & Phillips, 2010).

According to the literature, this distinction stems from several structural and behavioural factors. Women are often regarded as "second earners" in households, with their labour income being secondary to that of male breadwinners. Consequently, certain tax policies, such as high marginal effective tax rates and joint taxation, often reduce women's incentives to work or increase their hours, as couples seek to avoid higher tax brackets (Richards-Melamdir, 2021; Avram & Popova, 2021). Additionally, women's labour supply is more sensitive to external factors such as childcare costs, fertility, and access to part-time work (Keane, 2011). Their generally lower labour market participation rates and more dispersed working hours amplify their responsiveness to tax incentives, as they often have greater scope for increased participation (Meghir and Phillips, 2010).

Empirical findings suggest these patterns, albeit with differing emphases on the intensive and extensive margins. Keane (2011) provides a meta-analytic review, which reports that male labour supply elasticities are consistently low, while female elasticities, especially on the participation margin, are significantly larger. Evers *et al.* (2008) also conduct a meta-analysis and similarly find that women exhibit higher elasticities, but both at the extensive and intensive margins. Doorley and Keane (2023) find that tax-benefit systems primarily address the gender income gap arising from differences in working hours, while providing limited incentives for increasing female labour force participation at the extensive margin. Other studies, such as Coelho *et al.* (2024), suggest that high marginal tax rates on secondary earners discourage female labour supply at both margins.

The interplay between civil status and childcare responsibilities also plays a critical role in shaping labour supply responses. After a comprehensive review of the literature relating tax and the supply of effort, Meghir and Phillips (2010) conclude that hours of work do not respond particularly strongly to the financial incentives created by tax changes for men, but they are a little more responsive for married women and lone mothers. They also highlight that the

decision whether or not to take paid work at all is quite sensitive to taxation and benefits for women and mothers in particular.

Mastrogiacomo *et al.* (2017) examine labor supply responses to a major tax reform in the Netherlands, revealing that single men and women exhibit similar elasticities, while men in couples display significantly smaller elasticities compared to women in couples. Across all groups, responses at the extensive margin are larger than those at the intensive margin. Notably, secondary earners with children and single parents, particularly those with preschool-aged children, demonstrate the highest labor supply elasticities, with marginal tax rates remaining critical determinants of hours worked for these groups. Bosch and Jongen (2012) analyze a major tax reform in the Netherlands and report modest intensive margin responses, with negligible effects for men in couples and small but significant effects for single mothers. Bosch and Van Der Klaauw (2012) find that the reform positively influenced female labour force participation but had no significant impact on working hours. These findings align with studies such as Bastani *et al.* (2021), which examine the responses of secondary earners to a large reform in Sweden's tax and transfer system, documenting significant effects among secondary earners and married women, highlighting their sensitivity to tax incentives.

Rather than relying on indirect estimates of labour supply based on observable economic data, Hayo and Uhl (2015) use a survey-based approach in Germany, directly asking individuals about their labour supply adjustments to recent tax changes. They find limited overall responsiveness but note that taxation has a more pronounced effect on the self-employed. Interestingly, their findings suggest that gender does not significantly influence labour supply responses to payroll tax changes in Germany, contrasting with much of the broader literature.

In the Argentine context, quasi-experimental evidence on labour supply effects of taxation is scarce. One notable exception is the study by Tortarolo *et al.*, (2020) which evaluates the labour supply responses to the 2013 income tax break for wage earners examined in this thesis. Using a regression discontinuity design (RDD) and administrative data, the authors estimate an elasticity of 0,184 for overtime hours, highlighting measurable but modest adjustments in labour supply. The study also identifies more elastic responses among workers with flexible schedules, such as management, but does not explore gender-specific effects. This thesis builds on Tortarolo *et al.*'s framework to investigate whether similar or larger responses occur among women, given the broader literature of higher elasticities for female labour supply.

3.2. Theoretical framework

To address the research question of this study and guide the empirical analysis, this theoretical framework examines how the structure of income taxes influences gender dynamics in the labour market. It is built on three key perspectives: (i) the conceptual framework for evaluating taxation from a gender dimension, (ii) the theory of tax equity and its interaction with the wage gap, and (iii) the labour supply model.

3.2.1. Conceptual framework for gender and taxation

Though still incipient, the interaction between gender and taxation has gained increased prominence in academic discourse, with recent studies exploring the differential treatment based on gender within tax frameworks. This conceptual framework proposes that tax systems should be evaluated not only for efficiency and revenue generation but also for their impact on gender inequality. Specifically, this involves analyzing whether explicit or implicit gender biases exist in tax legislation and examining how tax incidence varies between genders (Stotsky, 1996; Elson, 2006).

Stotsky (1996) provides a foundational framework for identifying such biases. Explicit biases emerge when tax laws directly differentiate between men and women, such as family deductions that disproportionately benefit male breadwinners. Implicit biases, on the other hand, arise indirectly from societal norms and economic behaviours that lead to different outcomes for men and women under otherwise neutral tax systems (Gherardi & Rodríguez Enríquez, 2008).

Building on this framework Elson (2006) propose four dimensions for evaluating personal income taxes: (i) their explicit or implicit discriminatory content, (ii) their differential tax incidence on men and women, (iii) the behavioural incentives they generate, and (iv) their effects on gender income inequality (Elson, 2006). By analyzing the effects of a tax reform on income inequality and behavioural incentives, this study aligns with this broader framework and the specific theories outlined in the following subsections.

3.2.2. Tax theory: vertical and horizontal equity. The interaction of progressivity on the wage gender gap.

Tax theory, grounded in the principles of vertical and horizontal equity, provides a theoretical lens for examining the distributional effects of taxation. Vertical equity posits that individuals with greater capacity to pay should bear a higher tax burden, while horizontal equity asserts that individuals with equal capacity to pay should be taxed equally (Stiglitz, 1988; Lambert, 1993). Progressive tax systems reinforce vertical equity by taxing higher-income groups more heavily, while horizontal equity is maintained when individuals with similar incomes face similar tax rates.

Progressivity is particularly relevant in the context of gender dynamics, as women are overrepresented in low- and middle-income brackets. As outlined in the literature review, recent studies suggests that progressive taxation has the potential to reduce post-tax income disparities between genders by redistributing income more equitably leading to relatively smaller post-tax income gaps compared to pre-tax gaps (Richards-Melamdir, 2021; Doorley & Keane, 2023). Gender differences in tax payments stemming from low levels of progressivity constitute a form of implicit bias, as tax systems impact women and men differently due to gender disparities in earnings and care responsibilities that influence tax liabilities and benefit entitlements (Avram & Popova, 2021).

These factors interact with the structure of tax progressivity in several ways (Richards-Melamdir, 2021; Grown, 2010): (i) in progressive tax systems, gender wage gaps that favor men result in men being subject to higher marginal tax rates, which reduces the post-tax income gap; (ii) less progressive tax systems may disproportionately burden women if lower income brackets face higher effective tax rates than upper brackets, which are often dominated by men; (iii) greater tax progressivity is generally associated with narrower post-tax gender income gaps, as income redistribution mitigates disparities.

This literature also predicts that the degree to which the gender earnings gap is affected by the tax system depends on the size and nature of the gender wage gap and the design of the tax-benefit system. In countries with low female labour force participation, tax-benefit systems with strong welfare components cushion the gender income gap. Conversely, in countries with large gender wage gaps, progressive taxation plays a more substantial role in reducing income disparities (Doorley & Keane, 2023).

3.2.3. The labour supply models. Differential elasticities across genders.

Reforms that enhance the progressivity of tax systems address inequality not only through mechanical redistribution but also by influencing labour supply decisions (Coelho *et al.*, 2024). Labour supply models provide a framework to understand these behavioural responses to income taxation, distinguishing between static and dynamic models. Static models typically analyze short-term labour supply responses using cross-sectional data to estimate compensated and uncompensated elasticities. In contrast, dynamic models incorporate life-cycle considerations, such as savings, human capital accumulation, and intertemporal labour supply decisions, offering a nuanced understanding of how individuals respond to taxes over time (Keane, 2011).

The life-cycle labour supply model, introduced by Thomas MaCurdy (1981), frames labour supply decisions as the outcome of individuals optimally allocating consumption and leisure over time. While most labour supply research has employed static models, dynamic models allow for more comprehensive analyses, including the long-term effects of tax reforms on savings, retirement, and work hours (Keane, 2011). However, the complexity of these models, coupled with the high-quality data requirements, has limited their application, especially in simulating tax reforms (Meghir & Phillips, 2010).

Labour supply decisions are influenced by income taxation through multiple channels, including adjustments in working hours, effort, career choices, timing of compensation, tax avoidance, and evasion (Tortarolo *et al.*, 2020). Taxation influences labour supply decisions through two opposing forces: the substitution effect and the income effect (Rosen, 1995). An increase in marginal tax rates reduces net income per hour, encouraging individuals to substitute leisure for work (substitution effect). Conversely, the reduction in disposable income may prompt individuals to work more to maintain their standard of living (income effect). A reduction of a marginal tax rate has the opposite effect: it increases the net income per hour, which may lead individuals to work less as they can achieve the same level of income with fewer hours (income effect), or it may incentivize individuals to work more because the reward for additional effort is greater (substitution effect). The net effect on labour supply depends on the relative strength of these forces. In principle, estimates capture a mix of substitution and income effects.

Labour supply adjustments are observed at two key margins: the extensive margin, which measures labour market participation, and the intensive margin, which reflects adjustments in hours worked (Bosch & Jongen, 2012). Family characteristics and background also shape labour supply decisions, influencing preferences for work and responses to tax changes (Meghir & Phillips, 2010). The empirical framework of this study is grounded in extensive literature that examines the incidence of income tax and the behavioural responses it elicits across genders.

This framework is crucial to understanding how female labour supply might respond differently to changes in tax burdens, given that women generally exhibit higher labour elasticity than men (Keane, 2011). High marginal tax rates and joint taxation often create disincentives for women to participate in the labour market or increase their working hours, as couples seek to avoid higher tax brackets (Meghir & Phillips, 2010; Richards-Melamdir, 2021). Conversely, reduced tax burdens may encourage higher female labour participation by improving economic incentives.

3.3. Conceptual framework and hypotheses

Building on the theoretical and empirical evidence outlined in the literature review and theoretical framework, this study examines the impact of Argentina's 2013 personal income tax reform on gender disparities in income and labour supply. Specifically, the analysis focuses on two dimensions: (i) the effect of the reform on post-tax wages and (ii) its effect on female labour market participation, particularly on the intensive margin. This section presents the conceptual framework, integrating elements from the theoretical approaches discussed earlier with the specifics of the 2013 reform. This is followed by the formulation of two hypotheses.

3.3.1 Theoretical expectations on wages

The 2013 income tax reform, by reducing the tax burden on salaried employees earning less than AR$15.000 had a direct positive impact on post-tax salaries for workers within this income range. The reform is expected to alleviate the tax burden on individuals previously affected by the erosion of progressivity caused by inflation (Beveraggi & Ghilardi, 2015; Tortarolo, 2018), most of whom are women (Rodriguez Enríquez & Méndez Santolaria, 2021). By making the tax system more progressive, the reform lowered marginal tax rates for those earning below the threshold.

Women are disproportionately represented in lower-income brackets, precisely where the reform's tax exemptions were concentrated. As a result, the tax relief introduced in 2013 likely provided greater relative net income gains for women compared to men. This differential impact is expected to contribute to a narrowing of the gender wage gap, as women benefited more substantially from the reduction in tax liabilities. The following hypothesis guides the analysis:

Hypothesis 1:
Since women are disproportionately represented in lower income brackets, the 2013 reform is expected to reduce their tax burden more significantly than men's, resulting in greater relative net income gains for women and a reduction in the post-tax gender wage gap.

3.3.2. Theoretical expectations on labour market responses

The changes introduced by the 2013 reform created a significant tax break, increasing the financial incentives for individuals to supply more labour. The tax exemptions implemented under the reform are expected to influence labour supply both at the extensive and intensive margins. This study focuses on the rule that provided a tax break to individuals who were already working, hypothesizing that, on the intensive margin, these individuals would choose to work more hours and earn more, given that the marginal income tax rate on additional earnings was effectively reduced to zero during the tax holiday. This substitution effect makes working additional hours more attractive, provided it outweighs the income effect.

While the general population's labour supply response to such reforms is typically modest, as suggested by the literature (Tortarolo *et al.*, 2020), this study hypothesizes that women are more likely to exhibit stronger responses due to their traditionally higher labour supply elasticity. Women's labour supply has been the focus of numerous studies primarily because in many countries, women tend to work fewer hours and participate less in the labour market than men, meaning policies that draw women into the workforce could have substantial economic growth implications (Meghir & Phillips, 2010). In Argentina, the gender gap in hours worked is pronounced, with women averaging 19,3 hours of paid work per week compared to 36,6 hours for men (ECLAC, 2023).

Assuming the reform alleviated the burden on individuals impacted by the erosion of progressivity due to inflation (Beveraggi & Ghilardi, 2015; Tortarolo, 2018), a more progressive system, where women constitute the majority of beneficiaries, would result in

lower marginal tax rates for them, thereby providing stronger incentives to increase their labour supply.

Hypothesis 2:
Given that women exhibit higher labour supply elasticities than men, the reduction in their tax burden will result in a measurable increase in the hours they work.

4. Research design

4.1. Dataset

This study uses data from the Longitudinal Sample of Registered Employment (MLER), a dataset published by the Ministry of Labour, Employment, and Social Security in Argentina (MTEySS). The MLER is generated from the administrative records of the Argentine Integrated Pension System (SIPA), compiled from monthly affidavits that private companies submit to the Federal Public Revenue Administration (AFIP) to report their employees' social security contributions. This dataset provides a unique opportunity to analyze, on a monthly basis, the evolution of registered private employment and wages in Argentina over a 26-year period, from 1996 to 2021 (MTEySS, 2022).

The dataset contains monthly information on registered employment, including detailed data on worker characteristics and employer attributes. The MLER is structured at the employment relationship level, meaning it includes all employment relationships of each individual. Because it is based on official social security records, the sample population consists of all registered private-sector jobs reported in the SIPA between 1996 and 2021. According to the Ministry of Labour, Employment, and Social Security, the sample represents about 3% of the total population, capturing almost 600.000 workers and over 1,8 million employment relationships (MTEySS, 2022). To create the MLER, a simple random sampling method was used, along with an algorithm that replicates the previous sample while also incorporating new records. Each worker's full employment history is included, and once a person enters the panel, they remain in it until they exit registered employment, allowing for a comprehensive longitudinal view of their work trajectory.

For the analysis presented in the following sections, I use monthly observations for the pre-reform year, the year of reform itself, and the post-reform year (period: 2012-2014). This subsample consists of 6.400.498 observations from 214.392 individuals.

The MLER sample offers several advantages over survey data used in previous research, which often lack a panel design and are prone to underreporting issues (Quaglia, 2013; Rossignolo, 2022). This dataset captures information that is frequently underreported or less accurately recorded in surveys, such as salary levels and employment histories, enabling a high degree of precision in estimating gross salaries. Furthermore, the MLER includes data from across the entire national territory, ensuring comprehensive geographic representation, whereas household surveys typically cover only urban areas.

However, the MLER dataset has some limitations. It does not cover public-sector employment or unregistered private-sector jobs. According to the 2021 Permanent Household Survey, private registered salaried employees represent 54,1% of all private employees, 38,2% of all salaried employees (including public sector and unregistered workers), and 27% of the total employed population (including self-employed workers, employers, and unpaid family workers) (INDEC, 2021).

Additionally, the dataset has undergone anonymization and top-coding processes to protect confidentiality. Specifically, salaries have been randomly adjusted by ±3%, and salaries above the 98th percentile within each two-digit industry category (CIIU) have been micro-aggregated. This micro-aggregation process involves ranking salaries within each industry, averaging every three consecutive salaries, and imputing these averages to the original data points (MTEySS, 2022). Due to the non-linear structure of Argentina's tax system—particularly the Minimum Non-Taxable Income (MNI) threshold and tax brackets—this top-coding approach may slightly underestimate income tax liabilities (Afonso, 2023).

The MLER dataset does not contain household or family data, which prevents direct calculation of personal deductions for spouses, dependents, or other family-related allowances. To address this limitation, I use MLER gross salary data to simulate tax liability at the individual worker level following the tax calculator proposed by Tortarolo (2018), which allows to identify workers subject to the tax and compute monthly withholdings. The simulation begins with the conversion of pre-tax gross earnings to taxable earnings by subtracting 17% for social security contributions. This 17% deduction consists of 11% for pension contributions, 3% for social security contributions, and 3% as an estimated average for trade union contributions (Beveraggi & Ghilardi, 2015).

From the resulting net salary, I further subtract the non-taxable minimum and the special deduction, using the legally defined values for each period, income bracket, and region, as

specified in **Tables 1** and **2**. The outcome is the Net Taxable Income (NTI). To compute the income tax liability, I apply the tax schedule outlined in **Table 3** to the NTI. The final net salary (out-of-pocket income) is calculated by subtracting the income tax liability from the salary net of contributions.

Although this method does not account for individual-level personal deductions such as those for spouses or dependents, it provides a reliable approximation of actual tax withholdings both before and after the reform. This is particularly true because the gross earnings variable in the dataset comes from the social security records and are the same values employers used to calculate tax withholdings. Additionally, as discussed below (See Section 4.3.3), workers did not have the ability to manipulate the running variable, ensuring the robustness of the tax simulation.

4.2. Operationalization

Building on the hypotheses presented above, this study identifies two categories of outcome variables to evaluate the effects of the 2013 tax reform.

(i) The first category focuses on the tax burden to assess post-tax income disparities between genders. To study these effects, I use (a) net salary to assess post-tax income and b) average tax rate (ATR), defined as the ratio of taxes paid to gross salary.

(ii) The second category investigates behavioural responses to the reform. To study these effects, I use (a) the gross salary in the post reform months and (b) the gross salary growth relative to August 2013, the month immediately preceding the reform. These variables are used as a proxy to capture potential adjustments at the intensive margin, such as overtime hours, in response to tax relief. This approach aligns with existing literature, which emphasizes the utility of gross salary as a proxy when detailed data on wages and hours worked are unavailable (Meghir & Phillips, 2010), as is the case with the social security data used in this study. Both the gross and net salary variables are adjusted for inflation to ensure comparability across time periods and control for Argentina's high-inflation environment during the study period (Cavallo & Bertolotto, 2016).

Moreover, the analysis is conducted in two stages. First, the reform's effects are assessed across the full sample to identify general trends and overarching patterns. Second, to capture potential gender-specific differences, the analysis is performed separately for men and women. This

approach leverages the large sample size to provide deeper insights into how the reform differentially impacts labour and wage outcomes based on gender.

4.3. Descriptive statistics

Table 4 presents a comprehensive summary of the descriptive statistics for the entire sample, as well as for two subgroups: the treatment group, comprising individuals whose maximum wage during the reference period exceeded AR$15.000, and the control group, consisting of those whose maximum wage fell below this threshold. The data corresponds to August 2013, the month immediately preceding the implementation of the reform. The full sample for that month consists of 188.797 observations with a mean gross income of AR$ 8.299 and a standard deviation of AR$ 11.186. In the treated group, with 43.984 observations, the mean gross income is significantly higher at AR$ 17.607,99, compared to the control group, which has 144.813 observations and a mean gross income of AR$ 5.472,12.

In terms of gender composition, 32% of the sample are female. The treated group has a notably lower proportion of women, at 21%, compared to the control group, where 35% of the individuals are women. These figures reflect the overrepresentation of women in lower-income brackets.

The mean age across the full sample is 37,9 years, with treated individuals being older on average (41,6 years) than those in the control group (36,8 years). This age discrepancy suggests that older workers, who may have been employed longer, were more likely to fall into the treated category. This aligns with the job history data, where the average years worked is 8,9 years for the full population, 12,4 years for the treated group, and 7,8 years for the control group.

Lastly, the prevalence of workers holding multiple jobs is relatively low across all groups. 5.8% of the full sample reported having multiple jobs, with a slightly smaller proportion in the treated group (4%) compared to the control group (6%). This difference may be attributed to higher earnings in the treated group reducing the need for additional employment.

Table 4: Descriptive statistics for August 2013 (month before treatment)

	All		Treated		Control	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Gross income	8299,4	11186,44	17607,99	19961,13	5472,12	2795,44
Female	0,32	0,47	0,21	0,41	0,35	0,48
Age	37,96	11,75	41,64	10,96	36,84	11,75
Job history	8,88	6,55	12,43	5,9	7,8	6,35
Multiple jobs	0,058	0,233	0,042	0,201	0,062	0,242
No. Obs.	188.797		43.984		144.813	

Note: Descriptive statistics for the month before treatment.

Additionally, **Table A.2** in the Appendix presents descriptive statistics for income brackets during the pre-reform period (January 2012 to August 2013) and the post-reform period (September 2013 to December 2014). The data confirms that higher income brackets are predominantly composed of older individuals and males. Appendix tables and graphs provide further insights into salary distribution by region and gender, illustrating the gender disparities before and after the reform. In the pre-reform year, the mean salary for women was AR$ 6.176,54, compared to AR$ 8.338,97 for men, highlighting a substantial gender wage gap.

The number of people subjected to the tax also provides critical context for understanding the reform's intervention. In the month before the reform (August 2013), 49.366 individuals were taxed, with a gender breakdown of 38.872 men and 10.494 women, indicating that men constituted the majority of those paying the tax. However, in the first month after the reform (September 2013), the number of taxpayers significantly decreased to 34.732 individuals, comprising 27.797 men and 6.935 women. These figures illustrate the reform's immediate impact in reducing the number of taxed individuals.

4.4. Empirical strategy

4.4.1. Regression discontinuity design

To assess the causal effect of a treatment, randomized controlled trial (RCT) is often regarded as the gold standard for causal inference (Toshkov, 2016), because random assignment ensures that the treatment and control groups differ solely in their treatment status, allowing observed differences in outcomes to be attributed to the treatment (Angrist & Pischke, 2015). However, implementing RCTs in political science is frequently unfeasible, impractical, or ethically contentious (Toshkov, 2016). In such cases, quasi-experimental methods provide a robust alternative for causal inference.

The Regression Discontinuity Design (RDD) is one such approach. Rules that constrain the role of chance in human affairs often generate conditions akin to natural experiments, providing unique opportunities for causal inference (Angrist & Pischke, 2015). RRD exploits assignment rules that determine treatment eligibility based on a running variable that crosses a predefined cutoff.

Therefore, an RDD consists of three key components: the running variable, the cutoff, and the treatment. The running variable assigns a score to each unit, which determines the treatment eligibility above or below a known cutoff (Cattaneo *et al.*, 2020). In this study, the 2013 tax reform created a sharp discontinuity in tax rates based on whether a worker's highest gross monthly wage, accrued between January and August 2013, was below or above AR$15.000. Specifically, the running variable is the maximum wage received in the reference period, the cutoff is AR$15.000 and the treatment is continuing to pay the tax.

Under this setup, the control group comprises individuals below the threshold who became exempt from paying the tax, while the treatment group includes individuals earning above the cutoff who continued paying it. This setup creates a clean "sharp" RDD, where the probability of treatment shifts deterministically from zero to one at the cutoff point (Huntington-Klein, 2021; Angrist & Pischke, 2015).

The primary challenge in causal inference under an RDD framework stems from the fact that treated and untreated units cannot share the same value of the running variable. As a result, causal identification hinges on extrapolating toward the cutoff, where observations just above and below the threshold serve as valid comparisons (Cattaneo *et al.*, 2020). At the cutoff, the units on either side are assumed to be similar in all respects except for their treatment status, allowing the vertical distance between the two regression curves at the cutoff to approximate the treatment effect. This estimation is achieved by observing the discontinuity in outcomes at the threshold, which represents the local average treatment effect (Huntington-Klein, 2021).

The strength of RDD lies in its ability to convincingly address selection bias. Units just to the left and right of the cutoff can reasonably be considered comparable, with any observed differences in outcomes attributable to the treatment alone (Cunningham, 2021; Huntington-Klein, 2021). This comparability assumption underpins all RDDs and is formalized using continuity assumptions. These assumptions posit that the regression functions of treated and untreated units would have followed a smooth path across the cutoff in the absence of treatment. In this study, this framework enables us to compare workers with incomes just above

and just below the threshold to infer the causal effect of a salient and sharp tax cut on the labour supply and net earnings of high-wage earners.

This framework is also useful to deal with endogeneity. Individuals who work longer hours often earn higher hourly wages and face higher marginal tax rates, creating a circular relationship between incentives and effort (Meghir & Phillips, 2010). This interdependence leads to an endogeneity problem, complicating efforts to estimate the impact of incentives on working hours. To address this, credible analyses require exogenous changes to work incentives—changes that are unrelated to individual preferences for work (Meghir & Phillips, 2010). The 2013 tax reform offers such exogenous variation by altering after-tax wages independently of individual behaviour. This helps disentangle the simultaneity of working hours and after-tax wages, which may otherwise be influenced by unobserved factors like preferences or ability, or directly by the progressive tax system (Bosch & Van Der Klaauw, 2012).

Empirically, there are two strategies to address the challenge of modeling the regression functions. Early applications of RDD employed global polynomial approximations, known as parametric RD, which fit high-order polynomials to the entire range of the running variable (Angrist & Pischke, 2015). However, this approach has been widely criticized for its inability to produce point estimators and inference procedures with desirable statistical properties for the RD treatment effect (Cattaneo *et al.*, 2020).

Modern RD practices instead rely on local polynomial methods, which focus on estimating the treatment effect using only observations around the cutoff. Specifically, this approach focuses on a bandwidth that defines the neighborhood around the cutoff within which the analysis is conducted. This local regression approach, also referred to as non-parametric regression, avoids imposing a specific functional form on the entire data range and is substantially more robust to outliers and extreme trends far from the threshold (Huntington-Klein, 2021; Cattaneo *et al.*, 2020).

Following Cattaneo et al. (2020), I adopt the continuity-based framework for RD analysis, which is the most commonly employed approach in practice. Within this framework, estimation typically proceeds by using local polynomial methods to approximate the regression function on each side of the cutoff separately and then computing the estimated treatment effect.

The implementation of local polynomial regression in RDD requires three key decisions: the bandwidth, which defines the range of observations included in the estimation; the polynomial order, which specifies the degree of the local polynomial approximation; and the kernel function, which determines the weighting of observations based on their distance to the cutoff. In this analysis, I follow the methodological framework proposed by Cattaneo *et al.* (2020), which emphasizes local polynomial estimation with robust inference procedures. Specifically, I employ a local linear regression, using a triangular kernel and an optimal data-driven bandwidth selection procedure. This approach ensures credible estimation of the causal effect while minimizing bias and variance. The bandwidth is chosen to balance the trade-off between precision and bias, focusing the analysis on the observations most relevant to identifying the discontinuity at the cutoff (Cattaneo *et al*., 2020, Calonico *et al*., 2017).

4.4.2. Econometric Model

Building on the local linear regression framework proposed by Cattaneo *et al.* (2020), the empirical strategy estimates treatment effects at the cutoff using the following baseline equation:

$$Y_{it} = \alpha + \rho \cdot 1(R_i > c) + \beta_1 \cdot (R_i - c) + \beta_2 \cdot (1(R_i > c) \cdot (R_i - c)) + \gamma \cdot Cont_i + \varepsilon_i$$

where Y_{it} represents the dependent variable of interest for individual *i* in month or year *t*. The outcome variables include the net salary, the average tax rate (ATR), gross salary and wage growth relative to August 2013. The intercept is denoted by α, while R_i represents the running variable defined as the maximum gross monthly wage earned by each individual during the reference period (January to August 2013), which has been centered to zero:

$$R_i = \max(\text{gross monthly wage}_{i,\text{Jan-Aug 2013}}) - 15000$$

The parameter of interest, ρ, measures the local average treatment effect on the outcome variable Y at the cutoff. The vector $Cont_i$ represents control variables included in robustness checks to account for observable characteristics that may influence the outcome variables, such as age, salary in December 2012, job history (measured as years worked), and a binary indicator for multiple jobs. ε is the error term. Following Lee and Card (2008), the standard errors are clustered at the level of the running variable to account for potential correlation in the residuals within bins of the running variable.

The equation is used to assess pooled effects for the post-reform years, providing an overall estimate of the reform's impact. To investigate the temporal dynamics of the treatment effects, the same equation is applied to monthly data from the post-reform period, enabling an analysis of how treatment effects evolve over time.

To explore heterogeneity in treatment effects, the baseline model is extended to analyze gender-specific outcomes. Separate regressions are estimated for men and women following a conditioning or subsetting strategy proposed by Cattaneo *et al.* (2020). For this analysis, a dummy variable is introduced, equal to 1 if the observation corresponds to a woman and 0 otherwise. The model can be rewritten as:

$$Y_{it} = \alpha + \rho \cdot 1(R_i > c) + \beta_1 \cdot (R_i - c) + \beta_2 \cdot (1(R_i > c) \cdot (R_i - c)) + \delta \cdot Female_i + \gamma \cdot Cont_i + \varepsilon_i$$

As detailed above, the econometric analysis is conducted using local polynomial methods. This analysis is performed using the *rdrobust* package developed by Cattaneo *et al.* (2020). This package provides a fully non-parametric, internally coherent methodology for local polynomial bandwidth selection, point estimation, and inference. Given that RD estimates are sensitive to the choice of bandwidth, the bandwidth is selected using a data-driven, automatic approach to minimize specification searching and ad hoc decisions. Specifically, I employ the MSE-optimal bandwidth selection (denoted as *mserd*), which determines the optimal bandwidth by minimizing the mean squared error (MSE) of the local polynomial RD point estimator (Cattaneo *et al*., 2020; Calonico *et al*., 2014). Since the MSE is the sum of the estimator's squared bias and variance, this approach optimally balances the trade-off between bias and variance.

After estimating the treatment effect on the first outcome variable, net salary, the optimal bandwidth of 5706—determined through a data-driven procedure—is consistently applied in subsequent analyses to ensure methodological rigor and comparability across different outcomes. Notably, the optimal bandwidth for gross salary is very similar, at 5878, further validating the consistency of the approach. This and other alternative bandwidths are thoroughly explored in the robustness checks presented in Section 5.3.

4.4.3. Validity and reliability

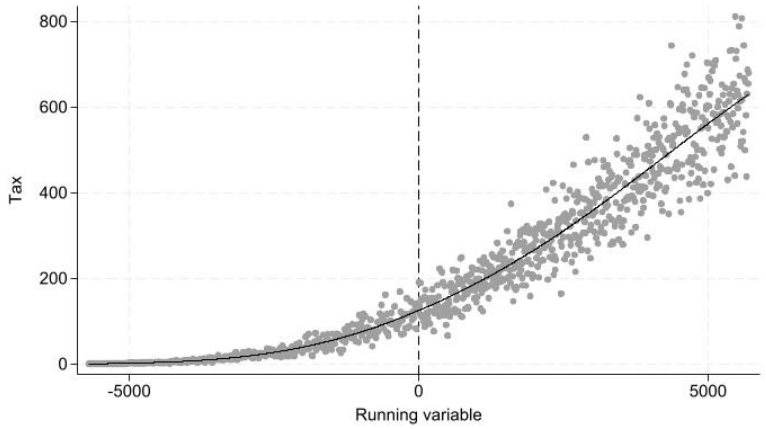
Validity refers to the degree to which a measurement or estimate accurately reflects reality, while reliability concerns the consistency of results when measured under similar conditions (Neuman, 2014). These two concepts are critical in research design to ensure robust and credible findings. Internal

validity focuses on eliminating systematic errors or biases within the study design that could lead to false conclusions, even with appropriate controls in place. Conversely, external validity pertains to the generalizability of the findings, assessing whether results derived from a specific setting or group can be applied to broader contexts or populations.

As detailed above, while the sharp RD parameter provides a causal estimate—capturing the average difference in potential outcomes under treatment versus control—it is inherently local in nature. This means the estimate applies only to units near the cutoff and may not generalize to other parts of the running variable's distribution. Consequently, the RD treatment effect often exhibits limited external validity unless additional, and typically restrictive, assumptions about the global shape of the regression functions are made (Cattaneo *et al.*, 2020).

An essential step in evaluating the robustness of a RDD is to provide empirical evidence supporting the plausibility of the assumptions underlying the method. Although the continuity assumptions that guarantee the validity of the RDD are inherently untestable—since they pertain to unobservable features of the data—the method allows for several empirical tests that can lend credibility to these assumptions under reasonable conditions (Cattaneo *et al.*, 2020). One intuitive way to illustrate the validity of the RDD is to visually inspect the relationship between the running variable and the outcome variable. This involves plotting the average outcome against the running variable in disjoint bins and overlaying separate polynomial fits for observations below and above the cutoff. The following section displays plots for all the outcome variables. In this section, **Figure 1** shows the absence of a discontinuity in the tax paid prior to the tax reform implementation, which strengthens the validity of the design as it demonstrates that the observed treatment effect in the post-reform period can be attributed to the reform itself rather than pre-existing trends or discontinuities.

Figure 1: Tax paid before the reform (August 2013)



Note: This figure presents binned scatter plots, with the number of bins determined using the mimicking variance method (Cattaneo *et al.*, 2020). Each dot represents the mean of the x- and y-variables within a bin, while the solid line represents a linear fit estimated using OLS. The horizontal axis depicts the score values of the running variable. The vertical axis shows the corresponding tax paid for August 2013.

In the following, I discuss the institutional background information that supports the design and I conduct standard empirical tests commonly used in the RD literature based on (i) the continuity of the score density around the cutoff and (ii) the null treatment effect on predetermined covariates. Additionally, Section 5.3, includes several robustness checks further enhancing the validity and reliability of this study.

4.4.3.1. The continuity of the score density around the cutoff

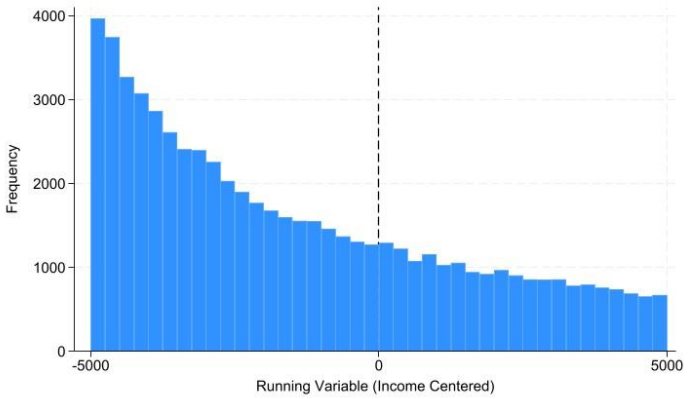
For RDD to produce unbiased estimates, the running variable must behave as if it were randomly assigned near the cutoff. This condition holds when the assignment rule is both clearly defined and precise, and individuals cannot manipulate their position relative to the threshold (Cunningham, 2021). However, this assumption can be violated if the assignment rule is known in advance, individuals have an incentive to act strategically, and they have sufficient time to adjust their behaviour.

As Cattaneo *et al.* (2020) suggest, the first step in addressing this concern involves evaluating institutional mechanisms that may facilitate or deter manipulation. In the context of this study, the exemption rule relied on pre-determined wages reported to the government prior to the reform announcement, which effectively precluded any possibility of strategic adjustments by firms or individuals (See Section 2.3). The primary data source for this analysis comprises monthly wage reports submitted by firms to the government, ensuring that the running variable—the maximum gross wage between January and August 2013—reflects actual, unmanipulated earnings. Additionally, firms had no economic incentive to misreport wages, as the statutory tax burden of the reform fell entirely on employees. Any attempt to underreport earnings would have provided no benefit to firms while risking strict penalties for misreporting, further discouraging manipulation (Tortarolo *et al.*, 2020).

The second step in verifying the continuity assumption involves an empirical test of the distribution of the running variable. This falsification test examines whether the number of observations below the cutoff is surprisingly different from the number of observations above it. Under the assumption that individuals cannot manipulate their score, the number of observations just above the cutoff should be roughly equal to the number just below it in a local neighborhood (Cattaneo *et al.*, 2020). To evaluate this, I first conducted a visual inspection of the running variable distribution. **Figure 2** presents a histogram of the running variable, illustrating the number of observations in small intervals around the AR$ 15.000 cutoff. The

figure reveals no evidence of clustering or bunching below the threshold, indicating that individuals near the cutoff did not systematically manipulate their reported earnings.

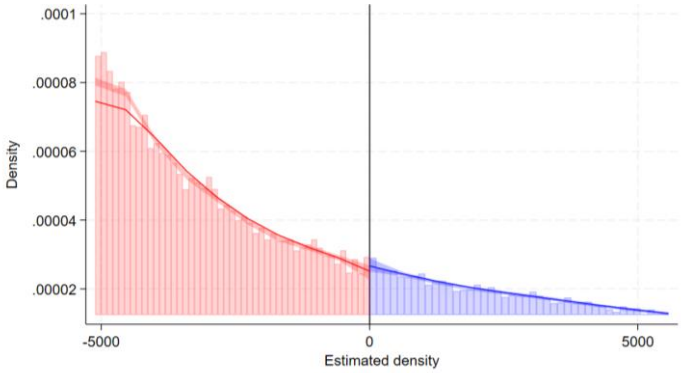
Figure 2: Histogram of the distribution over score values



Note: this graph shows the distribution of the sample over the score values. The vertical solid lines represent the cutoff.

To complement this visual analysis, I conducted a formal density test following the methodology outlined by Cattaneo *et al.* (2020). This test evaluates the null hypothesis that the density of the running variable remains continuous at the cutoff. The test statistic for manipulation yielded T = 1.5201 with a p-value of P>|T| = 0.1285 (See **Table B.1**. in the Appendix). Since the p-value is greater than conventional significance levels, the null hypothesis of continuity in the density of treated and control observations at the cutoff cannot be rejected. **Figure 3** illustrates the results of the continuity test, providing a graphical representation of the density estimation on either side of the cutoff. Taken together, the visual inspection and formal density test indicates no statistical evidence of manipulation at the threshold, supporting the validity of the RDD.

Figure 3: Manipulation test using *rddensity*



Note: This graph shows the formal density test as proposed by Cattaneo *et al.* (2020).

4.4.3.2. The null treatment effect on predetermined covariates

Another critical requirement for the validity of the RDD is that individuals just below and just above the cutoff are comparable (Angrist & Pischke, 2015). The idea behind this test is that predetermined covariates should not display any systematic discontinuity at the cutoff because they could not have been influenced by the treatment itself. To formally test this assumption, I follow the approach proposed by Cattaneo *et al.* (2020) and conduct a balance test for predetermined covariates. This falsification test employs local polynomial regression techniques to assess whether each covariate is continuous at the cutoff.

The analysis is implemented by estimating a local linear RD effect for each predetermined covariate using the *rdrobust* package. The results of the formal balance test are summarized in **Table 5**.

Table 5: Formal Continuity-Based Analysis for Covariates

			Robust inference		
Variable	**CERD optimal BW**	**RD Estimator**	**p-value**	**Conf. Int.**	**No. Obs.**
Age in August 2013	3801	-0,025	0,823	(-.548; .435)	42058
Female	5084	-0,008	0,284	(-.026; .008)	63988
Multiple jobs	7087	0,0005	0,852	(-.005; .007)	94397
Work history	4703	-0,056	0,547	(-.301; .159)	56878
Salary December 2012	4233	-40	0,534	(-205; 106)	47721

Note: This table summarizes the local linear Regression Discontinuity (RD) effects for various covariates, utilizing CER-optimal bandwidths as recommended by Cattaneo *et al.* (2020). The CER-optimal bandwidth is tailored to prioritize the size of hypothesis tests over their power, ensuring robust inference but potentially sacrificing some precision. The number of observations used in the analysis varies for each covariate; this occurs because the CERD-optimal bandwidth is different for every covariate analyzed.

The covariates tested include age, gender, job history (years worked), salary in December 2012, and a binary indicator for multiple jobs. Across all covariates, the point estimates are small, the 95% robust confidence intervals include zero and the corresponding p-values are all greater than conventional significance levels. In other words, there is no empirical evidence that these predetermined covariates are discontinuous at the cutoff.

The available evidence indicates that workers near the threshold are indeed comparable and that the policy could not have been gamed by individuals or firms altering wage reports to

benefit from the tax cut. These findings are essential for ensuring the validity of the RD analysis, as it supports the assumption of quasi-random assignment near the cutoff.

4.4.3.3. Absence of other interventions

A crucial assumption for the validity of a RRD is that no other policy interventions or external shocks coincide with the cutoff, as such factors could influence outcomes independently of the treatment. This assumption ensures that any observed discontinuity at the threshold can be attributed solely to the treatment effect (Angrist and Pischke, 2015). Violations of this assumption, such as overlapping interventions or omitted variables, could result in biased estimates by introducing spurious discontinuities at the cutoff.

To address this concern, institutional data and policy records have been reviewed to confirm the absence of concurrent policy reforms during the period under study (See Section 2.4). This historical validation ensures that the estimated treatment effects are not influenced by external changes in labor markets, tax policies, or other economic conditions, thereby reinforcing the internal validity of the analysis.

5. Results

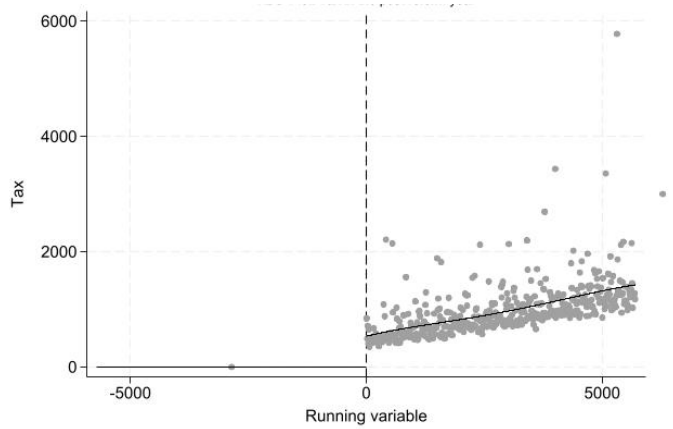
5.1. Pooled effects

The basic idea behind RDD is to estimate the causal effect of the 2013 tax reform by comparing average outcomes for individuals just above and below the income threshold that determined tax exemption. This section presents the pooled treatment effects for the post-reform year (September 2013 to August 2014).

To illustrate the RDD graphically, I create binned means plots following the *rdplot* routine in Cattaneo *et al.* (2020), where the mean outcome is plotted against the running variable (income centered at the cutoff). This "binned means plot" allows us to visually inspect the discontinuity in outcomes at the threshold (Huntington-Klein, 2021), which represents the treatment effect.

To illustrate the size of the treatment at the cutoff, **Figure 4** shows the mean tax rates by bins of the running variable for the post-reform period (September 2013 to August 2014). The figure demonstrates a sharp change in tax rates at the threshold, confirming the significant impact of the tax cut on individuals below the AR$15.000 income limit.

Figure 4: RRD Plot tax paid in the post reform year



Note: RD plots present two summaries: (i) a global polynomial fit which is an approximation to the unknown regression functions, represented by a solid line, and (ii) local sample means, represented by dots. The number and spacing of bins are determined using a data-driven Mimicking Variance Method, ensuring that the binned means reflect the variability in the raw data. Additionally, quantile-spaced bins (QS bins) provide a visual representation of the density of observations across the running variable, with each bin containing approximately the same number of observations.

To explore the reform's broader effects, **Figures 5.A and 5.B** plot the binned means for the first two outcome variables: average net salary and the average tax rate (ATR). Both plots reveal a clear discontinuity at the income threshold, with individuals just below the cutoff experiencing higher post-tax earnings and lower ATRs compared to those just above it. In contrast, **Figures 5.C and 5.D** examine the gross salary and wage growth during the post-reform period, which shows no visible discontinuity at the threshold. This suggests that while the reform directly influenced net outcomes through tax liability, it did not significantly affect gross earnings as a proxy for labour supply adjustments in the intensive margin. I will explore this further by analyzing monthly effects in the following sections. These additional tests will help determine whether the absence of a visible discontinuity in gross salary reflects a true null effect or masked temporal adjustments.

In the following, **Table 6** presents the regression results for the estimating equation described earlier, with separate analyses for the full population, men, and women.

Figure 5.A: RRD Plot Average net salary in the post-reform year

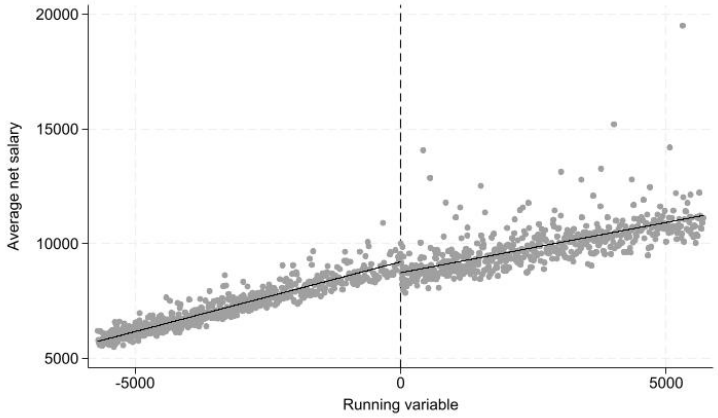


Figure 5.B: RRD Plot Average tax rate in the post-reform year

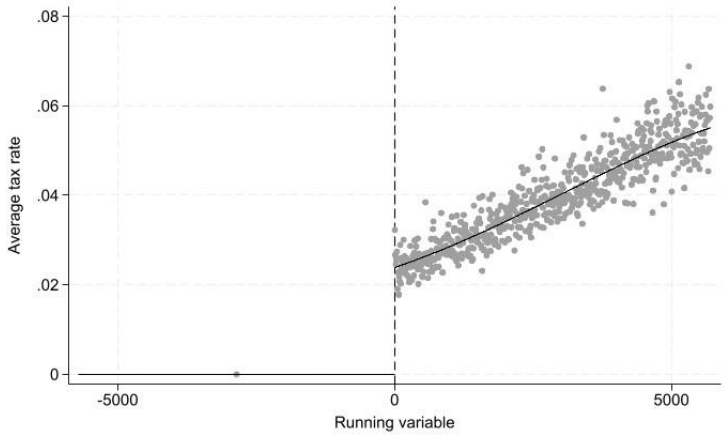


Figure 5.C: RRD Plot Average gross salary in the post-reform year

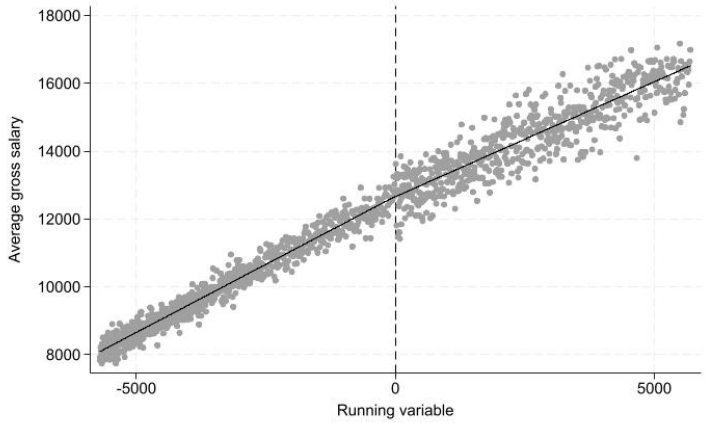
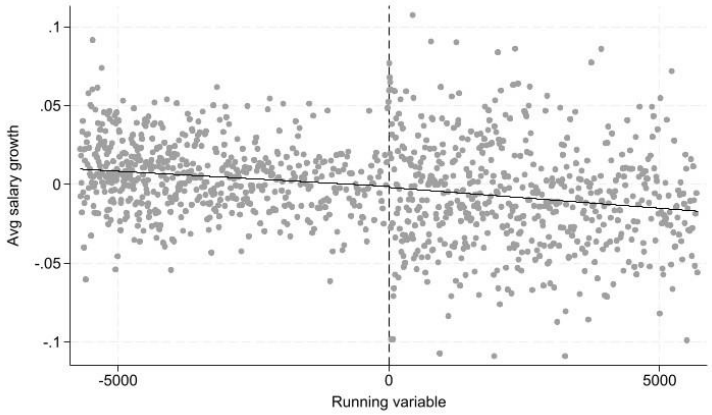


Figure 5.D: RRD Plot Average wage growth in the post-reform year relative to August 2013



Note: These figure presents binned scatter plots, with the number of bins determined using the mimicking variance method recommended by Cattaneo *et al*. (2020). Each dot represents the mean of the x- and y-variables within a bin, while the solid line represents a linear fit estimated using OLS. The horizontal axis depicts the score values of the running variable. The vertical axis shows the corresponding outcome variable.

Table 6: RDD Estimates

	Entire sample	Women	Men
Net salary			
Coefficient	-407	-324	-443
(s.e)	38,3	68,5	46,1
No. Obs.	2116103	672568	1443535
95% CI	(-512; -285)	(-531; -133)	(-564; -290)
ATR			
Coefficient	0.023	0.022	0.023
(s.e)	0,00023	0,00041	0,00027
No. Obs.	2080954	658018	1422936
95% CI	(.022; .024)	(.021; .023)	(.023; .024)
Gross salary			
Coefficient	-44,8	27,3	-77,9
(s.e)	52,7	93	63,5
No. Obs.	2116103	672568	1443535
95% CI	(-173; 131)	(-245; 288)	(-225; 142)
Salary growth			
Coefficient	-0,006	0,00112	-0,00761
(s.e)	0,00959	0,01894	0,01114
No. Obs.	185498	59194	126304
95% CI	(-.030; .025)	(-.041; .067)	(-.041; .024)

Note: Each column shows the results of pooled RDD treatment effects on the outcome for a 1-year period after treatment for a specific subgroup. Bandwidth below and above the cutoff = 5706. The

standard errors are adjusted for clustering by the running variable, ensuring that the estimates account for potential correlations within groups.

The tax reform caused a small and statistically significant reduction in net salary for individuals just above the AR$15.000 threshold, with an average decline of -407 ARS for the full sample ($p<0.01$). Gender-specific results indicate that men experienced a larger reduction of -443 ARS ($p<0.01$) compared to women, who saw a decline of -324 ARS ($p<0.01$). To further examine potential differences in treatment effects between men and women, I formally test the statistical significance of the observed differences in the estimated coefficients. This involves calculating the difference in treatment effects for men and women and assessing its significance using the associated standard errors. The results of this analysis confirm that the difference in treatment effects between men and women is not statistically significant.

The reform led to a small and statistically significant increase in the average tax rate (ATR) for individuals above the threshold. The ATR rose by 0,023 percentage points for the full sample ($p<0,01$). Gender-specific effects show a slightly smaller increase for women (0,022 percentage points) compared to men (0,023 percentage points), though the difference between the two is small and not statistically significant.

The analysis of gross salary—used as a proxy for labour supply adjustments—shows no significant effect of the reform. For the full sample, the estimated effect is -44,8 ARS and statistically insignificant. Gender-specific results show a small positive effect for women and a slightly larger negative effect for men, but neither result is statistically significant. Similarly, the results for salary growth show no significant impact of the reform. These results indicate that the reform had little to no influence on labour supply decisions, with workers being either unable or unwilling to adjust their income levels to respond to the tax changes (Tortarolo *et al.*, 2020.

The lack of significant changes in gross salary indicates that the observed effects on net salary and ATR are driven by the mechanical application of the tax reform rather than behavioural adjustments in labour supply. In the following section, I analyze monthly effects to explore whether any dynamic adjustments occurred over time.

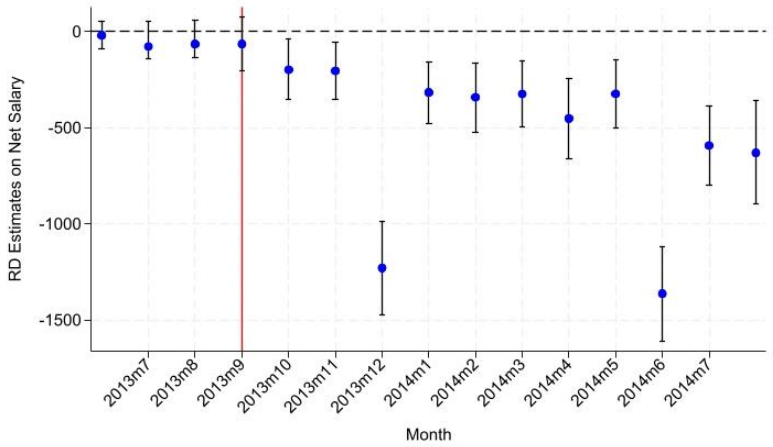
5.2. Monthly effects

To analyze the temporal dynamics of the tax reform's impact, I estimate the treatment effects on net salary and gross salary for each month from June 2013 to August 2014 using a monthly

RDD. This approach enables an analysis of whether the reform's effect was immediate, consistent over time, or characterized by temporal adjustments. As a robustness check, I include three pre-reform months (June, July, and August 2013) to verify the absence of any pre-existing discontinuities prior to the reform's implementation.

The monthly estimates for net salary, illustrated in **Figure 6**, reveal a statistically significant reduction starting in October 2013, immediately after the reform's implementation, reflecting the impact on the first salary paid following the policy change. This effect persists throughout the post-reform year, displaying minimal variation over time. The observed spikes in June and December correspond to biannual bonus payments mandated by Argentine labour law. The stability of the estimates in subsequent months indicates that the effect on net salary is largely a mechanical outcome of the reform—driven by higher tax liabilities for the treatment group—rather than a behavioural response by workers.

Figure 6: Monthly RD effects for net salary

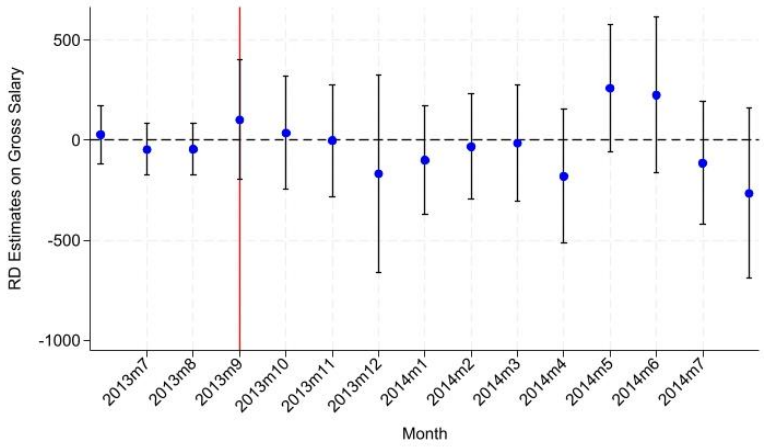


Note: This figure presents the RD estimates of the treatment effects on net salary by month. The dots represent the estimated coefficients, while the vertical bars indicate the 95% confidence intervals. A horizontal dashed line at y = 0 is included to help the reader assess whether the dynamic treatment effects are significantly different from zero. The vertical red line marks September 2013, the month when the reform was implemented.

In contrast, the monthly estimates for gross salary, presented in **Figure 7**, show no statistically significant discontinuities at the threshold during the post-reform period. The point estimates for gross salary remain small and insignificant across all months, suggesting that workers did not adjust their gross earnings—a proxy for changes in the intensive margin—in response to the reform. This finding aligns with the pooled analysis and reinforces the conclusion that the reform directly impacted disposable income (net salary) without affecting gross earnings.

Workers near the AR$15.000 threshold appear to have been either unable or unwilling to alter their labour supply (e.g., hours worked or effort) in response to the tax change.

Figure 7: Monthly RD effects for gross salary



Note: This figure presents the RD estimates of the treatment effects on gross salary by month. The dots represent the estimated coefficients, while the vertical bars indicate the 95% confidence intervals. A horizontal dashed line at y = 0 is included to help the reader assess whether the dynamic treatment effects are significantly different from zero. The vertical red line marks September 2013, the month when the reform was implemented.

5.3. Robustness checks

In this section, I conduct several robustness checks to confirm the reliability of the estimated treatment effects. **Table 7** presents the main results presented in **Table 6**, now including covariates such as age, salary in December 2012, work history, and multiple jobs. Furthermore, **Table C.1** in the Appendix reports the results of additional robustness checks, providing further evidence on the stability and validity of the findings.

5.3.1. Covariate-adjusted estimates

The first robustness check involves the inclusion of predetermined covariates—age, salary in December 2012, work history (years worked), and multiple jobs—in the regression discontinuity model. While the RD design does not require covariates for identification, their inclusion can improve the efficiency of the estimates by reducing the variance and shortening the confidence intervals (Cattaneo *et al.*, 2020).

Table 7 presents the results with covariate-adjusted estimates for the net salary, average tax rate (ATR), gross salary, and salary growth outcomes. These estimates are compared to the baseline results without covariates.

Table 7: Covariate-adjusted RD estimates

	Entire sample	Women	Men
Net salary			
Coefficient	-414	-365	-437
(s.e)	34,3	58,7	41,8
No. Obs.	1861925	595021	1266904
Robust 95% CI	(-517; -313)	(-592; -258)	(-541; -288)
ATR			
Coefficient	0,022	0,022	0,023
(s.e)	0,00022	0,00038	0,00026
No. Obs.	1833924	582536	1251388
95% CI	(.022; .023)	(.021; .023)	(.023; .024)
Gross salary			
Coefficient	-59	-33	-72
(s.e)	48,1	80,9	58,7
No. Obs.	1861925	595021	1266904
95% CI	(-185; 92)	(-334; 116)	(-199; 144)
Salary growth			
Coefficient	-0,00656	-0,0084	0,00162
(s.e)	0,00968	0,01124	0,01909
No. Obs.	161348	109474	51874
95% CI	(-.032; .0233)	(-.045; .021)	(-.039; .069)

Note: this presents the RD estimates for net salary, average tax rate (ATR), gross salary, and salary growth outcomes, adjusted for covariates of age, salary in December 2012, work history, and multiple jobs. Bandwidth below and above the cutoff = 5706.

The inclusion of covariates has little impact on the point estimates, suggesting that the treatment effects are robust to controlling for additional predetermined characteristics. The shorter confidence intervals for the net salary and ATR outcomes further demonstrate the efficiency gains achieved by adjusting for predetermined covariates.

5.3.2. Additional robustness checks

Table C.1 in the appendix summarizes the results of several additional robustness checks. The choice of bandwidth is one of the most consequential decisions in regression discontinuity analysis, as it influences both the bias and variance of the local polynomial estimator (Cattaneo

et al., 2020). A larger bandwidth reduces the variance but introduces more bias, while a smaller bandwidth minimizes bias but increases variance. Therefore, examining how results vary with different bandwidths is crucial for evaluating their reliability.

Panel A presents the main results using a common bandwidth of 5706 for all outcome variables, as selected by the MSE-optimal procedure. For comparison, Panel B reports results using outcome-specific bandwidths, where the bandwidth is optimized separately for each outcome. The estimates remain consistent across both specifications. To further assess sensitivity, Panel C uses the CER-optimal bandwidth, which prioritizes inference precision over bias minimization. The results remain similar, with confidence intervals slightly widened, reflecting the trade-off between bias and variance under this alternative bandwidth choice.

Another robustness check seeks to investigate how sensitive the results are to the response of units that are located very close to the cutoff (Cattaneo *et al.*, 2020). To test for this, I implement a donut hole approach, which excludes observations near the cutoff and re-estimates the treatment effects. Panel D excludes observations within a 250-unit margin of the cutoff, while Panel E excludes those within a 500-unit margin. The results remain stable, with the treatment effects very close to the main specification.

6. Conclusion

6.1. Summary and discussion

This thesis examines the gendered effects of Argentina's 2013 Personal Income Tax (PIT) reform, which introduced significant tax relief for workers earning below AR$15.000 (approximately USD 3.000) monthly. Grounded in a theoretical framework integrating gender-sensitive taxation principles and labour supply models, the analysis aimed to address two hypotheses: (1) the reform would disproportionately reduce the tax burden on women, narrowing the post-tax gender wage gap; and (2) women, due to higher labour supply elasticities, would exhibit measurable increases in labour supply at the intensive margin.

By leveraging the discontinuity at the income threshold created by the reform through a regression discontinuity design, this study estimates the reform's impact on two key groups of variables: post-tax wages (net salary and ATR) and labour supply at the intensive margin (gross salary and salary growth relative to August 2013). These variables serve to operationalize the effects of the reform on post-tax income and behavioural adjustments in labour supply. The

results demonstrate the mechanical impact of the 2013 tax reform on workers' net earnings and tax burdens while providing no evidence of behavioural responses in labour supply near the income threshold.

The findings reveal three key insights. First, the results reveal that the tax reform had a mechanical impact on workers' net earnings, with a small but significant local effect. Workers who remained subject to the tax experienced an average decline of AR$ 407 (approx 10 US dollars) in their net salary during the post-reform period. The treatment effect persisted over time, as demonstrated by the monthly analysis, with no significant temporal adjustments except for spikes in June and December that correspond to biannual bonus payments that are also subject to the tax.

Second, the analysis of the average tax rate (ATR) confirms that the reform slightly increased the effective tax burden. The ATR increased by approximately 2.3 percentage points for the treatment group, reflecting the reform's policy intent to exempt lower-income earners while maintaining tax contributions from higher-income individuals. However, the results do not provide evidence that the tax reform disproportionately reduced women's tax burden or narrowed the gender wage gap, as the estimated differences in coefficients between men and women were not statistically significant. Consequently, the results do not support the first hypothesis that reform would reduce women's tax burden more significantly than men's, resulting in greater relative net income gains for them.

Third, the analysis of gross salary —used as a proxy for labour supply adjustments—shows no significant effect at the cutoff. This result suggests that individuals did not adjust their labour supply, such as hours worked, in response to the reform. Similarly, salary growth shows no meaningful effect, further indicating the absence of dynamic adjustments in response to the tax change. Contrary to the second hypothesis, gender-disaggregated analysis did not show stronger labour supply responses among women, even though the literature suggests that women's labour supply tends to be more elastic.

The lack of significant labour supply adjustments can be attributed to several structural constraints. Workers at higher income levels often operate within rigid wage-hour packages and fixed working hours, which limit their ability to adjust their work hours in response to tax changes. These findings are consistent with prior literature suggesting that labor supply responses to income tax changes near thresholds are often minimal, as adjustment costs and institutional constraints prevent the immediate optimization of labor supply (Chetty *et al.*,

2011; Tortarolo *et al*., 2020). Moreover, firms and unions play a critical role in shaping job offers and wage-hour packages, responding to aggregate tax preferences in ways that further constrain individual adjustments.

While the theoretical framework suggests that women exhibit higher labour supply elasticity, the empirical evidence from this study does not support this prediction in the Argentine context. A potential explanation for these null findings is that women's relatively higher labour supply elasticity is insufficient to overcome structural constraints that limit their ability to adjust hours worked. These barriers, including rigid work schedules and limited job flexibility, constrain women's capacity to optimize labor supply in response to tax changes (Chetty *et al.*, 2011).

Additionally, the principle of individual taxation in Argentina may partially explain the lack of behavioural responses observed in this study. Unlike joint tax systems, which often penalize secondary earners by creating disincentives for their labor supply, the Argentine individual taxation system does not impose such penalties. Consequently, while the reduced tax rate for individuals earning below the threshold may lower their tax burden, the system itself does not discourage secondary earners from working more. This feature may also reduce the scope for significant labor supply adjustments at the intensive margin, as the reform does not substantially alter the economic incentives for secondary earners.

6.2. Limitations and recommendations for future research

Several limitations must be acknowledged to provide a more nuanced interpretation of the results. One of the key limitations is the lack of direct information on hours worked or other detailed measures of labour supply. Measuring the actual work effort of high-income earners is particularly challenging with the available data, as noted by Saez (2017). Gross salary is used as a proxy for labor supply adjustments in this study; however, it may not adequately capture small or nuanced changes in labor supply. Even if it is taken as a valid proxy it may fail to capture more nuanced dimensions of effort, particularly for higher-income individuals. These individuals—such as senior executives or self-employed workers—may adjust their work effort by being more creative, productive, or focused during their working hours, rather than by increasing the number of hours worked (Meghir & Phillips, 2010). Exploring new methodologies from the "New Tax Responsiveness" literature (Meghir & Phillips, 2010), which takes a broader view of effort and focuses on taxable income responses, future studies

could address this limitation by incorporating datasets with detailed information on hours worked or alternative proxies for effort productivity metrics or job performance indicators.

Another limitation is the absence of information on civil status and family composition, including the presence of children, which has two different implications for this study. First, this information would allow a more accurate tax liability calculation. Moreover, the information of who claims tax deductions within couples is also critical since deductions can lead to differing tax burdens for women and men, deviating from the officially stated tax rates. According to data from the Federal Public Revenue Administration (AFIP) for 2021, while 36,5% of men claiming income tax deductions did so for family dependents, only 23,4% of women claimed similar deductions (Larios & Méndez Santolaria, 2024).

Second, the literature suggests that the presence of children can be an important determinant of the elasticities. Mastrogiacomo *et al.* (2017) highlight that secondary earners with children and single parents tend to exhibit stronger labour supply responses, especially at the intensive margin. Additionally, controlling for family situations and the presence of children is known to significantly affect labour supply elasticity estimates for women (Evers *et al.*, 2008). Without this data, this study may miss important heterogeneities in labour supply responses based on family responsibilities. Future research should integrate information on civil status, family composition, and caregiving responsibilities to better capture these dynamics. Household-level data and administrative tax records that detail family deductions could illuminate the differential impacts of tax policy on various household types. While family information is available in Argentina's Household Survey, it lacks the accurate income data provided by the sample used in this study (See Section 4.1). Researchers must carefully weigh this trade-off when designing future studies.

Another branch of literature suggests that tax disincentives are particularly significant for lower-income families and households with substantial income inequality between members, especially when transitioning from part-time to full-time employment (Hayo & Uhl, 2015). Consequently, future studies could investigate the impact of income tax policy changes targeting lower earners, such as "*monotributistas*" who are subject to a distinct tax schedule.

6.3. Final remarks

This study provides valuable insights into the intersection of income tax and gender gaps in Argentina, contributing to the broader literature on gender and taxation. The 2013 tax reform,

while successful in reducing the tax burden on lower-income earners, did not yield evidence of reducing the relative tax burden on women or inducing meaningful labor supply adjustments.

Regarding its policy implications, this study contributes to the ongoing debate on the potential of tax policies to reduce gender gaps. While the results do not demonstrate significant gendered effects, the study's limitations—particularly the absence of detailed data on family composition, caregiving responsibilities, and work effort—preclude definitive conclusions. These limitations highlight the importance of richer datasets and more nuanced methodologies to fully understand how income taxes influence labor market dynamics for men and women.

Related research has suggested that more targeted policies—such as subsidized childcare, flexible work arrangements, or specific deductions for secondary earners—may better address the structural barriers that disproportionately limit women's labour supply (Suryani, 2022). In contrast, broad-based reductions in marginal tax rates may be unlikely to achieve the same effect, as they fail to directly account for the unique constraints faced by women in balancing work and family responsibilities (Mastrogiacomo *et al*., 2017). These insights call for a more comprehensive approach to fiscal policy research. Future research should explore these gendered dynamics using more comprehensive data sources, such as household-level information on caregiving responsibilities and detailed family composition. Additionally, examining the intersection of income tax systems with other policy domains—such as social protection, childcare support, and labor market flexibility—could provide a more holistic understanding of how to promote gender equity through fiscal policies.

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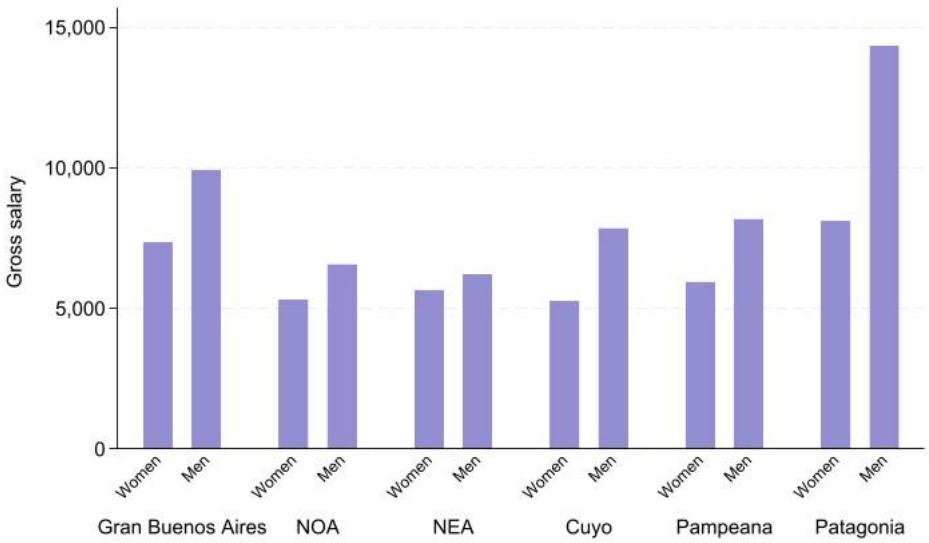
8. Appendix

A. Additional descriptive statistics

Figure A.1. Gross salary distribution by genders and regions



Note: This figure illustrates average gross salary by gender across different regions of Argentina.

Table A.2.: Descriptive statistics by income brackets

Income bracket	Pre reform			Post reform		
	Average wage	Average age	Female	Average wage	Average age	Female
<= 15K	6107,12	37,57	0,34	6833,099	37,32	0,34
15K-25K	18721,47	42,26	0,19	18801,23	41,23	0,22
> 25K	46478,43	44,7	0,15	44054,58	43,76	0,15

Note: Descriptive statistics are presented by income bracket. The pre-reform period is defined as January to August 2013, while the post-reform period covers September to December 2013.

Table A.3: Individuals subject to the PIT

	All	Men	Women
August 2013	49.366	38.872	10.494
September 2013	34.732	27.797	6.935

Note: Distribution of individuals subject to the tax in the pre- and post-reform months, categorized by gender.

Table A.4: Average gross salary in the pre- and post- reform periods

	All		Men		Women	
	Mean	**Std. Dev**	**Mean**	**Std. Dev**	**Mean**	**Std. Dev**
Pre-reform	7.652	12.362	8.338	14.046	6.176	7.353
Post-reform	11.621	18.893	12.632	21.229	9.445	12.184

Note: Average gross salary during the pre- and post-reform periods. The pre-reform period spans January to August 2013, while the post-reform period covers September 2013 to December 2014.

B. Manipulation test

Table B.1: RD Manipulation Test using local polynomial density estimation

c = 0.000	**Left of c**	**Right of c**
Number of obs	144813	43984
Eff. Number of obs	9827	8174
Order est. (p)	2	2
Order bias (q)	3	3
BW est. (h)	1704,525	1857,457

Running variable: income_centered.

Method	**T**	**P>|T|**
Robust	1,5201	0,1285

Note: This table shows the p-values of the RD manipulation test based on discontinuity in density using a local polynomial (Cattaneo et al., 2020). The test statistic for manipulation is T = 1.5201 with a p-value of P>|T| = 0.1285. To the left of the cutoff, there are 144,813 observations. To the right of the cutoff, there are 43,984 observations. The effective number of observations used in the test are 9,827 on the left and 8,174 on the right. The bandwidths for density estimation are h = 1704 on the left and h = 1857 on the right. The test uses a quadratic polynomial for estimation (Order est. (p) = 2) and a cubic polynomial for bias correction (Order bias (q) = 3).

C. Additional robustness checks

Table C.1: Robustness checks

	Net salary	ATR	Gross salary	Salary growth
A. Main specification				
Coefficient	-407	0.023	-44,8	-0,006
(s.e)	38,3	0,00023	52,7	0,00959
No. Obs.	2116103	2080954	2116103	185498
Robust 95% CI	(-512; -285)	(.022; .024)	(-173; 131)	(-.030; .025)
B. Outcome-specific bandwidths (MSERD)				
Coefficient	-407	0,022	-43,6	-0,00232
(s.e)	38,3	0,00016	52	0,01216
No. Obs.	2116103	2080954	2116103	185498
Robust 95% CI	(-512; -285)	(.022; .023)	(-208; 54)	(-.033; .0149)
C. Alternative bandwidth (CERD)				
Coefficient	-392	0,023	-16,7	-0,0029
(s.e)	54,2	0,00029	72,3	0,01312
No. Obs.	2116103	2080954	2116103	185498
Robust 95% CI	(-549; -224)	(.023; .024)	(-212; 213)	(-.052; .023)
D. Donut hole: Radius 250				
Coefficient	-406	0,022	-52,1	-0,00015
(s.e)	41,7	0,00034	59	0,01062
No. Obs.	2086215	2051254	2086215	182942
Robust 95% CI	(-522; -250)	(.021; .024)	(-206; 173)	(-.020: .049)
E. Donut hole: Radius 500				
Coefficient	-418	0,02227	-65,6	-0,00311
(s.e)	47,3	0,00045	68,3	0,01182
No. Obs.	2056710	2021959	2056710	180421
Robust 95% CI	(-592; -240)	(.021; .025)	(-294; 218)	(-.028; .058)

Note: Panel A presents the main results using a common bandwidth of 5706 for all outcome variables, selected through the Mean Squared Error (MSE)-optimal procedure. Panel B reports results using outcome-specific bandwidths, optimized separately for each outcome variable under the MSE-optimal framework. Panel C employs the CER-optimal bandwidth, which emphasizes precision in inference over bias minimization. Panel D explores the sensitivity of the estimates by excluding observations within a "donut hole" radius of 250 around the threshold. Panel E further expands the "donut hole" radius to 500. Across all panels, the results demonstrate that the estimated effects are robust to alternative bandwidth specifications and methodological adjustments.